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1 General

1.1 **GENERAL**

- .1 Unless specified otherwise, instructions and requirements specified in this section shall apply to all sections of the Work.
- .2 It is the responsibility of the Contractor to direct and implement all the Work shown and specified, including construction facilities and requirements specified herein.
- .3 Work specified in the Specification has been divided into technical sections for the purpose of ready reference. Division of Work among Subcontractors and Suppliers is solely the Contractor's responsibility and Consultant assumes no liability to act as an arbiter to establish subcontract limits between sections or divisions of Work.
- .4 Do not scale Drawings. Use dimensions indicated.
- .5 The General Requirements in this section are over and above the requirements listed in the City of Toronto Master Services Agreement; wherever there is an overlap or conflict, the more stringent requirement is to be followed.

1.2 **DEFINITIONS**

- .1 Provide: This term means to Furnish, supply, Install and connect, complete and in place, including accessories, finishes, tests, and services required to render item so specified complete ready for use.
- .2 Furnish: This term means fabrication or procurement of materials, equipment, or components, or performance of services to the extent specified and shown. Where used with respect to materials, equipment, or components, the term includes crating and delivery to Project site but is not intended to include installation of item, either temporary or final.
- .3 Install: This term means placement of materials, equipment, or components, including receiving, unloading, transporting, storage, uncrating and installing, and performance of such testing and finish Work as is compatible with degree of installation specified.

1.3 **EXAMINATION OF BID DOCUMENTS**

- .1 The Contractor shall have read all the Bid Documents in conjunction with one another and Consultant shall assume that they are in agreement. Contractor shall have examined all the Bid Documents as soon as possible after receipt thereof and if he had discovered any discrepancies, omissions, errors, ambiguities or conflicts in or among the Bid Documents, or be in doubt as to their meaning or intent, shall have brought the matter to the attention of the Consultant at least four (4) Business Days prior to the date set for receiving Bids.
- .2 The Contractor shall understand and agree that where a discrepancy in Products or systems between Consultant Drawings exists, Contractor shall have allowed in its Bid for the most expensive Product or system indicated, and a Request for Information (RFI) issued to the Consultant to clarify the issue at no increase in Contract Price.
- .3 Contractor shall avoid submitting RFI's on information readily available within the Contract Documents.

1.4 **WORK OF CONTRACT**

- .1 Work of this Contract comprises the supply of all material, equipment and labour necessary for the complete construction of new works, alterations and additions and all other related Work as shown on the Contract Drawings, specified herein or both, all in accordance with the terms of the Contract.

1.5 **SCHEDULING OF THE WORK**

- .1 The Contractor shall be required to start work immediately upon the execution of the Contract.
- .2 The Contractor shall include all costs on account of premium time or overtime required and all costs on account of premium prices required in order to obtain labour, plant, materials or equipment or other critical items including waiting time, double handling, after hours delivery and installation, protection of new and existing services at the site in order to meet the completion dates of the scope of work and the project completion date.
- .3 The Contractor shall include all costs on account of schedule interfacing, coordination and cooperation with other Contractors or Subcontractors who will be carrying out work during the progress of this Contract in order to meet the completion date for the work and the overall completion date of the project.
- .4 The Owner will not entertain hardship claims or tolerate delays and interruptions in the work.

1.6 **METHODS OF PROCEDURE**

- .1 All Work that interfaces with the existing building systems or Work that occurs within critical areas within the building, which include but are not limited to: IT spaces, UPS Rooms, Electrical Rooms, Mechanical Rooms, and Fire Safety Rooms require the production of a Methods of Procedure (MOP) document that must be submitted to the Owner and the Consultant for review and approval. Refer to MOP sample template attached.
- .2 The Contractor is responsible for the production of all Methods of Procedure documents necessary to complete the work. The Contractor shall include all costs associated with the production and revision of Methods of Procedures documents. The Contractor is responsible for all required revisions the Methods of Procedures documents so that they meet the approval of the Owner.
- .3 The Contractor shall include all costs associated with the production of a look ahead schedule that outlines all construction activities occurring within the next predetermined period of the Project. The duration of the schedule and the frequency with which the schedule will be updated shall be determined by the Owner and submitted to the Consultant and the Owner for review. The frequency of updates shall not be less than once in a two-week period. The determination as to which activities will require the production of Methods of Procedures documents will be based on the Consultant's and the Owner's review of the look ahead schedule.

1.7 **ADDITIONAL SECURITY**

- .1 Some of the buildings included in the scope of work will require security services during construction.

- .2 The Owner has existing contracts with three security companies. The Contractor is required to coordinate and engage with a security company as directed and specified by the Owner.
 - .1 Security company name and contact information will be provided as needed.
 - .2 The Owners reserves the right to direct the Contractor to provide their own security sub-contractor.
 - .1 Contractor to provide cost estimate prior to executing any sub-contract for security.
- .3 The above security services will be compensated by the Owner via the Cash Allowance.
- .4 TPS buildings not included
- .5 Toronto Police Service (TPS)
 - .1 The Contractor shall engage with Paid Duty Police to provide the necessary security monitoring for TPS buildings. Refer to the Toronto Police website at <http://www.torontopolice.on.ca/paidduty/> for additional information.
 - .2 Contractor to coordinate with the Paid Duty Police regarding secured access to building and rooms during construction.
 - .3 The Contractor must provide the TPS with all the necessary information that it requires to conduct and complete a security background check of the personnel assigned to this project including any Subcontractors.
 - .4 The background check must be completed before any Work commences.
 - .5 The background check will be completed by TPS after the recommendation of award has been approved. The successful Contractor and team (personnel and all Subcontractors) may also be required to have the team all sign non-disclosure confidentiality agreements. During the period of the agreement, the TPS reserves the right to ask that service provider personnel be removed from working within the TPS environment without advance notice. In such a case, the Contractor will immediately remove the individual from the Contract and replace them with a similar or more skilled individual who has successfully passed the TPS background security check, at no additional cost to the TPS or the Owner.
 - .6 Any building access cards that have been issued will remain the property of TPS and must be returned upon request. The TPS reserves the right acting in its sole discretion to disqualify any respondent, who in the opinion of the Service constitutes a security risk.

1.8 **DRAWINGS AND INSTALLATION**

- .1 The Drawings are intended to show the general character and scope of the Work and not necessarily the detail design, or exact details of the installation. Contractor shall provide all items, articles, materials, services and incidentals, including detail design with Drawings, whether or not expressly specified or shown on Drawings, to make finished Work complete and fully operational, consistent with the intent of the Contract Documents.

- .2 The Contractor shall supply and install all items of Work, goods and services that are listed or shown, or that may reasonably be inferred from the Contract Documents, as being required to produce the intended result.
- .3 The location, arrangement and connection of equipment and materials shown on the Drawings represent a close approximation to the intent and requirements of the Contract. The right is reserved by the Consultant to make reasonable changes required to accommodate conditions arising during the progress of the Work, at no extra cost to the Owner.
- .4 The location and size of existing services shown on the Drawings are based on the best available information. The Contractor shall ensure that the actual location of existing services be verified in the field before Work is commenced. Particular attention shall be paid to buried or concealed services and structures.
- .5 Changes and modifications necessary to ensure coordination and avoidance of interference and conflicts with other trades or to accommodate existing conditions, shall be the responsibility of the Contractor and made at no extra cost to the Owner.
- .6 The Contractor shall reimburse the Consultant for the latter's time spent on answering any questions or requests for information where the answer is clearly stated or shown on the Drawings or Specifications.

1.9 **EXISTING CONDITIONS**

- .1 In the case of renovation projects, certain new installations may be dependent upon existing conditions for support as indicated on Drawings. The Contractor shall, by way of a Site visit during Bidding period, carefully examine such existing conditions and satisfy itself as to the structural adequacy of such existing substrates. By commencing Work in the field, Contractor implies acceptance of existing conditions.
- .2 Acoustic Report
 - .1 For Accessibility Preliminary Template for Acoustics, refer to appendices.

1.10 **CULTURAL HERITAGE RESOURCES**

- .1 If cultural heritage resources (such as archaeological sites, artifacts, building and structural remains, and/or human burials) are encountered during performance of Work, contact Consultant immediately and suspend Work in immediate area until assessment has been completed by Ministry of Culture, Tourism and Recreation. Perform required measures to mitigate negative impacts on found resources to acceptance of Consultant.

1.11 **REGULATORY DOCUMENTS**

- .1 Nothing contained in the Drawings and Specifications shall be so construed as to conflict with any law, by-law or regulation of the municipal, provincial or other authorities having jurisdiction. Work shall be performed in conformity with all such laws, by-laws and regulations.
- .2 Contract forms, codes, Specifications, standards, manuals and installation, application and maintenance instructions referred to in the Specifications are to be of the latest published editions at the date of signing the Contract.
- .3 In addition to codes and standards specified in individual sections of the Specifications, comply with the latest edition of the following:

- .1 Association of Heating, Refrigeration and Air-Conditioning Engineers
- .2 American Society for Testing and Materials
- .3 Canadian Gas Association
- .4 Canadian General Standards Board
- .5 Canadian Standards Association
- .6 Illuminating Engineering Society of North America
- .7 National Building Code of Canada
- .8 National Fire Prevention Association
- .9 National Standards of Canada
- .10 Ontario Building Code
- .11 Ontario Hydro Electrical Safety Code
- .12 Ontario Ministry of the Environment and Climate Change
- .13 Ontario Ministry of Labour
- .14 Ontario Occupational Health and Safety Association
- .15 Underwriters' Laboratories of Canada

1.12 **PERMITS**

- .1 The Owner will apply and pay for the building permit. Contractor shall expedite and pick up the building permit.

1.13 **CONSTRUCTOR**

- .1 The Contractor shall be the "Constructor" as defined in the Occupational Health and Safety Act. As such, the Contractor shall be responsible for ensuring that the provisions of the statutes, regulations and by-laws pertaining to the duties, obligations, and safe performance of the Work in accordance with the obligations of the Constructor as set out in the Occupational Health and Safety Act are observed.

1.14 **MANDATORY PRE-CONSTRUCTION SITE MEETINGS**

- .1 After the tender award, the Contractor and applicable Subcontractor shall attend a pre-construction site meeting at each building address included as part of the Work.
- .2 Contractor shall bring their abatement Subcontractor to the pre-construction site meeting of buildings where abatement work is going to occur.

2 Environmental Protection

2.1 **GENERAL**

- .1 The Contractor shall be responsible for monitoring, reporting and ensuring the Work is done in compliance with the requirements of all environmental legislation and regulations governing the Place of the Project.

- .2 Protection of the environment in all aspects of the Project is of prime importance to the Owner.
- .3 Should the Contractor fail to comply with any environmental requirements when instructed, the Owner will undertake the corrective action and the costs for such corrective action shall be borne by the Contractor.
- .4 Directions given by the Owner or Consultant with respect to action to be taken to correct environmental deficiencies must be acted upon immediately.

3 Project Coordination

3.1 **GENERAL**

- .1 The Contractor shall ensure that the Contract Documents are fully coordinated with all trades involved in the Project.
- .2 The Contractor shall coordinate progress of the Work, progress schedules, submittals, use of Site, temporary utilities, construction facilities and construction Work, in conjunction with the progress of work of other Contractors.
- .3 The Contractor shall ensure all trades cooperate with and work together so that the Work will fit together and make a complete and satisfactory job in every detail. Ensure each Subcontractor maintains its own quality assurance program.
- .4 The Contractor shall comply with Owner's instructions for access to Owner occupied areas.
- .5 The Contractor shall coordinate with all government departments and agencies, Authorities Having Jurisdiction and utilities such as the City's Building Department, ESA, TSSA, Toronto Hydro, Enbridge Gas, but not limited to, and organize all required inspections and approvals for the completion of construction Work. It will be the full responsibility of the Contractor to ensure that all conditions of permits and approvals are met during construction Work and all permits are closed.

3.2 **CONSTRUCTION ORGANIZATION AND START-UP**

- .1 The Contractor shall comply with Contract requirements for staging areas of the Site; field offices and storage areas; access and parking facilities, and temporary utilities and construction facilities.
- .2 Refer to Division 00 and 01 for required staging.

3.3 **WORK SEQUENCE**

- .1 The Contractor shall coordinate the stages of Work to accommodate Project requirements during construction; and the sequence and direction of execution to meet Project schedule.
- .2 The Contractor shall coordinate the progress schedule with the Owner's requirements during construction.
- .3 The Contractor shall construct Work in stages or manner to provide for continuous operation of all facilities under this Contract. Do not close off public or Owner usage of any area of the Site which are not defined as part of the Contractor's work areas.

3.4 **COORDINATION AND INTERFERENCE DRAWINGS**

- .1 The Contractor shall coordinate placement of materials and equipment to ensure that all components will be properly accommodated within the spaces provided prior to commencement of Work.
- .2 The Contractor shall take complete responsibility for any remedial Work that results from failure to coordinate any aspect of the Work prior to its fabrication/installation.
- .3 The Contractor shall ensure that all accesses and clearances required by jurisdictional authorities and/or for easy maintenance of equipment are provided in the layout of equipment and services.
- .4 The Contractor shall prepare interference Drawings indicating the co-relation of the architectural, mechanical, electrical, security/communications and process systems and the building structure, and review with trades at Contractor's coordination meetings. Agree with trades on proposed installation and routing of systems prior to installation. Interference Drawings shall contain information based on reviewed Shop Drawings.
- .5 The purpose of the interference Drawings coordination is to enable efficient use of available space, proper sequencing of the Work, and to resolve conflicts or interferences at no extra cost to the Owner. The Contractor shall sequence the production and review of interference Drawings in advance of the actual Work being performed to allow construction to proceed as scheduled.
- .6 The Contractor shall prepare and distribute minutes of interference coordination meetings to all parties.

3.5 **CONTRACTOR'S USE OF PREMISES**

- .1 The Contractor shall carry out Work in such manner as to cause a minimum of noise or interference to adjacent properties. Secure the approval of authorities having jurisdiction before proceeding with any Work which may cause interference. Provide all necessary precautions to protect existing property and people.
- .2 To ensure coordination and communication is maintained between the Contractor, Owner, and building occupants, the Contractor is required to provide an up-to-date Construction Schedule and phasing plan to the building occupants 2 weeks prior to the start of Work. Day to day operations and housekeeping rules are to be discussed and adhered to by the Contractor. Schedule and Phasing plan to be discussed with the Owner and building occupants and revised as needed prior to commencing Work. Any changes to the Schedule and Phasing Plan are to be discussed first with the Owner and building occupants.
- .3 The Contractor shall coordinate use of premises with Owner and building end users to avoid interference with the Owner's normal operations of the facility. Day to day operations and housekeeping rules are to be discussed and adhered to by the Contractor.
- .4 The Contractor shall assume full responsibility for protection and security of Products and Work under this Contract.
- .5 The Contractor shall limit operations to the prescribed areas including installation operations, storage areas and movement of vehicles and equipment.
- .6 Access and egress to and from the Site of Work areas shall be by the prescribed routes only.

- .7 The Contractor shall allow free and unrestrictive access to the Site by Owner, Consultant or his Representatives, or by any authorized person representing the Owner, and allow them to enter upon and inspect any or all parts of the Work under this Contract.

3.6 **NOISE**

- .1 Construction Work undertaken shall not contravene the requirements of local noise and pollution by-laws and all other regulatory requirements. Any construction Work that requires drilling, cutting, coring or hammering, must be undertaken after hours and/or on weekends. No additional overtime charges will be paid for the Work performed after hours and/or on weekends.

3.7 **OWNER'S OCCUPANCY**

- .1 The Owner will occupy existing premises during entire construction period for execution of normal operations.
 - .1 The Contractor shall coordinate with the Owner in scheduling operations to minimize conflict and to facilitate Owner's usage.
 - .2 The Contractor shall provide an emergency contact list to the Owner and building occupants.
 - .3 Contractor shall allow for:
 - .1 Access for Owner's personnel
 - .2 Maintenance and use of parking facilities outside of the Contractor's areas as defined in the Contract Documents
 - .3 Owner's movement of equipment, vehicles and material
 - .4 Operation of HVAC, electrical systems and equipment

3.8 **SUPERINTENDENCE**

- .1 The Contractor shall provide the following full-time staff with responsibilities as stated below. All staff shall have relevant formal training and experience with similar Project size and complexity.
 - .1 Project Manager or Construction Manager and Site Supervisor whose responsibilities include managing all administrative aspects of the Project including administration of Contracts and changes with the Owner, the Subcontractors and Suppliers. This role will also include for administration of all Contract administration documents required by the Contract Documents including schedules, logs, reports, meeting minutes, RFI's, Site instruction, change orders, change directives, and monthly progress payment invoice. This person shall be on Site full time for the complete duration of the Project and must chair the site kick-off meeting, and the regular progress and coordination meetings. The Project Manager will be the main point of contact for the City and for the Consultant on this Project, shall maintain complete involvement, coordinate with all stakeholders (internal and external to the City) and attend regular construction progress on site bi weekly meetings.
 - .2 Site Engineer or Site Coordinator whose responsibility includes planning and coordination of the Work, review of submittals and Shop Drawings, maintaining as-built records, and assisting the Site Superintendent and Construction

Manager. This person shall be on Site full time for the complete duration of the Project.

- .2 The Contractor shall provide other foremen as necessary to direct and control the Work on Site, such personnel to be well experienced, competent in their specialized fields and having full knowledge and experience in directing the Work under their charge.
- .3 In addition to the full time Superintendent that the Contractor shall place in full charge of the Work on Site, ensure that each major Subcontractor maintains a full time Superintendent to be in charge and responsible for their respective Work and who shall report to the Contractor's site superintendent.
- .4 In addition to the above, a Representative of the Contractor is required to be present when work is occurring on a building.

4 Cutting and Patching

4.1 **APPROVALS**

- .1 The Contractor shall submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of any element of the 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.

4.2 **INSPECTION**

- .1 The Contractor shall inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, Contractor shall inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.

4.3 **EXECUTION**

- .1 The Contractor shall execute cutting, fitting, and patching to complete the Work.
- .2 The Contractor shall provide supports to assure structural integrity of surroundings; including devices and methods to protect other portions of the Project from damage.
- .3 The Contractor shall employ appropriate trades with skilled labour to perform cutting Work.
- .4 Cut materials using proper equipment and methods.
- .5 The Contractor shall remove and replace defective and non-conforming Work.
- .6 The Contractor shall execute Work to avoid damage to other Work.
- .7 Prepare proper surfaces to receive patching and finishing.

- .8 Fit all Work segments together to integrate with penetrations through surfaces and with other Work.
- .9 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .10 At penetration of fire-rated wall, ceiling, or floor construction, completely seal voids with fire-rated or fire-resistant material, specified to the full thickness of the construction element.
- .11 Refinish surfaces to match adjacent finishes; for continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.
- .12 Where Drawings indicate or Specifications call for items to be relocated, perform Work to the same quality of workmanship specified for new Work. Replace damaged or missing items at no extra cost to the Owner. Provide new fasteners; for exterior, use stainless steel.

5 Field Engineering

5.1 **NOT USED**

6 Project Meetings

6.1 **ADMINISTRATIVE**

- .1 The Consultant will schedule and chair bi-weekly Project meetings throughout the progress of the Work.
- .2 The Consultant will record the minutes of the meetings. Minutes to include significant proceedings and decisions and identify "action by" parties. Meeting minutes will be issued to all attendees within 42 hours after the meeting is concluded.
- .3 Representatives of Contractor, Subcontractor and Suppliers attending meetings shall be qualified and authorized to act on behalf of the party each represents.
- .4 The Contractor shall present, at each meeting, scheduled Work activities in the format acceptable to the Owner. Contractor to prepare and issue Work performance dashboards to be included in the meeting minutes. Dashboards are to visually convey key performance indicators, Work progress, financial information, outstanding issues, risks, achievements etc. Refer to Section 01 10 00.2 for a Dashboard Template that the Contactor shall use.

6.2 **KICK-OFF MEETING**

- .1 The Consultant will arrange a kick-off meeting immediately upon award of Contract. Attendance by authorized Representatives of Owner, Consultant and Contractor is mandatory. The purpose of this meeting is to commence the Work under this Contract, to acquaint the Contractor's and Owner's designated personnel with each other, and to discuss methods and means by which full cooperation and coordination of all participants can be achieved during the execution of the Work.

6.3 **SAFETY MEETING**

- .1 The Contractor shall conduct safety meetings as required by the Owner and OHSA.
- .2 Agenda may include the following:

- .1 Safe work practices
- .2 Accident reporting and investigations
- .3 Health and safety inspections
- .4 Health and safety committees
- .5 Orientation and training
- .6 Emergency preparedness

6.4 **PROGRESS AND COORDINATION MEETINGS**

- .1 The Consultant will conduct and record bi-weekly progress and coordination meetings and other extraordinary meetings as may be required from time to time by the Owner.
- .2 Agenda may include the following:
 - .1 Review, approval of minutes of previous meeting;
 - .2 Review of Work progress since previous meeting;
 - .3 Field observations, problems, conflicts and interferences
 - .4 Problems which impede construction schedule;
 - .5 Review of off-site fabrication delivery schedules;
 - .6 Corrective measures and procedures to regain Project schedule;
 - .7 Revisions to construction schedule;
 - .8 Progress, schedule, during forthcoming work period;
 - .9 Review submittal schedules; expedite as required;
 - .10 Maintenance of quality standards;
 - .11 Pending changes and substitutions;
 - .12 Review proposed changes for effect on construction schedule and on completion date;
 - .13 Other business.

7 Submittals

- .1 Refer to Section 01 33 00 Submittal Procedures.

7.2 **MONTHLY EARNED VALUE PROGRESS**

- .1 With each monthly progress claim provide an "S" curve indicating the actual earned progress compared against the planned earned progress.

7.3 **REQUEST FOR INFORMATION (RFI)**

- .1 Requests for Information shall be completed and submitted by the Contractor if items are not indicated on the Drawings or contained in the Project Manual that is required to

properly perform the Work. RFI's shall include a detailed written statement that indicates the specific Drawings or specification sections that require clarification.

- .2 Upon receipt of a RFI the Consultant will provide a response to the Contractor within five Business Days. Business Days are considered Monday to Friday.

7.4 **CONTEMPLATED CHANGE ORDERS**

- .1 The Contractor shall prepare, as a minimum, a detailed, itemized Contemplated Change Order breakdown in accordance with, but not limited to, the requirements below. Subcontractor or Material Supplier pricing shall follow the same requirements.

- .1 Labour: Include hourly wage, number of hours including overtime.
- .2 Equipment rentals: No rental charges will be allowed for hand tools, minor equipment, etc.
- .3 Materials: Material purchased by the Contractor and incorporated into the Work, showing costs, quantities or unit prices of all items, as appropriate.
- .4 Delivery charges for material or equipment.
- .5 Overhead and taxes.

- .2 The following shall *not* be included in a Contemplated Change Order breakdown:

- .1 Owned equipment costs.

- .3 The Contract Administrator or the Owner reserves the right to request reasonable additional information to support the Contemplated Change Order.

8 Schedules

8.1 **SCHEDULES REQUIRED**

- .1 One Group Construction schedule by building with all tasks and critical path shown for the entire Group.
- .2 Detailed building Schedules with all tasks and critical path shown.
- .3 Work schedule with workforce loading.
- .4 Submittal Schedule for System Design and Engineering, Shop Drawings, Product Data, As-Built Drawings, Operating and Maintenance Manuals, Samples.
- .5 Delineation Plan

8.2 **SUBMISSION**

- .1 The Contractor shall submit initial schedules within seven days after award of Contract.
- .2 Consultant and Owner will review schedule and return reviewed copy within ten (10) Business Days after receipt.
- .3 The Contractor shall resubmit finalized schedule within three days after return of reviewed copy.
- .4 Submit updated progress schedule with each application for payment and as otherwise instructed by Owner.

- .5 Distribute copies of the reviewed schedule to job Site, Subcontractors and other concerned parties.

8.3 **RESPONSIBILITY**

- .1 The Contractor shall perform overall planning and control of the Project.
- .2 Plan and schedule the Work to provide a continuous and efficient flow of the Work to achieve the Contract completion date.
- .3 The Contractor shall develop a detailed schedule as previously described, based on sequencing, phasing, and direction of installation required by the Project.
- .4 At the regular scheduling meetings, The Contractor shall report on the actual progress of each element of Work, including work of Subcontractors.
- .5 The Contractor shall report on firm established delivery and/or start dates for all critical material and equipment, of own trades and of Subcontractors. Immediate notice shall be given to the Owner of all problems or anticipated problems in respect of deliveries of critical materials or trade operations.

8.4 **CONSTRUCTION SCHEDULES**

- .1 The Contractor shall prepare and submit to the Owner a detailed schedule. Schedule shall be created using the scheduling software Microsoft Project at no extra cost to the Owner, based on sequencing, phasing, and direction of installation required by the Project.
 - .1 Prepare schedule in the form of a horizontal bar chart and with manpower loading figures based on average weekly loading.
 - .2 Provide a separate bar line for each trade or operation. Identify all tie-ins to Owner's existing facilities.
 - .3 Provide horizontal time scale identifying the first work day of each week.
 - .4 Format in chronological order of the start of each item of Work.
 - .5 Format schedules to allow plotting of actual progress against scheduled progress.
- .2 Update for progress and submit weekly or as requested by Owner.

8.5 **WEEKLY SCHEDULE WITH MANPOWER LOADING**

- .1 For weekly coordination meeting provide a detailed two-week work schedule outlining Work activities and manpower requirements (by trade) planned for that period. Update and submit weekly.
- .2 Identify problems on the past week's operation and submit proposed solutions at coordination meetings.

8.6 **SHOP DRAWINGS AND PRODUCT DATA**

- .1 Contractor's detailed schedule of Work or a separate schedule shall identify the development and submission of Shop Drawings and submission of Product data.

- .2 The Contractor shall provide Shop Drawings in the form specified and in an orderly sequence as directed by the Consultant.
- .3 The Contractor to shall provide sufficient information for comprehensive review of Shop Drawings.
- .4 At the start of the Project, review the Contract Documents and compile a submittal schedule which shall include all submittals required by the Contract Documents. Coordinate the submittal schedule with the construction schedule, show all scheduled dates the submittals are to be submitted, and the latest review return date from the Consultant.
- .5 At the time of submission, the Contractor shall notify the Owner in writing of deviations in Shop Drawings from the requirements of the Contract Documents.
- .6 Shop Drawings and all other submittals to be issued to the Consultant via OnWare.
 - .1 OnWare is a browser Contract Administration software the Consultant is using exclusively for the program.
 - .2 The Consultant will provide access and log information to the Contractor prior to the start of Work.
- .7 Shop drawings and all other submittals issued in any other form outside of OnWare will not be accepted
- .8 Upon receipt of a Shop Drawing the Consultant will provide a response to the Contractor within ten Business Days. Business days are considered Monday to Friday.

8.7 **DELINEATION**

- .1 The Contractor shall coordinate with other contractors at the facility and arrange for delineation in time and space as required for the completion of construction Work. There could be multiple contractors performing Work at the facility. No additional/overtime charges will be paid if the construction Work is delayed because of coordination with other contractors performing Work at the facility.
- .2 The Contractor shall develop Construction Delineation Plan and implement to ensure that delineation in both time and space is established and maintained among two or more Contractors. Additionally, ensure site coordination during construction Work activities performed at the facility and that there is only one Constructor (Contractor) at the facility at any point in time in the construction Work area.

9 **Quality Control**

9.1 **INSPECTION AND TESTING BY CONTRACTOR**

- .1 The Contractor shall be responsible for inspection and testing as required by the Contract Documents, statutes, regulations, by-laws, standards or codes or any other jurisdictional authority. Give the Consultant timely notice of the readiness for inspection, date and time for such inspection for attendance by the Consultant.

9.2 **INSPECTION AND TESTING BY INDEPENDENT AGENCIES**

- .1 Independent inspection/testing firms may be engaged by Owner for the purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Owner.

- .2 Employment of inspection/testing firms does not relieve the Contractor's responsibility to perform Work in accordance with Contract Documents. Defective materials and/or workmanship may be rejected, regardless of previous inspection, whenever found.
- .3 The Contractor shall provide assistance required for executing inspection and testing by the appointed firms. Allow access and facilities for inspection and testing.
- .4 If defects are revealed during inspection and/or testing, the Owner will request additional inspection and/or testing to ascertain the full degree of the defect. Correct defects and irregularities as advised by Owner at no cost to Owner. Pay costs for retesting and re-inspection.

9.3 **PROCEDURES**

- .1 The Contractor shall allow inspection/testing agencies access to the Work on the Site, at off-site manufacturing and fabrication plants.
- .2 The Contractor shall notify the appropriate agency and Owner and Consultant in advance of the requirement for tests, in order that attendance arrangements can be made.
- .3 The Contractor shall submit samples and/or materials required for testing. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the Work.

9.4 **REPORTS**

- .1 Copies of inspection and test reports will be issued to prime Contractor, Owner and Consultant.
- .2 The Contractor shall provide copies to Subcontractor of work being inspected/tested.

9.5 **EQUIPMENT/SYSTEMS**

- .1 The Contractor shall submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

10 Temporary Construction Facilities and Controls

10.1 **INSTALLATION/REMOVAL**

- .1 The Contractor shall provide construction facilities and temporary controls to execute the Work expeditiously.
- .2 The Contractor shall remove from Site all such Work after use.

10.2 **GUARD RAILS, BARRICADES AND TRAFFIC CONTROL**

- .1 The Contractor shall provide secure, rigid guard railings and barricades where required for protection of Work, workers and public.
- .2 The Contractor shall provide flag-persons, traffic signals, flares, lights or lanterns as required to perform the Work and protect the public.
- .3 Provide as required by governing authorities.

10.3 **CONSTRUCTION TRAILERS AND TEMPORARY BUILDINGS**

- .1 Where applicable, Provide temporary facilities, including but not limited to washroom, locker rooms and office space. If required, move existing equipment into the temporary

facility to ensure continuity of space use. Provide signage and ensure the path of travel to temporary facilities is kept clean and safe for all building occupants.

- .2 Stay within the working limits defined in the Contract Documents. If the Contractor can prove that there are additional or alternate requirements, the Contractor shall define the extent of space required for construction trailers, laydown areas, storage containers or buildings, construction access roads, etc. and submit a proposal to the Contract Administrator for review and approval.
- .3 Where not available, Provide means of storage and protection of furniture, equipment and existing Work moved or altered to facilitate construction.
- .4 Locate construction trailers, laydown areas, and temporary buildings as arranged with the stakeholders and Contract Administrator.
- .5 When temporary building facilities and/or laydown areas are no longer required, promptly remove all contractor equipment, including all construction waste, unless otherwise specified or directed. Restore all areas to conditions at start of Contract to the satisfaction of the Contract Administrator.

10.4 **HOARDING**

- .1 Provide hoarding where required to protect the public, workers and private property from injury or damage.
- .2 Provide protection from damage for all existing trees and plants that are not indicated to be removed.
- .3 Install hoarding, fencing, barriers and dust-tight partitions to protect the parts of the building that are not under construction.
- .4 Provide and maintain, at all times, appropriate protection to fully weatherproof areas of the facility which may become exposed due to demolition, removals, and construction. Prevent ingress of water, snow, etc., into the interior or building components. All costs for clean-up and restoration of damages resulting from failure to comply are the responsibility of the Contractor.
- .5 All Furniture, Equipment and existing Work moved or altered to facilitate construction or movement of material or equipment to be stored and protected with dust-tight covers. Storage space to be provided by the Contractor where not possible to store on site. All Furniture, Equipment and existing Work to be subsequently returned to its original location by the Contractor.

10.5 **DUST TIGHT SCREENS**

- .1 The Contractor shall provide dust tight screens or partitions to localize dust generating activities and for the protection of workers, finished areas of the Work and the public.
- .2 The Contractor shall maintain and relocate protection until such Work is complete.

10.6 **ACCESS AND CONSTRUCTION PARKING**

- .1 The Contractor shall use entrance, exits and on-Site routes as directed by Owner.
- .2 Parking is not permitted on any Site. Contractor to arrange for their own parking. Comply with the Owner's requirements for daily site access.

- .3 Before Contractor enters the Site with his vehicles or equipment, he shall coordinate with the Owner and appropriately barricade, stake off or snow fence the access routes and storage areas and around the construction area in order to prevent damage to buildings, grounds, plantings, turf and surrounding facilities at the Site, and to restrict unauthorized persons from entering the construction area. The Contractor shall be responsible for making good any and all damages caused by his operations on Site. Restoration of such damages shall be to the original condition or better, and to the satisfaction of, and at no extra cost to, the Owner.

10.7 **USE OF THE WORK**

- .1 Confine the Work and the operations of employees to limits indicated by the Contract Documents. Do not unreasonably encumber the premises with Products.
- .2 Storage of material shall be outside of the building with exception of material for each day's work requirements.
- .3 Fabrication shops shall not be set up within the building except as directed by the Owner.
- .4 Do not load or permit to be loaded any part of the Work with a weight or force that will endanger the Work.
- .5 The Contractor shall be responsible for careful and reasonable use of any Owner-supplied water and power.

10.8 **TEMPORARY SIGNAGE**

- .1 Ensure that employees and the public are informed of the Work being performed in the work area a minimum of 5 days in advance of Work commencing and that signage is installed noting the nature of Work being performed, anticipated start and end dates and any dangers that may result from the Work.
- .2 Replace existing signage as it is removed in the course of the Work with temporary signage. Replace with new signage where indicated on Drawings upon completion of the Work.
- .3 Fabricate temporary signage from corrugated plastic. Where required, add grommets for installation.

10.9 **SANITARY FACILITIES**

- .1 The Contractor shall provide weatherproof sanitary facilities as required portable, trailer type washrooms which consist of flush toilets and wash basins in accordance with local health and other authorities.
- .2 The Contractor shall maintain in clean condition.
- .3 Contractors and Subcontractors are not allowed to use the buildings existing facilities.

10.10 **WATER SUPPLY**

- .1 For water required for construction, refer to City of Toronto Master Services Agreement.

10.11 **TEMPORARY POWER AND LIGHTING**

- .1 Refer to the City of Toronto Master Services Agreement.

10.12 **EQUIPMENT/TOOL/MATERIALS STORAGE**

- .1 The Contractor shall provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials. Locate as directed by Owner.
- .2 The Contractor shall locate materials not required to be stored in weatherproof sheds on Site in a manner to cause the least interference with Work activities, as directed by Owner.

10.13 **SECURITY**

- .1 Be responsible for the security of Work and material supplied, stored and installed until all Work is complete and accepted by Owner.
- .2 Any security guard patrol or service provided by Owner is for the protection of the Owner's interest in the Work on the Site, and shall not relieve the Contractor of his responsibility to protect the Work of the Contract.

10.14 **PROJECT CLEANLINESS**

- .1 Refer to CCDC2, 2008 Article 3.13 of General Conditions.
- .2 The Owner reserves the right to perform clean-up Work not expeditiously completed by the Contractor and deduct such costs from the Contract Price.

10.15 **COVID 19 PROTOCOL**

- .1 The Contractor shall take all necessary precautions to minimize the risk of COVID-19 transmission and illness to themselves, workers and others at the construction site as well as the public sharing common spaces or accessing areas of the project after turn-over.
- .2 The Contractor shall establish and implement a site- specific COVID-19 safety plan that outlines the policies and procedures that reflect the guidance from the following:
 - .1 City of Toronto Public Health "COVID-19 Guidance" document "COVID-19 Guidance for Workplaces and Businesses". Refer to Appendix.
 - .2 CCA Document "COVID-19 Standardized Protocols for All Canadian Construction Sites". Refer to Appendix.
 - .3 The City of Toronto Health Officer, Provincial Health Officer and Federal Health Officer recommendations and regulations in force at the time.
- .3 Prior to the start of construction, The Contractor shall develop cleaning and decontamination procedures for all common areas and surfaces. A written plan shall be submitted for review a minimum of 2 weeks prior to construction. The procedures must cover all areas including trailers, gates, equipment, vehicles, all high-touch surfaces such as door handles, counters, cabinet doors, elevator buttons, light switches, faucets, toilet handles, hand rails, touch screen surfaces, keypads and other locations described in the referenced documents and as advised by public health authorities. Procedures shall be posted at all entry points to the site and throughout the project site.
- .4 The Contractor shall establish health screening of all personnel on site. This includes screening prior to entry and exit of the worksite.

- .5 The Contractor shall provide adequate hand-washing facilities on site for all workers. Ensure that washing facilities are visible and easily accessed. Install Wash Station at project sites without ready access to an indoor bathroom / washing facility.
- .6 Practice social distancing, including modifying workspaces and common areas where necessary.
- .7 The Contractor shall develop a preparedness and response plan if someone becomes ill with the symptoms of COVID-19.
- .8 The Contractor shall submit bi-weekly reports documenting the measures that were undertaken in the previous period. Submit the report prior to each bi-weekly construction meeting, and attach a copy of the report to the meeting minutes.

10.16 **ROAD CLEAN-UP**

- .1 The Contractor shall take all precautions to avoid depositing materials, debris and mud on the Owner's roadways and parking areas and on roads and streets adjoining the Owner's property from vehicles and equipment operating to and from the construction Site, and be responsible for removal of such deposits by brooming and washing.

11 Fire and Life Safety

11.1 **SAFETY PLAN**

- .1 The Contractor shall submit to the Owner for review, prior to the Commencement date or as directed by the Owner, the following:
 - .1 The Contractor's occupational health and safety policy and procedures.
 - .2 The Contractor's site-specific safety plan and associated procedures.
 - .3 The site-specific emergency response plan listed below:
 - .1 Site-specific emergency response plan guideline.
 - .2 Emergency Response Planning for Construction Projects by the Provincial Labour-Management Health and Safety Committee.
 - .4 The site-specific traffic control plan.
 - .5 The Contractor's site orientation package.

11.2 **TRAINING, AWARENESS AND ORIENTATION**

- .1 The Contractor shall provide the Owner, Consultant and visitors to the Site, training, awareness, orientation, or familiarization in advance of Site visit.

11.3 **FIRE PROTECTION**

- .1 The Contractor shall provide and maintain temporary fire protection equipment e.g. portable fire extinguishers, during performance of Work required by authorities having jurisdiction, governing codes, regulations and by-laws, to the satisfaction of the Owner and all local and insurance authorities in order to protect the property of the Owner and the Contractor against fire hazards during construction.
- .2 Bulk storage of flammable liquids and other hazardous materials is not allowed on the Site.

- .3 Flammable liquids must be handled in approved containers.
- .4 The bringing in, use, and disposal of gasoline, benzene or other flammable materials shall be handled with good and safe practice as required by authorities having jurisdiction.
- .5 The Contractor shall provide fire extinguishers of the non-freezing chemical type in each temporary building, enclosure, and trailer.
- .6 The Contractor shall use fire-proofed tarpaulins.
- .7 A fire watch shall be required for each of the following activities regardless of the number, duration, or size of the activity in operation on a single floor:
 - .1 Any open flame activities (e.g. soldering and welding);
 - .2 Shutdown of fire detection system;
 - .3 Shutdown of sprinkler system;
 - .4 Connection to drain line.

11.4 **OCCUPATIONAL HEALTH AND SAFETY**

- .1 Safety is of prime importance on this Project.
- .2 The Contractor shall conform to safe Work practices in accordance with regulations and authorities having jurisdiction.
- .3 The Contractor shall promptly report to Owner all accidents or if any claim is made by anyone against the Contractor or Subcontractor on account of any accident.
- .4 The Contractor shall provide at the Site, equipment to supply first aid service.
- .5 The Contractor shall enforce proper Work methods and act immediately on directions regarding safety and Work practices given by authorities having jurisdiction or the Owner at no additional cost to Owner.
- .6 Failure of Contractor to comply with verbal or written instructions or orders from the Ministry of Labour inspector or other authorities as well as instructions from the Owner or Consultant regarding safe Work practices or provision of specified requirements under the act shall be considered non-compliance of the Contract.
- .7 The Contractor shall maintain on Site a copy of the latest edition of the "Occupational Health and Safety Act, Construction Projects, issued April 2009", and "Occupational Health and Safety Act, Industrial Establishments, issued October 2006".
- .8 The Contractor shall ensure that all personnel are adequately equipped to comply with safety regulations and that sufficient safety equipment is available.
- .9 Lack of equipment will not be reason for non-compliance.

11.5 **SAFETY SUPERVISOR**

- .1 The Contractor shall designate a senior employee as Contractor's safety supervisor.
 - .1 Duties will include involvement in training, instruction, planning, safety patrols, and enforcement of rules.

- .2 The Contractor shall provide name and telephone number (site, office and residential) to Owner.
- .2 The Contractor shall ensure that a designated person is certified by IHSA (Infrastructure Health and Safety Association).
- .3 The designated safety supervisor must be familiar with Workplace Hazardous Materials Information System (WHMIS) regulations and be responsible for compliance.
- .4 The Contractor shall ensure that Controlled Products shall be properly labeled.
- .5 The Contractor shall provide proper warning labels and training at the workplace.
- .6 The Contractor shall provide copies of material safety data sheets for any controlled Product in the workplace.
- .7 The Contractor shall be responsible for all other requirements of the regulations as applicable to employers.
- .8 Before commencing any Work on the Site, The Contractor shall attend Owner's safety orientation meeting and provide Owner with a proposal as to how hazardous materials will be stored and dispensed on the Site area, in addition, specifically outline the measures which Contractor will undertake to prevent damage or injury in the event of an accidental spill.
- .9 The Contractor's "Handling Procedure" will be provided no later than ten days following the health and safety orientation meeting.

12 Material and Equipment

12.1 **PRODUCTS - GENERAL**

- .1 The Specifications may contain Product brands that form the basis of some design, and the Specifications will explicitly state so. Such "basis of design" Products are indicated as first listed item in the Product Specifications.
 - .1 Other listed manufacturers' Products are acceptable only on the condition that they comply with, or are modified as necessary, to comply with specified and indicated requirements and conform to quality levels and functional requirements of "basis of design" Product.
 - .2 Inclusion of a manufacturer's model number does not void any specified or indicated requirements.
- .2 When manufacturers' catalogued trade name and model number is specified for a Product, any specified Product will be acceptable.
- .3 When a Product is specified by reference to a standard only, any Product that meets the specified standard may be selected. Products meeting minimum reference standards will be accepted subject to the Consultant's review for compliance with the Specifications.
- .4 When a Product is specified by performance Specification without manufacturers specified, any Product meeting the requirements of the Specification may be accepted subject to Consultant's review.
- .5 Unless otherwise indicated in the Specifications, maintain uniformity of manufacture for any particular or like item throughout the Work.

12.2 PRODUCT AND MATERIAL QUALITY

- .1 Products, materials, equipment, and articles referred to as Products throughout the Specifications incorporated in the Work shall be new, not damaged or defective, and of the best quality compatible with Specifications for the purpose intended. If requested, furnish evidence as to type, source and quality of Products provided.
- .2 Defective Products will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is a precaution against oversight or error. Remove and replace defective Products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Unless otherwise indicated in the Specifications, maintain uniformity of manufacturers for any particular or like item.

12.3 SUBSTITUTIONS

- .1 Refer to Section 01 62 01 Substitution Request Form.

12.4 EXPEDITING

- .1 Immediately after award of Contract, The Contractor shall review Product delivery requirements and anticipate foreseeable supply delays for any item. If delays in supply of Products are foreseeable, notify the Owner of such, in order that substitutions or other remedial action may be authorized in sufficient time to prevent delay in performance of Work.
- .2 In the event of failure to notify the Owner at commencement of Work and should it subsequently appear that Work may be delayed for such reason, the Owner reserves the right to substitute more readily available Products of similar character at no increase in Contract Price.
- .3 The Contractor shall utilize Canadian materials and Products if available and equivalent in price and quality.
- .4 The Contractor shall submit, when requested by Owner, an updated material procurement/expediting record clearly indicating the status of material delivery and fabrication. Particulars to be covered by this record shall include the item identification, sub-vendor, order date, order number, Shop Drawing submission date(s) and review date(s), required delivery date, promised delivery date, date received, date checked and general remarks.
- .5 The Contractor shall accumulate and submit similar records from (assigned) Subcontractors and ensure that Subcontractors are properly and frequently expediting all equipment and material to meet delivery deadlines to suit installation schedule.
- .6 Allow the Owner or their Representative free access to the Contractor's plant and to Subcontractor's plants for visual inspection of allotted material and/or progress of the Work.

12.5 TRANSPORTATION

- .1 The Contractor shall pay transportation costs to Site of Products required in the performance of Work.

12.6 **STORAGE, HANDLING AND PROTECTION**

- .1 The Contractor shall handle and store Products in a manner to prevent damage and deterioration.
- .2 The Contractor shall remove and replace damaged Products at own expense and to the satisfaction of Owner.

12.7 **WORKMANSHIP**

- .1 Workmanship shall be the best quality, executed by workers experienced and skilled in the respective duties for which they are employed.
- .2 The Contractor shall immediately notify the Owner if required Work is such as to make it impractical to produce required results.
- .3 Do not employ any unfit person or anyone unskilled in their required duties. The Owner reserves the right to require the dismissal from the Site of workers deemed incompetent, careless, insubordinate, or otherwise objectionable.

12.8 **CUTTING AND REMEDIAL WORK**

- .1 Refer to article - Cutting and Patching.

12.9 **FASTENINGS**

- .1 The Contractor shall provide metal fastenings and accessories in same texture, colour and finish as adjacent material unless indicated otherwise.
- .2 The Contractor shall prevent electrolytic action between dissimilar metals and materials.
- .3 The Contractor shall use non-corrosive hot dipped galvanized steel fasteners and anchors for securing exterior Work, unless stainless steel or other material is specifically requested in the affected Specification section.
- .4 Space anchors within their load limit or shear capacity and ensure that they provide positive permanent anchorage. Wood or any other organic material plugs are not acceptable.
- .5 The Contractor shall keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

12.10 **PROTECTION OF WORK**

- .1 The Contractor shall adequately protect Work completed or in progress. Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by the Owner, at no increase in Contract Price.
- .2 The Contractor shall prevent overloading of any part of the Work or building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of the Owner.
- .3 The Contractor shall maintain and monitor protection of roofing membrane when Work is done on or above finished roofing system.

12.11 **EXISTING UTILITIES**

- .1 Connect to existing services or utilities at times directed by Owner or local governing authorities, with a minimum of disturbance to Work, building occupants, pedestrian and vehicular traffic.
- .2 The Contractor shall protect and maintain existing active services. When inactive services are encountered cap off in a manner approved by authority having jurisdiction and stake or otherwise record location of capped service.

13 Systems Demonstrations

13.1 **NOT USED**

14 Contract Closeout

14.1 **FINAL CLEANING**

- .1 When the Work is substantially performed, the Contractor shall remove surplus Products, tools, construction machinery and equipment not required for the performance of the remaining Work. Final cleaning shall include, but are not limited to the following:
 - .1 Remove waste materials and debris from the Site at regularly scheduled times or dispose of as directed by the Owner. Do not burn waste materials on Site, unless approved by the Owner.
 - .2 Use professional cleaners for final cleaning. Use only cleaning material recommended by manufacturer of surface to be cleaned.
 - .3 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation system is not permitted for this purpose.
 - .4 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on previously cleaned surfaces
 - .5 Remove dirt and broom clean, wash and sweep exterior walks, steps and paved surfaces. Leave exterior Work broom clean before the inspection process commences.
 - .6 Remove dust, dirt and other foreign disfigurements from exposed surfaces.
 - .7 Vacuum clean and dust building interiors, behind grilles, louvers and screens. Leave Work vacuum-clean before the inspection process commences.
 - .8 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, mechanical and electrical fixtures and equipment. Replace broken, scratched or disfigured items at no extra cost to the Owner.
 - .9 Remove grease, stains, spots, marks, dust and dirt from decorative Work, electrical and mechanical fixtures, furniture, fittings, and walls and floors.
 - .10 Remove from building and site, snow and ice that would prevent operation and activities of the facility.

14.2 **WARRANTY**

- .1 Refer to Division 00 for Warranty information.

14.3 **DOCUMENTS**

- .1 The Contractor shall submit close-out documents to the Consultant and the City of Toronto in electronic and printed copy formats within 45 days of the issuance of Substantial Performance. Provide electronic copies and printed in 3-ring binders of close-out documents to the Consultant for prior review. Closeout documents submissions includes, but is not limited to:
 - .1 As-Built Drawings in electronic (USB) AUTOCAD live files as per the latest drawing standard.
 - .2 Notice of Project
 - .3 Health & Safety Pre-start report and Policy.
 - .4 Project Schedules
 - .5 Warranties and bonds, including the Two-Year Warranty Certification.
 - .6 Section 01 33 00 Submittal Procedures: Shop Drawings, As-Built Drawings, Building Manuals, Operation and Maintenance Manuals, Samples.
 - .7 Change Orders and Change Directives
 - .8 Testing and inspection certificates required by municipal, provincial and other authorities having jurisdiction.
 - .9 Final adjustment in cash allowances.
 - .10 Product data, materials and finishes and related information.
 - .11 Commissioning reports.
 - .12 Individual Specifications sections: Specific requirements for operation and maintenance data.
 - .13 Substantial Performance Certificate and Advertisement
 - .14 Contact List for Design and Construction Teams
 - .15 Prime Consultant Final Completion Certificate.
 - .16 Access Database
 - .1 As part of the Closeout documents, the Contractor shall provide a breakdown of tasks under each specification division and fill out pricing and quantities.
 - .2 Access Database to be submitted to the Consultant as an excel file. Template to be provided to the General Contractor at a later date.
- .2 Collect reviewed submittals and assemble documents executed by Subcontractors, Suppliers, and manufacturers.
- .3 Submit material in a neatly indexed package, prior to final application for payment.
- .4 All Warranties shall commence from date of Certificate of Substantial Performance unless indicated otherwise.

- .5 Contractor shall be responsible for obtaining and enforcing all required warranties.
- .6 Examine all sections of the Specification to ensure inclusion of all warranties specified.

14.4 **INSPECTION/TAKEOVER PROCEDURES**

- .1 Prior to application for certificate of Substantial Performance, The Contractor shall carefully inspect the Work and ensure it is complete, that major and minor construction deficiencies are complete, defects are corrected and the building is clean and in condition for occupancy. Notify the Owner in writing of satisfactory completion of the Work and request an inspection.
- .2 The Contractor shall conform to OAA/OGCA document No.100 for takeover procedures.
- .3 Consultant will allow a maximum of two final inspections for each discipline for rectifying all defects. Beyond this all additional visits will be charged to the General Contractor at a rate of \$1000.00 per visit/report per person.
- .4 During inspection by the Owner and Consultant, a list of deficiencies and defects will be tabulated. Correct within agreed time schedules.

14.5 **EQUIPMENT HANDOVER LIST**

- .1 The Contractor shall submit Equipment Handover List in accordance with Section 01 33 00, containing specific technical data for each equipment which has, or shall have, an Asset Tag number allocated. List shall include but not limited to the equipment name, quantity and equipment model.
 - .2 The template format will be provided by the Owner.
- End of Section



Detailed Technical Method of Procedure
Isolation of Switchboard EB

Title: Isolation of Switchboard EB
Version: 2
Project:
Site Address:
Revision Date:

Activity Date:
Estimated Duration: 4:30
Start Time: 7:30
End Time: 11:30
Required Tech 1:
Required Tech 2:

Approved by:

Technical Details Approval by:	<input type="checkbox"/> -	<input type="checkbox"/> -	<input type="checkbox"/> COT - FM	<input type="checkbox"/> COT - Site Operations					
Impact/Schedule Approval by:	<input type="checkbox"/> T.P.S	<input type="checkbox"/> TPS - COMM	<input type="checkbox"/> PARAMEDICS	<input type="checkbox"/> COT - transportation	<input type="checkbox"/> COT - OEM	<input type="checkbox"/> COT – I & T	<input type="checkbox"/> COT – Security	<input type="checkbox"/> T.F.S	

Overview: MOP 60 pertains to the isolation of Switchboard EB and the downstream loads in order to remove panel CDP and connect new UPS-2 feeders.

Blackout: In the event of an utility outage during the activity, the work shall continue as the building is being carried under the generator plant in a controlled condition.



Detailed Technical Method of Procedure
Isolation of Switchboard EB

Risk Assessment Summary				
Floor	Tenant	Building Level Impact	Risk Level	Duration (hrs)
Full Building	All	Isolation of Switchboard EB. The Blue Side loads will be carried by UPS-1 while UPS-2 is isolated. Momentary loss of emergency power identical to monthly generator testing.	High	4.5
Floor	Tenant	Floor Level Impact	Risk Level	Duration (hrs)
9th	T.P.S.	Loss of B feed at critical load TPS Radio Equipment Room.	High	4.5
8th	Paramedics	No stakeholder specific impacts.	N/A	0
	T.P.S. - COMM	No stakeholder specific impacts.	N/A	0
7th	T.P.S - I&T	Loss of B feed at critical load TPS TRIP Room.	High	4.5
	Paramedics			
	T.F.S - I&T			
6th	O.E.M.	No stakeholder specific impacts.	N/A	0
	T.F.S.	No stakeholder specific impacts.	N/A	0
5th	COT - Transportation	No stakeholder specific impacts.	N/A	0
4th	Paramedics	No stakeholder specific impacts.	N/A	0
3rd	COT - I&T	No stakeholder specific impacts.	N/A	0
2nd	COT - I&T	No stakeholder specific impacts.	N/A	0
1st	COT - I&T	No stakeholder specific impacts.	N/A	0
	COT - Security	No stakeholder specific impacts.	N/A	0
	Trans - RLC	No stakeholder specific impacts.	N/A	0
Basement	COT - I&T	No stakeholder specific impacts.	N/A	0
	COT - FM	No stakeholder specific impacts.	N/A	0

Low Risk - minimal to no impact to critical system redundancy
Medium Risk - work that has an impact to system redundancy (typical to normal maintenance)
High Risk - work that has an impact to system redundancy (above normal maintenance, e.g. loss of A or B feed at critical load, or limited cooling capacity)



Detailed Technical Method of Procedure
Isolation of Switchboard EB

Emergency Contacts				
Company	Title		Phone	Email
-	Construction Manager			
-	Project Manager			
-	Mechanical Foreman			
-	Project Foreman			
-	Mechanical Project Manager			
COT - FM	Project Manager			
COT - FM	Construction Coordinator			
COT - Site Operations	Operations Supervisor			
COT - Site Operations	Electrician			
-	Project Lead			
-	Electrical Enginner, E.I.T.			
-	Mechanical Lead			
-	Mechanical Engineer			
COT - FM				
COT - I&T				
COT - I&T				
COT - I&T				
COT - OEM				
COT - OEM				
COT - Transportations				
COT - Transportations				
COT - Security				
Paramedics				
T.F.S				
T.F.S				
T.P.S.				
T.P.S.				
T.P.S.				
T.P.S.				
T.P.S.				
Technician				
Technician				
Technician				
Technician				



Detailed Technical Method of Procedure
Isolation of Switchboard EB

Step	Description	Action By	Verified
0.0	Preliminary Steps		
0.01	At Switchboard 'EC' Blue Side, adjust the tie breaker settings and perform secondary injection.	FS	
0.02	At 'MTS A/C Riser 1', confirm the MTS is fed from DP-P-EB1.	Ops	
0.03	At 'MTS A/C Riser 2', confirm the MTS is fed from DP-P-EB1.	Ops	
0.04	At 'MTS-P-E1', confirm the MTS is fed from DP-P-EB1.	Ops	
0.05	At 'MCC-1EA', confirm the MCC is fed from Switchboard 'EA'.	Ops	
0.06	At 'MCC-2EA', confirm the MCC is fed from Switchboard 'EA'.	Ops	
0.07	At 'DP-P-EB5', confirm the panel is fed from Switchboard 'EA'.	Ops	
0.08	Confirm the building is being supported by Chiller 1 and Chiller 2.	Ops	
0.09	Confirm all UPSs are online with no alarms.	-	
0.10	Review generator fuel levels and confirm there are no alarms.	Ops	
0.11	Confirm PPE is prepared. Proper PPE must be worn for every switching steps and when confirming 0 voltage.	Ops	
0.12	Operations to notify security and the stakeholders that the work is about to begin.	Ops	

Step	Description	Duration	Start	End	Actual End	Action By	Verified
1.0	Start Generator Plant						
1.01	At Switchboard 'EA', turn the 'SELECT EMERGENCY AS PREFERRED SOURCE' switch.	1 min	7:00	7:01		-	-
1.02	At Switchboard 'EA', verify 'LOAD CONNECTED TO EMERGENCY' light is on.	1 min	7:01	7:02		-	-
1.03	At Switchboard 'EB', turn the 'SELECT EMERGENCY AS PREFERRED SOURCE' switch.	1 min	7:02	7:03		-	-
1.04	At Switchboard 'EB', verify 'LOAD CONNECTED TO EMERGENCY' light is on.	1 min	7:03	7:04		-	-
Step Sign Off (Initial):							-
Contingency Plan/Comments:							
2.0	Transfer Switchboard EC Blue side loads to Red side						
2.01	At UPS-1, confirm module is online with no alarms. Record load.	1 min	7:04	7:05		-	-
2.02	At UPS-2, confirm module is online with no alarms. Record load.	1 min	7:05	7:06		-	-
2.03	At UPS-1, turn the System Mode key to the 'BYPASS' position for three seconds.	1 min	7:06	7:07		-	-
2.04	At UPS-1, confirm the UPS is on Static Bypass.	1 min	7:07	7:08		-	-
2.05	At UPS-2, turn the System Mode key to the 'BYPASS' position for three seconds.	1 min	7:08	7:09		-	-
2.06	At UPS-2, confirm the UPS is on Static Bypass.	1 min	7:09	7:10		-	-
2.07	Obtain 2 Kirk Keys #17096 from key cabinet, insert into breakers 'EC-T1' and 'EC-T2' of Switchboard 'EC'.	1 min	7:10	7:11		-	-
2.08	At Switchboard 'EC', CLOSE breaker 'EC-T1'.	1 min	7:11	7:12		-	-
2.09	At Switchboard 'EC', remove the panel cover wearing proper PPE. At the tie breaker labelled 'EC-T2', test the following voltages: Phase A Line Terminal to Phase A Load Terminal (confirm voltage is less than +/-5V). Phase B Line Terminal to Phase B Load Terminal (confirm voltage is less than +/-5V). Phase C Line Terminal to Phase C Load Terminal (confirm voltage is less than +/-5V)	1 min	7:12	7:13		-	-
2.10	At Switchboard 'EC', CLOSE breaker 'EC-T2'.	1 min	7:13	7:14		-	-
2.11	At Switchboard 'EC', OPEN main breaker 'EC-A', remove Kirk Key and secure it.	1 min	7:14	7:15		-	-
2.12	At UPS-1, confirm the UPS is carrying all of the EC loads.	1 min	7:15	7:16		-	-
2.13	At UPS-1, turn the System Mode key to the 'NORMAL' position for three seconds.	1 min	7:16	7:17		-	-
2.14	At UPS-1, confirm module is online with no alarms. Record load.	1 min	7:17	7:18		-	-



	2.15	At UPS-2, shutdown the UPS.	1 min	7:18	7:19		-	-		-	
	2.16	At HMI, OPEN Switchboard 'EB' cell EB-4b breaker 'UPS-2 Input'.	1 min	7:19	7:20		-	-		-	
	2.17	At HMI, OPEN Switchboard 'EB' cell EB-2c breaker 'UPS-2 Bypass'.	1 min	7:20	7:21		-	-		-	
Step Sign Off (Initial):								-			
Contingency Plan/Comments:											
3.0 Isolation of UPS-P-4 Loads											
	3.01	At 'PP-9-UB1', OPEN all feeder breakers. (record the ones originally open)	1 min	7:21	7:22		-	-		-	
	3.02	At 'PP-7-UB1', OPEN all feeder breakers. (record the ones originally open)	1 min	7:22	7:23		-	-		-	
	3.03	Operations to return to 'PP-7-UB1' while all other loads are isolated and disconnect TP-UPS Panel 1 temporary feeders.	0 min	7:23	7:23		-	-		-	
	3.04	Verify with the associated stakeholders that all equipment are running satisfactorily.	1 min	7:23	7:24		-	-		-	
Step Sign Off (Initial):								-			
Contingency Plan/Comments:											
4.0 Isolation of UPS-P-4											
	4.01	At 'UPS-P-3', verify there is no alarm.	1 min	7:24	7:25		-	-		-	
	4.02	At 'UPS-P-4', verify there is no alarm and no load.	1 min	7:25	7:26		-	-		-	
	4.03	At 'UPS-P-4', shutdown UPS-P-4 module.	1 min	7:26	7:27		-	-		-	
Step Sign Off (Initial):								-			
Contingency Plan/Comments:											
5.0 Isolation of DP-P-EB4											
	5.01	At 'DP-P-EB4', OPEN breaker 'AC-PH-1'.	1 min	7:27	7:28		-	-		-	
	5.02	At 'DP-P-EB4', OPEN breaker 'UPS-P-4 Module'.	1 min	7:28	7:29		-	-		-	
	5.03	At 'DP-P-EB4', OPEN breaker 'UPS-P-4 Bypass'.	1 min	7:29	7:30		-	-		-	
	5.04	At BAS control system, acknowledge alarms and confirm system is running satisfactorily.	1 min	7:30	7:31		-	-		-	
Step Sign Off (Initial):								-			
Contingency Plan/Comments:											
6.0 Isolation of DP-P-EB2											
	6.01	At 'DP-P-EB2', OPEN breaker 'MTS-P-E1'.	1 min	7:31	7:32		-	-		-	
	6.02	At 'DP-P-EB2', OPEN breaker 'TX-P-B2'.	1 min	7:32	7:33		-	-		-	
	6.03	At 'DP-P-EB2', OPEN breaker 'MTS-A/C RISER 1'.	1 min	7:33	7:34		-	-		-	
	6.04	At 'DP-P-EB2', OPEN breaker 'MTS-A/C RISER 2'.	1 min	7:34	7:35		-	-		-	
	6.05	At 'DP-P-EB2', OPEN breaker 'DP-P-EM'.	1 min	7:35	7:36		-	-		-	
	6.06	At 'DP-P-EB2', confirm the 3 spare breakers are OPEN.	1 min	7:36	7:37		-	-		-	
	6.07	At HMI, OPEN Switchboard 'EB' cell EB-6c breaker 'DP-P-EB2'.	1 min	7:37	7:38		-	-		-	
Step Sign Off (Initial):								-			
Contingency Plan/Comments:											
7.0 Isolate Switchboard EB											
	7.01	At Switchboard 'EB', insert key and enable MAINTENANCE MODE.	1 min	7:38	7:39		-	-		-	
	7.02	At Switchboard 'C', OPEN, rack out and lock off breaker 'C-8 SWBD EB'.	1 min	7:39	7:40		-	-		-	
	7.03	At Switchboard 'EG-B', OPEN, rack out and lock off breaker 'EG-B-4b SWBD EB'.	1 min	7:40	7:41		-	-		-	
Step Sign Off (Initial):								-			
Contingency Plan/Comments:											
8.0 Disconnect Panel CDP and Connect New Feeders											
	8.01	At Switchboard 'EB', confirm 0 voltage.	1 min	7:41	7:42		-	-		-	
	8.02	At Switchboard 'EC', main breaker 'EC-A', adjust trip settings and perform secondary injection.	0 min	7:42	7:42		-	-		-	
	8.03	At Switchboard 'EB' cell EB-4c, disconnect existing panel CDP feeders.	45 min	7:42	8:27		-	-		-	
	8.04	At Switchboard 'EB' cell EB-4c, connect new UPS-2 Input Panel feeders.	120 min	8:27	10:27		-	-		-	
	8.05	At Switchboard 'EB' cell EB-4c, confirm torquing and meggering of new feeders	15 min	10:27	10:42		-	-		-	
Step Sign Off (Initial):								-			
Contingency Plan/Comments:											



9.0 Energize Switchboard EB											
	9.01	At Switchboard 'C', remove lock, rack in and CLOSE breaker 'C-8 SWBD EB'.	1 min	10:42	10:43		-	-		-	
	9.02	At Switchboard 'EG-B', remove lock, rack in and CLOSE breaker 'EG-B-4b SWBD EB'.	1 min	10:43	10:44		-	-		-	
	9.03	At Switchboard 'EB', insert key and enable AUTO MODE.	1 min	10:44	10:45		-	-		-	
Step Sign Off (Initial):								-			
Contingency Plan/Comments:											
10.0 Transfer Switchboard EC back to normal configuration											
	10.01	At HMI, CLOSE Switchboard 'EB' cell EB-4b breaker 'UPS-2 Input'.	1 min	10:45	10:46		-	-		-	
	10.02	At HMI, CLOSE Switchboard 'EB' cell EB-2c breaker 'UPS-2 Bypass'.	1 min	10:46	10:47		-	-		-	
	10.03	At UPS-2, startup the UPS.	1 min	10:47	10:48		-	-		-	
	10.04	At UPS-2, confirm module is online with no alarms.	1 min	10:48	10:49		-	-		-	
	10.05	At UPS-2, turn the System Mode key to the 'BYPASS' position for three seconds.	1 min	10:49	10:50		-	-		-	
	10.06	At UPS-2, confirm the UPS is on Static Bypass.	1 min	10:50	10:51		-	-		-	
	10.07	At UPS-1, turn the System Mode key to the 'BYPASS' position for three seconds.	1 min	10:51	10:52		-	-		-	
	10.08	At UPS-1, confirm the UPS is on Static Bypass.	1 min	10:52	10:53		-	-		-	
	10.09	At Switchboard 'EC', insert key and CLOSE main breaker 'EC-A'.	1 min	10:53	10:54		-	-		-	
	10.10	At Switchboard 'EC', OPEN breakers 'EC-T1' and 'EC-T2', remove Kirk Keys #17906.	1 min	10:54	10:55		-	-		-	
	10.11	Return 2 Kirk Keys #17096 to key cabinet.	1 min	10:55	10:56		-	-		-	
	10.12	At UPS-1, turn the System Mode key to the 'NORMAL' position for three seconds.	1 min	10:56	10:57		-	-		-	
	10.13	At UPS-1, confirm module is online with no alarms. Record load.	1 min	10:57	10:58		-	-		-	
	10.14	At UPS-2, turn the System Mode key to the 'NORMAL' position for three seconds.	1 min	10:58	10:59		-	-		-	
	10.15	At UPS-2, confirm module is online with no alarms. Record load.	1 min	10:59	11:00		-	-		-	
Step Sign Off (Initial):								-			
Contingency Plan/Comments:											
11.0 Energize DP-P-EB2											
	11.01	At HMI, CLOSE Switchboard 'EB' cell EB-6c breaker 'DP-P-EB2'.	1 min	11:00	11:01		-	-		-	
	11.02	At 'DP-P-EB2', CLOSE breaker 'MTS-A/C RISER 1'.	1 min	11:01	11:02		-	-		-	
	11.03	At 'DP-P-EB2', CLOSE breaker 'MTS-A/C RISER 2'.	1 min	11:02	11:03		-	-		-	
	11.04	At 'DP-P-EB2', CLOSE breaker 'DP-P-EM'.	1 min	11:03	11:04		-	-		-	
	11.05	At 'DP-P-EB2', CLOSE breaker 'MTS-P-E1'.	1 min	11:04	11:05		-	-		-	
	11.06	At 'DP-P-EB2', CLOSE breaker 'TX-P-B2'.	1 min	11:05	11:06		-	-		-	
	11.07	At 'DP-P-EB2', confirm the 3 spare breakers are left OPEN.	1 min	11:06	11:07		-	-		-	
Step Sign Off (Initial):								-			
Contingency Plan/Comments:											
12.0 Energize DP-P-EB4											
	12.01	At 'DP-P-EB4', CLOSE breaker 'AC-PH-1'.	1 min	11:07	11:08		-	-		-	
	12.02	At 'DP-P-EB4', CLOSE breaker 'UPS-P-4 Module'.	1 min	11:08	11:09		-	-		-	
	12.03	At 'DP-P-EB4', CLOSE breaker 'UPS-P-4 Bypass'.	1 min	11:09	11:10		-	-		-	
	12.04	At BAS control system, confirm system is running satisfactorily.	1 min	11:10	11:11		-	-		-	
Step Sign Off (Initial):								-			
Contingency Plan/Comments:											
13.0 Energize UPS-P-4											
	13.01	At 'UPS-P-4', startup UPS-P-4 module.	1 min	11:11	11:12		-	-		-	
	13.02	At 'UPS-P-3', verify there is no alarm.	1 min	11:12	11:13		-	-		-	
	13.03	At 'UPS-P-4', verify there is no alarm.	1 min	11:13	11:14		-	-		-	
Step Sign Off (Initial):								-			
Contingency Plan/Comments:											

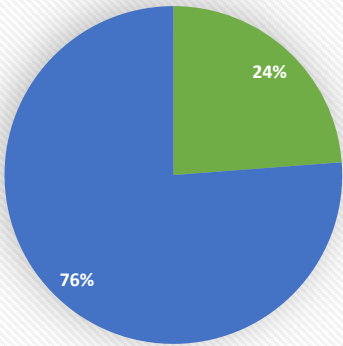


14.0 Energize UPS-P-4 Loads											
	14.01	At 'PP-9-UB1', CLOSE all feeder breakers. (keep the ones originally open OPENED, see step 2)	1 min	11:14	11:15		-	-		-	
	14.02	At 'PP-7-UB1', CLOSE all feeder breakers. (keep the ones originally open OPENED, see step 2)	1 min	11:15	11:16		-	-		-	
	14.03	Verify with the associated stakeholders that all equipment are running satisfactorily.	1 min	11:16	11:17		-	-		-	
Step Sign Off (Initial):							-				
15.0 Shutdown Generator Plant											
	15.01	At Switchboard 'EA', turn the 'SELECT NORMAL AS PREFERRED SOURCE' switch.	1 min	11:17	11:18		-	-		-	
	15.02	At Switchboard 'EA', verify 'LOAD CONNECTED TO NORMAL' light is on.	1 min	11:18	11:19		-	-		-	
	15.03	At Switchboard 'EB', turn the 'SELECT NORMAL AS PREFERRED SOURCE' switch.	1 min	11:19	11:20		-	-		-	
	15.03	At Switchboard 'EB', turn the 'SELECT NORMAL AS PREFERRED SOURCE' switch.	1 min	11:19	11:20		-	-		-	
	15.04	At Switchboard 'EB', verify 'LOAD CONNECTED TO NORMAL' light is on.	1 min	11:20	11:21		-	-		-	
	15.05	Wait for generator cool down period.	5 min	11:21	11:26		-	-		-	
Step Sign Off (Initial):							-				
16.0 Closeout											
	16.01	Confirm building is back in normal conditions and no alarms.	3 min	11:26	11:29		-	-		-	
	16.02	Operations to notify security and the stakeholders that the work is completed.	1 min	11:29	11:30		-	-		-	
Step Sign Off (Initial):							-				
End of Technical Portion of the MOP											

Schedule Tracking							
Phase	Address	Progress	Projected Start	Forecast / Actual Start	Projected Finish	Forecast / Actual Finish	Status
Pre-Construction	Address	50%	1900-01-00	1900-01-00	1900-01-00	1900-01-00	
	Address	50%	1900-01-00	1900-01-00	1900-01-00	1900-01-00	
Construction	Address	50%	1900-01-00	1900-01-00	1900-01-00	1900-01-00	1
	Address	50%	1900-01-00	1900-01-00	1900-01-00	1900-01-00	
Commissioning	Address	50%	1900-01-00	1900-01-00	1900-01-00	1900-01-00	
	Address	50%	1900-01-00	1900-01-00	1900-01-00	1900-01-00	2
Closeout	Address	50%	1900-01-00	1900-01-00	1900-01-00	1900-01-00	
	Address	50%	1900-01-00	1900-01-00	1900-01-00	1900-01-00	
Warranty	Address	50%	1900-01-00	1900-01-00	1900-01-00	1900-01-00	3
	Address	50%	1900-01-00	1900-01-00	1900-01-00	1900-01-00	

- Notes:
- Explanation
 - Explanation
 - Explanation

Overall Construction Progress



Program Progress Pending

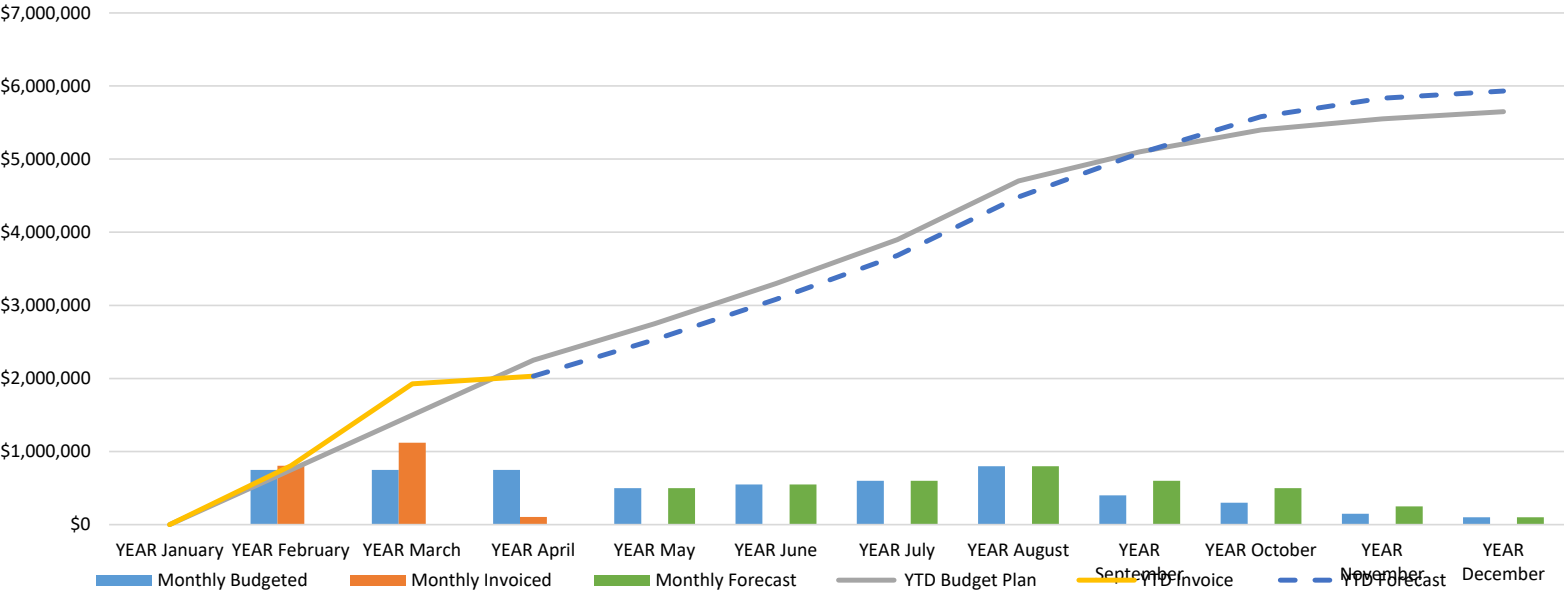
Risks		
Issue / Risk	Potential Impact	Mitigation Strategies
Risk #1	Impact	• Mitigation
Risk #2	Impact	• Mitigation
Risk #3	Impact	• Mitigation

Key Achievements	
1	Achievement 1
2	Achievement 2
3	Achievement 3
4	Achievement 4

Task / Schedule / Risk Legend

Not Started | On Track / Low Risk | Slight gap to schedule, budget / Medium Risk | Significantly gap to schedule, budget, / High Risk | Completed

Group XX - Forecast Invoice vs. Actual Invoice



Notes:

- 1. Note
- 2. Note
- 3. Note

Address	Budgeted	Cash Allowance Used	Contingency Used	Invoiced	Remaining
Address #1	\$500,000.00	\$110,000.00	\$120,000.00	\$200,000.00	\$530,000.00
Address #2	\$400,000.00	\$30,000.00	\$25,000.00	\$150,000.00	\$250,000.00
Address #3	\$800,000.00	\$80,000.00	\$95,000.00	\$375,000.00	\$425,000.00
Address #4	\$1,200,000.00	\$30.00	\$0.00	\$550,000.00	\$650,000.00
Address #5	\$1,300,000.00	\$25,000.00	\$0.00	\$950,000.00	\$350,000.00
Address #6	\$350,000.00	\$0.00	\$0.00	\$0.00	\$350,000.00
Address #7	\$875,000.00	\$50,000.00	\$0.00	\$350,000.00	\$525,000.00
Address #8	\$900,000.00	\$0.00	\$0.00	\$0.00	\$900,000.00
Total	\$6,325,000.00	\$295,030.00	\$240,000.00	\$2,575,000.00	\$3,980,000.00

1 General

- .1 This section is intended to provide basic identification of the Work, for the Contractor to determine upfront, the nature of the Work involved in this Contract. In no way shall this section be interpreted as being a full representation of the Work of this Contract.
- .2 It is the Contractor's sole responsibility to examine the Commercial Documents, Specifications and Drawings issued to establish/determine total scope of Work.

2 Project Overview

- .1 Toronto City Council adopted the City of Toronto Corporate Accessibility Policy to ensure accessibility at all its facilities and public spaces. The Corporate Real Estate Management Division then initiated a capital Program to upgrade/renovate the facilities that fall under its capital maintenance program. This Program will support the City-wide mandate to remove physical barriers across all City facilities.
- .2 This Tender package represents the upgrade of a total of eight (8) buildings located at different addresses within a specific geographical area. The buildings addresses are as follows:

Building Address	Building Type
20 BEFFORT ROAD	FIRE HALL NO. 145
1009 SHEPPARD AVENUE	FIRE HALL NO. 143
1026 FINCH AVENUE WEST	FINCH YARD – BLDG. B
1026 FINCH AVENUE WEST	FINCH YARD – BLDG. D
1300 SHEPPARD AVENUE WEST	TORONTO ANIMAL SERVICES
4100 KEELE STREET	FIRE HALL NO. 141
4330 DUFFERIN STREET	TORONTO EMERGENCY SERVICES HEADQUARTERS & PARKING STRUCTURE
5700 BATHURST STREET	FIRE HALL NO. 112 & EMS STATION 16

- .3 The buildings included in this Tender are being renovated to meet the City of Toronto Accessibility Design Guideline (TADG 2016).

3 Project Schedule

- .1 An overall project construction schedule (attached to end of this section) has been developed based on the start and finish for each building in this Contract. These timelines have been discussed with the City and agreed to by the stakeholders and as such must be adhered to. These timelines must also take into account the phasing requirements for each building to minimize the interruption to the operation of each facility. The Contractor shall follow the attached schedule construction start and finish dates without exception and provide a detailed construction schedule as required in the specifications taking into account the overall schedule timelines and phasing requirements shown on the

Drawings. Construction schedule to be submitted to the Consultant for review prior to the commencement of the work.

- .2 Simultaneous work in similar buildings is not allowed. For example, two Fire Halls or two Police Stations cannot be under construction at the same time.

4 Project Phasing

- .1 All the buildings included in this Contract are occupied and will be operational during construction. As such, the Project shall be carried out in multiple phases to minimize interruption to the operation of the facility. The phasing to implement the work in each building is indicated on the architectural drawings for each building. The phasing plan for each building was discussed with the City and accepted by the stakeholders and therefore expected to be followed by the Contractor in performing the Work. Any deviation from this phasing plan must be approved by the City's Project Manager.
- .2 Discuss all storage, employee swing space, room and facility closures, equipment and furniture moves, and any other activities that may impact the operation of the facility with the Stakeholder of each building to ensure Stakeholders acceptance of implementation and site conditions. Refer to Section 01 10 00 General Requirements.
- .3 Provide the City Project Manager with 30 Calendar Days notice prior to starting the Work in any phase.
- .4 The City, at their sole discretion, may choose to relocate staff and furniture at their own cost. The Contractor will be notified in this event and a credit for phasing and relocation costs on that particular building shall be provided by the Contractor to the City on the next monthly invoice.

5 Working hours

- .1 The buildings included in this Tender will be occupied and in operation Monday to Friday. Construction Work must occur 7 days a week 8:00 PM to 6:00 AM.
- .2 Extension or modification to the above specified hours of work must be submitted in writing to the City's Project Manager for approval.

6 Subcontractors

.1 Abatement Subcontractor

- .1 The following are the City's abatement contractor requirements:

- .1 Licensed Unionized Abatement Contractor
- .2 Site Supervisor must hold the MOL's Supervisor 253S MTCU Accreditation
- .3 All other workers must hold the MOL's Asbestos Worker 253W MTCU Accreditation
- .4 Proof of all requirements listed above must be provided prior to award and is subject to review and acceptance by the City.

- .2 The following is a list of non-mandatory Subcontractors that already met the City of Toronto requirements for Designated Substance removal. These Subcontractors perform abatement work in City buildings on a frequent basis and

are familiar with the City's strict abatement policies and procedures. These Subcontractors are already cleared to perform Work in Toronto Police Services buildings and other sensitive buildings.

- .1 Furcon Environmental Ltd
- .2 The BearStar Group Inc.
- .3 JMX Environmental

.2 Background Check and Security Clearances

- .1 All Contractors and Subcontractors are subject to background checks, police clearances and vulnerable sector checks before being authorized to perform any Work.
- .2 The following is a list of non-mandatory Subcontractors that are already cleared to perform work on Toronto Police Service buildings:
 - .1 New Park Contracting – General Contractor
 - .2 Stevens & Black Electrical Contractors
 - .3 Active Mechanical

.3 Mandatory Toronto Police Service (TPS) Subcontractors

- .1 For all TPS buildings included in this Contract, The Contractor is required to use Johnson Controls as their subtrade. TPS has an existing contract with Johnson Controls. The General Contractor to engage Johnson Controls to do the following Work in TPS buildings:
 - .1 Johnson Controls will be responsible for security systems, all security controls, maglocks and card reader installations, maintenance and warranty.
 - .2 Contractor shall be responsible for coordinating product lead time, Shop Drawings and provisions for all support structures, power and systems required for a complete installation.
 - .3 No exceptions or other Subcontractors will be considered for the supply, install and delivery of security system equipment for TPS buildings.
 - .4 The General Contractor is responsible for coordination between Johnson Controls and all other trades and Subcontractors.
 - .5 Johnson Controls Contact:
Keith Porter
Security & Fire Account Executive, Building Efficiency
Email: keith.porter@jci.com
Main: (905) 731-2813
Cell: (647) 637-8010
Fax: (905) 747-3736

Address: 56 Leek Crescent, Richmond Hill Ontario L4B 1H1
Website: <http://www.johnsoncontrols.com/>

- .2 Keying and Cylinder installation at the Toronto Police Services buildings (TPS):
 - .1 TPS will coordinate the keying and cylinder installation directly with their locksmith, Action Locksmiths.
 - .2 TPS will then issue an invoice to General Contractor to make the payment once the work is completed.
- .4 Preferred Corporate Security Subcontractors
 - .1 The General Contractor shall engage one of the following Subcontractors as their security subtrade for all buildings. Johnson Controls is to be used exclusively as security Subcontractor for all Toronto Police Services buildings as indicated above. No other Subcontractors will be considered for this Work under this section.
 - .1 Security Subcontractor shall be responsible for the following:
 - .1 Supply, installation, and delivery of security system equipment, all security controls, maglocks and card reader installations, maintenance, and warranty for all buildings.
 - .2 General Contractor shall be responsible for the following:
 - .1 Coordinating product lead time, Shop Drawings and provisions for all support structures, power and systems required for a complete installation.
 - .2 Coordination between security Subcontractor and all other trades.

COMPANY	CONTACT
AC Technical Systems Limited 2100 Forbes Street, Units 8 – 10 Whitby, ON L1N 9T3	Contact Name: Dominic Burns Telephone: (905) 666-8676 Fax: (905) 666-9795 E-mail: dburns@actechnical.com
Bond Securcom 41 Scarsdale Road, Unit 1 Toronto, ON M3B 2R2	Contact Name: Cesar Traverso Telephone: (416) 256-6666 Fax: (416) 249-8636 E-mail: CTraverso@bondsecur.com
Chubb Security Systems 5201 Explorer Drive Mississauga, ON L4W 4H1	Contact Name: Kevin Teasdale Telephone: (905) 629-2600 Fax: (905) 629-135 E-mail: kevin.teasdale@chubbfs.ca
Convergent Technologies 5716 Coopers Avenue Mississauga, ON L4Z 2E8	Contact Name: Eric Heagle Telephone: (905) 602-8622 Fax: (905) 602-8722 E-mail: eric.heagle@convergent.com

Delco Security	Contact Name: Jason Baycroft Telephone: (416) 346-8628 E-mail: jbaycroft@delcosecurity.com
Fitch Security Integration Inc. 14 Meteor Drive Toronto, ON M9W 1A4	Contact Name: Ed Fitchett Telephone: (416) 235-1818 Fax: (416) 235-1226 E-mail: efitchett@fitch.ca
Johnson Controls L.P. 56 Leek Crescent Richmond Hill, ON L4B 1H1	Contact Name: Ralph Staffiere Telephone: (905) 731-2813 Fax: (905) 474-5404 E-mail: raffaele.staffiere@jci.com
Merit Security 55 Bower Street Acton, ON L7J 1E2	Contact Name: Mark Mackrell Telephone: (416) 984-3880 Fax: (905) 853-5841 E-mail: meritsec@cogeco.ca
Met-Scan Canada Ltd 30 Kern Road, Suite 104 Toronto, ON M3B 1T1	Contact Name: Rick Holder Telephone: (416) 391-2200 x111 Cell: (416) 709-3102 E-mail: rholder@met-scan.com
Paladin Technologies 2210 Markham Road, Unit 4 Toronto, ON M1B 5V6	Contact Name: Marc Kingsbury Telephone: (416) 916-6767 E-mail: mkingbury@paladinsecurity.com
Profile Security 110 – 5525 Eglinton Ave W Toronto, ON M9C 5K5	Contact Name: Jason Caissie Telephone: (416) 695-1260 x 235 Fax: (416) 695-1958 E-mail: jasonc@profileinc.com
Quinn Digital Asset Protection 7065 Tranmere Drive, Unit 3 Mississauga, ON L5S 1M2	Contact Name: Rob Quinn Telephone: (416) 441-3770 x 223 Cell: (416) 303-6252 E-mail: rob.quinn@quinndigital.ca
Siemens Building Technologies, Ltd. 1577 North Service Road Oakville, ON L6H 0H6	Contact Name: Manny Lopes Telephone: (905) 799-9937 Fax: (905) 465-8167 E-mail: manuel.lopes@siemens.com
Securitas ES Canada 15 Marmac Drive, Suite 100 Toronto, ON M9W 1E7	Contact Name: John Kenneally Telephone: (647) 616-3183 E-mail: john.kenneally@securitases.com
Stanley Convergent Security Solutions 2495 Meadowpine Blvd, Unit #1 Mississauga, ON L5N 6C3	Contact Name: Scott Jupp Telephone: (289) 290-7100 Fax: (905) 238-0750 E-mail: Scott.Jupp@sbdinc.com

Tyco Integrated Fire & Security 2400 Skymark Avenue Mississauga, ON L4W 5K5	Contact Name: Tim Grose Telephone: (905) 212-4400 Fax: (416) 808-8028 E-mail: tim.grose@jci.com
Veridin Systems Canada Inc. 13 – 245 Matheson Blvd. East Mississauga, ON L4Z 3C9	Contact Name: Mike Finelli Telephone: (905) 568-9100 Fax: (905) 568-9957 E-mail: mfinelli@veridin.ca
Vipond Inc. 6380 Vipond Drive Mississauga, ON L5T 1A1	Contact Name: Max Pasquali Telephone: (905) 564-7060 Fax: (905) 760-7070 E-mail: Max.Pasquali@vipond.ca

7 Description of Contract (General Contract)

- .1 The Contract comprises the building modifications Work which consists of, but is not limited to, the following:

.1 Designated Substances

- .1 Some of the building systems may contain designated substances. Prior to the Contractor starting any Work, the Contractor will be required to remove the designated substance from the building systems. Contractor shall coordinate timing and the extent of such removal with the City's Project Manager. Refer to DSS reports, Abatement Summary, ACM and LCM Abatement Specification, City of Toronto Asbestos Management Policy, City of Toronto Management Plan and Design Drawings.

.2 Discovery of potential ACM and LCM Substances during the Work.

- .1 During the execution of the Work, potential designated substances may be encountered. If this occurs, the Contractor is to inform the Consultant immediately with description of the affected Work area, photographs, and site location. The Consultants Environmental Sub-Consultant will attend site and sample the suspected material. Once there is confirmation that the material is or contains ACM or LCM, a report will be produced by the Consultants Environmental Sub-Consultant to determine the appropriate abatement method and issue to the Contractor. The Contractor's Work is to continue in parallel with this investigation to ensure adherence to the schedule.

.3 Monitoring and Testing of Abatement Work

.1 Monitoring

- .1 The Contractors Abatement Subcontractor may be required to coordinate with an Environmental sub-consultant for monitoring during the Work.

.2 Testing

- .1 The City's Environmental sub-consultant will continue testing the space after abatement is completed. Any

remediation as a result of testing is the responsibility of the Contractor.

.2 Pre-Tendered Equipment

.1 Automatic Door Openers (ADO)

- .1 The City of Toronto prepared and issued a pre-tender package for various types of ADO's for this Contract. As a result, an ADO supplier (Assa Abloy) has been selected to supply, install and deliver the ADO's for the entire program as detailed in the appendices and the Drawings. The Contractor shall purchase the specified ADO's in the Contract documents as per the appendices, directly from (Assa Abloy), coordinate product lead time, Shop Drawings, and provisions for all support structures, power and systems required for a complete installation

.2 Commercial Plumbing Fixtures, Washroom Accessories and Drinking Fountains

- .1 The City of Toronto has an existing contract with the plumbing fixture supplier, NEXT Plumbing Supply (NEXT) and has negotiated bulk pricing for some commercial plumbing fixtures, washroom accessories and drinking fountains. The Contractor is to purchase selected equipment from NEXT. The Contractor is to reference both NEXT's contract number and RFQ number indicated on the Plumbing and Accessories Order Form when contacting NEXT.

.2 Ordering and Purchasing:

- .1 The Contractor is required to procure the selected plumbing and accessory equipment from NEXT. The Contractor is to provide the quantities per item to NEXT on the 'Plumbing and Accessories Order Form' and submit it to the Consultant and City of Toronto for review (Refer to the appendices for the Plumbing and Accessories Order Form). Once reviewed, the Contractor will then send the order to NEXT, NEXT will fill the order and provide a Lump Sum bill to the Contractor. The Contractor is responsible for the purchase, delivery and installation of these fixtures and accessories. Refer to Specification sections for a list of the selected plumbing fixtures and accessories and additional details. Refer to the appendices for the Plumbing and Accessories Order Form.

.3 Network Data and Voice:

- .1 The City of Toronto has an existing contract with Bell Canada for Voice and Data cabling. Bell Canada is responsible for end to end (Lan room to endpoint) cabling which includes, installation, termination, and testing. The Contractor shall coordinate with Bell Canada for all new data and voice cabling, relocations, and removals of existing cabling. Pathways must be provided for voice and data cabling. Refer to the appendices for the City of

Toronto Cabling Standards and Procedures. The Contractor shall contact Bell Canada for pricing during Tender.

Bell Canada Contact:
Roger D. Vachon
Project Manager - Structured Cabling Solutions | BBM
Phone: 905-540-7442
Email: roger.vachon@bell.ca

- .2 Prior to the start of Work, the Contractor shall coordinate all low voltage cabling infrastructure (Data & Voice) with City of Toronto IT-Network and Telecommunication Services. IT-Network Service is responsible for reviewing layouts, connecting cables to the network switch and if required interface with Bell to install new network equipment.
- .3 Once the Work is completed, the system shall be tested in the presence of the sub-contractor and IT-Network services to confirm connectivity.
- .4 The Contractor shall include network services as part of the construction schedule and when required IT-Network and Telecommunication Services shall be included in the construction meetings.
- .4 Architectural scope; including but not limited to the following:
 - .1 Demolition of
 - .1 Existing drywall partitions
 - .2 Existing concrete block/concrete walls
 - .3 Wall openings
 - .4 Flooring tiles, flooring materials and bases
 - .5 Existing drywall ceilings and reflected ceilings and tiles
 - .6 Existing doors and frames
 - .7 Existing plumbing fixtures
 - .8 Existing millwork
 - .9 Concrete stairs
 - .10 Curtain wall/glazing and exterior doors
 - .2 New Installations of
 - .1 Hoarding to match phasing requirements
 - .2 Site line painting to meet modified parking requirements
 - .3 Site signage
 - .4 Tactile indicators
 - .5 Stairs and nosing indicators

- .6 Guardrails and handrails
- .7 Millwork
- .8 Concrete stairs
- .9 Doors and hardware
- .10 Door operators and controls
- .11 Floor finishes including tiles, carpets, VCT, concrete sealant, etc.
- .12 Floor transitions
- .13 Wall finishes
- .14 Signage
- .15 Suspended ceiling and grid
- .16 Gypsum board ceiling
- .17 Drywall and concrete block partitions
- .18 Patching and painting
- .5 Mechanical scope; including but not limited to the following:
 - .1 Demolition of
 - .1 Plumbing fixtures including sinks, toilets, urinals, and associated accessories
 - .2 Domestic cold/hot water piping
 - .3 Drainage piping
 - .2 New installations of
 - .1 HVAC equipment and controls
 - .2 Plumbing fixtures
 - .3 Domestic cold/hot water piping
 - .4 Connection to existing piping
 - .5 Hose bibbs
 - .6 Piping insulations
 - .7 Piping accessories
 - .8 Drainage piping
 - .9 Hot water heaters
 - .10 Exhaust fans and associated ductwork controls
 - .11 Testing and balancing

- .6 Electrical scope; including but not limited to the following:
 - .1 Removal of
 - .1 Existing outlets/switches/thermostats/access cards along the barrier-free path of travel
 - .2 Lighting fixtures and outlets
 - .3 Exit signs
 - .4 Relocation of existing electrical equipment to suit the installation of universal washroom
 - .2 New Installation of
 - .1 Outlets/switches/thermostats/access cards along the barrier-free path of travel
 - .2 Power supply to all mechanical and electrical equipment
 - .3 Lighting fixtures and controls
 - .4 Hand dryers
 - .5 Exit signs
- .7 Structural scope; including but not limited to the following:
 - .1 Removal of
 - .1 Concrete stairs
 - .2 Roof openings
 - .3 Wall openings
 - .2 New Installation of
 - .1 Roof support for any new mechanical equipment
 - .2 Roof framing for new roof openings
 - .3 Concrete stairs

End of Section

ID	Grou No.	Resource Names	Task Name	Duration	Start	Finish	Predecessors	Nov	Dec	2022 Qtr 1	Jan	Feb	Mar	2022 Qtr 2	Apr	May	Jun
1	G08		Construction Administration	140 days?	Fri 21-11-12	Wed 22-06-08											
2	G08	GC	4330 Dufferin St - EMS & Fire HQ & Parking Structure	140 days	Fri 21-11-12	Wed 22-06-08											GC
3	G08	GC	1026 Finch Ave W - Building B	50 days	Fri 21-11-12	Fri 22-01-28						GC					
4	G08	GC	1026 Finch Ave W - Building D	90 days	Fri 21-11-12	Mon 22-03-28								GC			
5	G08	GC	1300 Sheppard Ave W - Toronto Animal Shelter	70 days	Fri 21-11-12	Mon 22-02-28							GC				
6	G08	GC	1009 Sheppard Ave W - Fire Hall No. 143	62 days	Fri 21-11-12	Tue 22-02-15						GC					
7	G08	GC	20 Beffort Rd - Fire Hall No. 145	90 days	Fri 21-11-12	Mon 22-03-28								GC			
8	G08	GC	4100 Keele St - Fire Hall No. 141	90 days	Fri 21-11-12	Mon 22-03-28								GC			
9	G08	GC	5700 Bathurst St - Fire Hall No. 112 & EMS Post 16	105 days	Fri 21-11-12	Tue 22-04-19										GC	

- 1 General
- 1.1 **GENERAL**
 - .1 Provide Work of this section in accordance with the Contract Documents.
 - .1 This section applies on projects where commissioning is performed by the General Contractor.
- 1.2 **DESCRIPTION**
 - .1 The commissioning process provides the Owner of the facility with a high level of assurance that the systems to be commissioned, including but not limited to the mechanical and electrical systems, have been installed in accordance with the Contract Documents, and operate within the design intent.
 - .2 The process does not take away or reduce the responsibility of the Design Consultants or Installing Contractors to Provide a finished Product. Commissioning is intended to enhance the quality of the system start-up and aid in the orderly transfer of beneficial use and knowledge from the Design Consultant and the Installation Contractor to the Owner.
 - .3 The General Contractor has primary responsibilities for coordinating all commissioning activities with the Consultant, Subcontractors, manufacturers and equipment Suppliers.
 - .4 The Consultant will witness and confirm that all startup commissioning and training are in general conformance with the Contract Documents.
- 1.3 **COMMISSIONING PROGRAM**
 - .1 The commissioning program is divided into four parts:
 - .1 Part 1: Verification Testing
 - .2 Part 2: Performance Testing
 - .3 Part 3: Systems Operating Manuals
 - .4 Part 4: Operator Training
- 1.4 **SUBSTANTIAL COMPLETION**
 - .1 Substantial Completion of the trades Work requires the following parts of the commissioning program to be completed and accepted by the Owner:
 - .1 Part 1: Verification Testing
 - .2 Part 4: Operator Training
 - .2 Part 2: Performance testing may begin before Substantial Completion and extend upwards of nine months minimum after Substantial Completion, based on seasonal conditions required to obtain test load conditions.
- 1.5 **ROLES AND RESPONSIBILITIES**
 - .1 Owner
 - .1 Assign maintenance and operations personnel and schedule them to participate in meetings, witnessing of demonstrations, and training.

- .2 Designate a person(s) as an authorized acceptance authority, to sign-off and accept test reports.
- .3 Authorize the use of Owner's utilities for the commissioning process.
- .2 General Contractor
 - .1 Responsibility: primary point of responsibility to inform the Owner on the status, integration, and performance of the systems within the facility. Lead the coordination and scheduling of installation Work and commissioning Work. Ensure deficiencies are corrected.
 - .2 Scheduling: develop a coordinated commissioning schedule, including the scheduling requirements from the trade contractors conducting the commissioning. Coordinate Owner's commissioning personnel to be available at appropriate times for witnessing of tests.
 - .3 Information: collate and disseminate information to all construction team parties, including progress reports, meeting minutes, etc.
 - .4 Observation of tests: observe testing of installation and equipment and make recommendations for acceptance.
 - .5 Documentation of tests: document results of tests directly or ensure documentation is completed by trade contractors. Provide template format for tests to applicable trade contractors.
 - .6 Acceptance: determine and advise the Owner of the date of acceptance for each system and sub-system for start of the Warranty Period.
- .3 Acceptance Authority
 - .1 Witness demonstration tests of equipment and systems, and have the authority to sign-off on the test forms to accept the test results.
 - .2 Coordinate and schedule additional operations and maintenance personnel to witness the test if required.
- .4 Consultant
 - .1 Conduct periodic construction reviews to determine that the Work is in general conformance with the Contract Documents.
 - .2 Responsible for the system evaluation, adequacy of the system to meet design intent, capacity of the system, and review of Shop Drawings.
 - .3 Attend and participate in the systems training sessions. Provide hand-out literature to be reviewed by operations personnel as part of these sessions.
 - .4 Participate in operations staff orientation tours and final construction reviews.
 - .5 Attend initial meeting with TAB or similar testing contractor(s) to review testing methodology and acceptance criteria.
 - .6 Review verification and performance testing sheets and procedures prepared by the Installation Contractors.

- .7 Review testing documentation for system conformance to Contract Documents. Issue a report noting deficiencies requiring corrective Work.
- .8 Review as-built records as required to the Contract Documents.
- .9 Review and comment on the final commissioning report.
- .5 Installation Contractor
 - .1 Include requirements for submittal data, start-up and testing, O&M data, and training in each Purchase Order or Subcontract written.
 - .2 Ensure cooperation and participation of Subcontractors.
 - .3 Ensure participation of major equipment manufacturers in appropriate training and testing activities. Provide and pay for power, fuel, oil and all other necessities to perform testing and commissioning. Provide qualified personnel for video recording and editing of training sessions.
 - .4 Attend construction/commissioning coordination meetings scheduled by the General Contractor.
 - .5 Prepare schedules for systems orientation and review, O&M Manual submission, training sessions, systems testing, flushing and cleaning, equipment start-up, specialty testing, and completion of deficiency Work. Prepare schedule in MS Project. Submit schedule on agreed revision cycle, for integration into the master commissioning schedule prepared by the General Contractor.
 - .6 Provide detailed schedule and notification to the General Contractor for up-coming tests, a minimum of two weeks before the anticipated test data.
 - .7 Conduct system orientation and inspection at the equipment placement completion stage. Do not make connections to equipment until acceptance has been given by the Owner.
 - .8 Participate in, and schedule Vendors and Subcontractors to participate in the training sessions.
 - .9 Gather O&M Manuals and data on all equipment, and assemble in binders as specified.
 - .10 Shop Drawings which are to be included in the O&M Manuals, which are marked as "Reviewed" (or similar) by the Consultant or Owner, are to be marked on the front page as "ISSUED FOR MANUALS".
 - .11 Shop Drawings which are to be included in the O&M Manuals, which are marked as "Reviewed as Noted" (or similar) by the Consultant or Owner, are to be revised by the manufacturer to incorporate comments and marked on the front page as "REVISED FOR MANUALS".
 - .12 Shop Drawings which are marked as "Revised and Resubmit" (or similar) shall not be included in the O&M Manuals.
 - .13 Provide a final commissioning report as described below.
- .6 Equipment Suppliers and Miscellaneous Contractors
 - .1 Provide submittals and appropriate O&M Manuals.

- .2 Attend initial commissioning coordination meetings scheduled by the General Contractor.
- .3 Participate in training sessions as scheduled by the Installation Contractor.
- .4 Demonstrate performance of equipment as applicable. This includes in-season and out-of season testing depending on time of year of Substantial Completion.
- .5 Provide written and signed start-up reports and submit to the Installation Contractor.

2 Products

2.1 **GENERAL**

- .1 Refer to commissioning Specifications for affected division of the Work.

3 Execution

3.1 **COMMISSIONING PLAN AND SCHEDULE**

- .1 The General Contractor shall coordinate, develop and submit an integrated construction and commissioning schedule. Any additional site visits required by the Consultant's Commissioning Agent resulting from incomplete work or corrections regarding commissioning shall be paid for by the General Contractor.
- .2 Installation Contractor shall assist in the development and coordination of the overall commissioning schedule and plan.

3.2 **VERIFICATION AND PERFORMANCE TESTING**

- .1 Personnel
 - .1 Develop and document each commissioning test and procedure using personnel experienced in this type of Work.
- .2 Test Reports
 - .1 Provide a verification test report for each piece of equipment.
 - .2 Provide a verification test report for each system.
 - .3 Provide a performance test report for each system.
 - .4 If template documents are used, modify document to suit the specific requirements of the system being tested.
 - .5 Submit test reports for review to the Owner and Consultant. Each report is to be reviewed for technical depth, clarity of documentation and completeness.
- .3 Safety Interlocks
 - .1 Test safety or permissive interlocks in a real or closely simulated condition of failure.
 - .2 Provide details of proposed method of testing each device.
- .4 As a result of initial testing results, testing plans and procedures may need to be adjusted to suit.

3.3 OPERATING AND MAINTENANCE MANUALS/SYSTEMS OPERATING MANUALS

- .1 Provide Operating and Maintenance Manuals (O&M) in accordance with the specific requirements of each division of the Work and the General Contract requirements.
- .2 Systems Operating Manuals (SOM) are to be provided by the Consultant.
- .3 Submit the O&M Manuals for review at least two months prior to the start of operator training.

3.4 TRAINING

- .1 Assist in scheduling and coordinating training sessions for the operations and maintenance staff for each system.
 - .1 The General Contractor shall coordinate with the Owner and the Installation Contractor to schedule each training session.
 - .2 The Installation Contractor shall schedule training sessions with their Sub-contractors and equipment manufacturer service representatives.
- .2 Training is to be conducted in a classroom setting with the appropriate system schematics, handouts, and any audio/visual training aids on-site with the equipment. Video record the training sessions in full and submit two DVD discs or two USB flash drives to the Design Consultant for turning over to the Owner.
- .3 The Consultant will assist the Installation Contractor with the development of training handouts, and in conducting training sessions with regards to system operation.
- .4 Equipment Vendors shall provide training on the specifics of each major equipment item including design intent, troubleshooting, and repair techniques.
- .5 Refer to each division commissioning Specification for training details.

3.5 RECORD DRAWINGS

- .1 The Installation Contractor shall maintain and provide As-Built Drawings in accordance with the General Conditions of the Contract.
- .2 The General Contractor and Design Consultant shall review As-Built Contract Documents to verify incorporation of both design changes and As-Built construction details.

3.6 ACCEPTANCE PROCEDURES

- .1 The final acceptance procedures will be determined by the Commissioning Authority and the Owner, and will include but not be limited to the following:
 - .1 Demonstration and acceptance of systems in full automatic control.
 - .2 All I/O points individually verified for proper function, calibration, and operation. The General Contractor will audit report results and witness sufficient field tests to confirm all I/O have been tested.
 - .3 All control sequence of operation strategies have been tested, including alarm generation, graphics, remote reporting functions, and part load operation.
 - .4 All graphic display devices are operating correctly.
 - .5 Mass storage of retrieved data is functioning correctly.

.2 Witness Testing

- .1 Request for witness testing only after already completing initial testing based on the accepted procedures and test sheet criteria. Where deficiencies are found by the Installation Contractor during these initial tests, these deficiencies will be corrected before scheduling a demonstration (witness) test.
- .2 If during a witness test, a deficiency is discovered that in the opinion of the acceptance authority prevents the safe operation of the equipment or system, the test shall be abandoned. The Installation Contractor shall then correct the deficiency and reschedule the test(s).

3.7 **FINAL COMMISSIONING REPORT**

- .1 Upon completion of all four phases of the commissioning program, provide a final commissioning report for each division of the Work describing the following:
 - .1 General summary: a listing of each system and date of acceptance.
 - .2 System summary: a general description of the state of operation of each system, including any noted operating problems which were discovered and corrected during the commissioning process, as well as those problems which were discovered but were not resolved.
 - .3 Documentation index – document type: a table index listing all commissioning documents, arranged alphabetically by type of document (Verification Test, Performance Test, O&M, SOM, Training).
 - .4 Documentation index – alphabetic: a table index listing all commissioning documents, arranged alphabetically only by system name and/or equipment name.

3.8 **EXCLUSIONS**

- .1 Responsibility for Construction Means and Methods
 - .1 The Installation Contractor is responsible for the safe operation of the equipment and systems until such time as the equipment and systems have been accepted by the Owner. Once accepted by the Owner, the Owner may require the Installation Contractor to maintain and operate the system until such time as the Owner is prepared to operate the facility, and such Work will be paid for by the Owner as a separate Contract.
- .2 Hands-On Work
 - .1 The Installation Contractor shall provide all services requiring tools or the use of tools to start-up, test, adjust, or otherwise bring equipment and systems into a fully operational state.
 - .2 The General Contractor shall coordinate and observe these procedures (and may make minor adjustments as necessary).

End of Section

-
- 1 General
- .1 Items to be submitted for review
- .1 Shop Drawings
- .2 Samples
- .3 Operating and Maintenance Manuals
- .4 "As-Built" Drawings
- .5 Certificates and transcripts
- .6 Progress photographs
- .2 Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the Work. Failure to submit in adequate time is not considered sufficient reason for an extension of Contract Time and no claim for an extension by reason of such default will be allowed.
- .3 Work affected by the submittal shall not proceed until review is complete.
- .4 Submittals MUST be accompanied by "Standard Submittal Form" with all blank spaces filled in. A copy of the form is bound into the Specifications following this section.
- .5 Contractor shall retain one reviewed and stamped copy of each submission on Site. Only the stamped copies shall be used on the Work.
- 2 Shop Drawings
- 2.1 **GENERAL**
- .1 The term "Shop Drawing" means Drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of the Work.
- .2 The Contractor shall arrange for the preparation of clearly identified Shop Drawings as called for by the Contract Documents or as the Consultant may reasonably request.
- .3 Prior to submission to the Consultant, the Contractor shall review and stamp all Shop Drawings. By this review the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalogue numbers and similar data and that he has checked and coordinated each Shop Drawing with the requirements of the Work and of the Contract Documents. The Contractor's review of each Shop Drawing shall be indicated by stamp, date, and signature of a responsible person.
- .4 Submittals not stamped, signed, dated and identified as to the specific Contract requirements may be returned without being examined and shall be considered rejected.
- .5 The Contractor shall submit Shop Drawings to the Consultant for his review with reasonable promptness and in orderly sequence so as to cause no delay in the Work or in the work of other Contractors. If either the Contractor or the Consultant so requests they shall jointly prepare a schedule fixing the dates for submission and return of Shop Drawings. At the time of submission the Contractor shall notify the Consultant in writing of any deviations in the Shop Drawings from the requirements of the Contract Documents.
-

- .6 The Consultant will review and return Shop Drawings in accordance with schedule agreed upon, or otherwise with reasonable promptness so as to cause no delay. The Consultant's review will be for conformity to the design concept and for general arrangement only and such review shall not relieve the Contractor of responsibility for errors or omissions in the Shop Drawings or of responsibility for meeting all requirements of the Contract Documents unless a deviation on the Shop Drawings has been approved in writing by the Consultant.
- .7 The Contractor shall make any changes in Shop Drawings which the Consultant may require consistent with the Contract Documents and resubmit unless otherwise directed by the Consultant. When resubmitting, the Contractor shall notify the Consultant in writing of any revisions other than those requested by the Consultant.
- .8 The Contractor shall secure from all his Subcontractors and material Suppliers, uniform size Shop Drawings showing the construction materials, etc., or as required and upon which the respective Bids have been based.
- .9 Shop Drawings shall define the division of responsibility between the trades, and all items shown on the Shop Drawings shall be supplied as part of the Contract unless it is specifically noted that certain items are not part of the Contract.
- .10 Any work done before receiving the Consultant's final review of the Shop Drawings shall be at the Contractor's risk.

2.2 SHOP DRAWINGS IDENTIFICATION

- .1 An electronic stamp will be sized and placed to fit on each Shop Drawing:



The review of this Shop Drawing is for the sole purpose of ascertaining conformance with the general design concept and general arrangement only. This review does not constitute approval or verification of the design inherent in the Shop Drawings, and any omissions or errors therein remain the responsibility of the Contractor. The Contractor remains entirely responsible for complying with the Contract Documents, confirming all field dimensions and site conditions, for information that pertains to fabrication, techniques of construction and installation, and co-ordination of the Work.			
Reviewed	Reviewed As Noted	Revise & Resubmit	Not Reviewed
Reviewed By:		Date:	

2.3 REPRODUCTION OF ENGINEERING DRAWINGS

- .1 Reproduction of the engineering Drawings, to serve as background or reference for Shop Drawings, will be permitted. Cost of reproduction shall be based on the number of electronic Drawing files as indicated below, and shall be paid for by the Contractor in accordance with rates indicated below. Rates are exclusive of HST. The Consultant will prepare the files by removing logos, seals and other identification or reference to the Owner or Consultant, checking all reference files and removing unnecessary external references, and packaging files for release. Any identification or reference to the Owner or Consultant is to be removed from all Drawings that are used by the Contractor for this

Contract. Costs incurred for the reproduction of engineering Drawings shall be paid by the Contractor directly to the Consultant.

- .1 One to ten files: \$1,000.00
 - .2 Eleven to twenty files: \$1,900.00
 - .3 Twenty-one to fifty files: \$4,500.00
 - .4 Fifty-one to one hundred files: \$8,000.00
 - .5 More than one hundred files: \$75 rate per file, plus \$500.00 administration fee
 - .6 The submission of a copy of the Consultant's Drawings as a Shop Drawing without additional detailed installation, fabrication or Product information added is not an acceptable form of submittal and is grounds for automatic rejection.
- .2 Prior to the release of digital or electronic files, the Consultant will issue to the Contractor the Digital Transfer Agreement form attached to the end of this section.
- .1 The Contractor shall review and return to the Consultant an electronic copy of the agreement with the Contractor's signature.
 - .2 By this review and signing of the agreement, the Contractor has acknowledged and agreed to the terms contained within the Digital Transfer Agreement.
 - .3 The Consultant will not release digital files to the Contractor until the agreement is signed and executed. The Consultant will retain an executed copy of the Digital Transfer Agreement.

2.4 SUBMITTAL SYSTEM - GENERAL

- .1 Submit Portable Data Files (PDF's) of fully detailed and dimensioned Shop Drawings of the Work.
- .2 Shop Drawings will be returned to the Contractor stamped and marked "REVIEWED", or "REVIEWED AS NOTED", or "REVISE & RESUBMIT" or "NOT REVIEWED". These stamps are defined as follows:

Stamp	Meaning
REVIEWED	Drawings reviewed without comments. Proceed with construction
REVIEWED AS NOTED	Incorporate corrections or comments and proceed with construction. No other alterations are to be made to the Drawings by the Contractor subsequent to receipt of Drawings stamped and marked as above. If further changes are made in addition to the Consultant's notations, then the Drawings must be resubmitted for further review.
REVISE & RESUBMIT	Revise Drawing in accordance with corrections or comments and re-submit to the Engineer for further review
NOT REVIEWED	Drawing does not require Engineer's review

- .3 Shop Drawing numbering shall be in numerical sequence beginning with the specification Section number followed by "001". If a revision is submitted it shall be followed up in sequence beginning with ".R1". See below table for example:

Section 02 41 19	Selective Structure Demolition
02 41 19.001	Demolition Plan
02 41 19.001.R1	Demolition Plan
02 41 19.002	Conflict with Buried Fiber Cable

- .4 Coordinate Shop Drawing file sizes with Consultant in advance of submittal. Generally, submit up to 10 megabytes file size only.
- .5 Drawings shall be blackline as much as possible to obtain good resolution when printed.
- .6 Consultant may mark up the Shop Drawings electronically or may print and mark up manually.
- .7 A copy of Shop Drawings with Consultant's comments in colour and shall be emailed back to the Contractor or posted on a File Transfer Protocol (ftp) site or project website, if such site exists. The Consultant will retain on its electronic folder, a PDF copy of Shop Drawings returned to the Contractor. Original marked up hardcopy if applicable will also be retained by the Consultant.

2.5 **SUBMITTAL SYSTEM**

- .1 Shop Drawings shall be submitted in electronic format for obtaining reviews from the Consultant.
- .2 Electronic submittals shall be uploaded by the Contractor in PDF format. Any other format will result in delays in the review of submittals.
- .3 Contractor shall electronically notify various people of each submittal according to a communications plan determined at the beginning of the Work.
- .4 Consultant will apply the review stamp to the submittals and upload a PDF version of the reviewed Drawings complete with comments. Consultant will return submittals and will be named to align as closely as possible.
- .5 Consultant will electronically notify the various parties of a reviewed submittal as determined at the beginning of the Work in the communications plan.
- .6 Contractor shall download "Reviewed" submittal and print out the files in order to obtain the Consultant's review comments.
- .7 Contractor is responsible for opening and checking all documents and shall confirm the following and if there are any discrepancies, the Contractor shall contact the Consultant immediately.
 - .1 That the files contained have been correctly transmitted.
 - .2 That the transmittal sheet accurately lists the files that were sent.
 - .3 That the files match-up with files previously submitted by the Contractor to the Consultant.

2.6 SUBMITTAL SYSTEM – ONWARE

- .1 The Consultant will be utilizing a web based construction contract administration control software identified as IBI-CAtrax (<https://login.onware.com>) to manage requests for information, submittal construction communications, and change management documents for the Project.
- .2 The Contractor and requested sub-contractors will be provided with access to this web-based software and project database following Contract award by the Owner.

2.7 INFORMATION REQUIRED

- .1 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information requested in the individual Specification sections or as necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of the section under which the adjacent items will be supplied and installed. Indicate cross references to design Drawings and Specifications.
- .2 Where a submittal relates to door schedule(s), submittal MUST be cross referenced to the door schedule(s) indicating door number and type. Non-compliance will result in the rejection of Shop Drawing.
- .3 All submittals shall be clearly drawn with CAD or typewritten to be legible.

2.8 ENGINEER'S STAMP AND SIGNATURE

- .1 Shop Drawings of components, apparatus and equipment which are designed by the Contractor shall bear the stamp and signature of an Engineer registered in the Province of Ontario in accordance with the Ontario Building Code and the Professional Engineer's Act.

2.9 CHANGES

- .1 Adjustments made on Shop Drawings by the Consultant are not intended to change the Contract Price. If adjustments affect the value of Work, state such in writing to the Consultant prior to proceeding with the Work.
- .2 Make changes in Shop Drawings as the Consultant may require and which are consistent with Contract Documents. When resubmitting, notify the Consultant in writing of any revisions other than those requested by the latter.

2.10 UNITS OF MEASUREMENT

- .1 Shop Drawings shall show weights and dimensions in either metric (S.I. units) or Imperial units, consistent with the Consultant's Drawings and Specifications.

2.11 MISCELLANEOUS

- .1 Fabrication shall not proceed until Drawings have been reviewed, unless other authorization is granted in writing by the Consultant.
- .2 The Contractor and each Subcontractor is expected to operate as an expert in his respective field. The Contractor shall save Owner and Consultant harmless from any defect resulting from failure in this regard including cost of remedial action necessary before or after completion of the Work.

- .3 Drawings shall be prepared specifically for the Work.

2.12 **RECORD SUBMISSIONS**

- .1 Record purpose submissions for:
 - .1 Piping specialties.
 - .2 Valves.
 - .3 Any inspection certificate/report submitted by authorities shall be stamped "FOR RECORD PURPOSES ONLY".
 - .4 For each size or model as applicable for equipment, submit two copies or one copy on CDROM(s), scanned file copies in Adobe Acrobat Version 6 or later.

2.13 **SUBMISSIONS TO AUTHORITIES HAVING JURISDICTION**

- .1 Contact authorities having jurisdiction over the Place of Work for required list of submissions for their review.
- .2 All detailed design Drawings or other submittals required to be submitted to the authority for approval shall be prepared, submitted, and paid for by the Contractor.

2.14 **BROCHURES**

- .1 Submit two copies of Product data sheets or brochures, or one copy on CDROM(s), scanned file copies in Adobe Acrobat Version 9. Data sheets or brochures are for requirements requested in Specification sections and as the Consultant may reasonably request where customized Shop Drawings will not be prepared due to standardized manufacture of Product.
- .2 Brochures or Drawings of standard production equipment shall be for one size or model and include all performance data and characteristic curves for such equipment.
- .3 Wiring diagrams and schematics shall accompany Shop Drawings for all equipment which have electrical controls furnished with the equipment.

3 **Samples**

3.1 **SAMPLES**

- .1 Submit for review all samples as requested in the respective Specification sections. Label samples as to origin and intended use in the Work.
- .2 Deliver samples prepaid to Consultant's business address, unless otherwise approved by Consultant. Large, heavy items such as concrete block samples may be reviewed on site if arranged in advance with the Consultant.
- .3 Notify the Consultant in writing at the time of submission, of deviations in samples from requirements of Contract Documents.
- .4 Adjustments made on samples by the Consultant are not intended to change the Contract Price. If such adjustments affect the value of Work, state such in writing to the Consultant prior to proceeding with the Work.
- .5 Make changes in samples which the Consultant may require consistent with the Contract Documents.

4 Building, Operating and Maintenance Manuals

4.1 **BINDERS**

- .1 Binders: Commercial quality, 260 mm x 295 mm; hard covered, jacketed, "D" ring style with 3 rings in size to suit binder thickness.
- .2 Covers: Identify each binder with typed or printed title "Building, Operating and Maintenance Manuals"; list title of Project, Owner, and date of manual submission.
- .3 Organize contents into applicable categories of Work, parallel to Specification sections. When only one volume is required, include a complete index. Where more than one volume is required, include a complete index of all volumes and each succeeding volume shall contain an index of its own contents.
 - .1 Provide tabbed fly leaf for each category of Work, with typed description of Product and major component parts of equipment.
 - .2 Include names, addresses, telephone number and general email address of Contractor with names of responsible parties; schedule of Products and systems, indexed to content of the volume.
 - .3 For each Product or system, list names, addresses, telephone numbers and general email address of Subcontractors and Suppliers who can effect repair or maintenance on equipment, including local source of supplies and replacement parts.
 - .4 Product data: organize to parallel Project Manual (Specifications) breakdown. Mark each sheet to clearly identify specific Products and component parts and data applicable to installation; delete inapplicable information. Supplement Product data to illustrate relationships of component parts of equipment and systems to show control and flow diagrams
 - .5 Typed text information: Provide as required to supplement Product data. Provide logical sequence of instructions for each procedure incorporating manufacturer's instructions.
 - .6 For test information, manufacturer's printed data or typewritten data is required.
 - .7 For Drawings, provide appropriate reinforced binder tabs and bind in with text; fold larger sheets.

4.2 **BUILDING MANUALS**

- .1 For building Products, applied materials and finishes include:
 - .1 Product data with catalogue number, size, composition and colour and texture designations.
 - .2 Maintenance instructions for finished surfaces and materials.
 - .3 Copy of finish hardware and paint schedules.
 - .4 Spare materials for maintenance purposes as listed in various technical sections.
 - .5 Provide information for reordering custom manufactured Products.

- .2 Include instructions for cleaning agents methods and recommended schedule for cleaning and maintenance, include precautionary information against detrimental agents and proper methods.

- .3 Additional requirements: Include as specified in individual Specification sections.

4.3 **OPERATING AND MAINTENANCE MANUALS**

- .1 One Operating and Maintenance Manual is to be submitted for each building and address included as part of the project.

- .2 Manuals are to contain operational information on equipment, cleaning and lubrication schedules e.g. filters, overhaul and adjustment schedules and similar maintenance information. Give equipment function, normal operation characteristics and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

- .3 Instructions shall be in such form and language so as to facilitate the Owner in the proper operation and maintenance of building systems.

- .4 In addition to information specified, include the following:

- .1 Final Shop Drawings and Product data of equipment.
- .2 Record Drawings of mechanical and electrical installations.
- .3 Full description of building systems and operations.
- .4 Operating procedure: include start up, break-in, and routing normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter and any special operating instructions.
- .5 Controls and operating sequences; wiring diagram of control panels.
- .6 Schematic diagram of pneumatic, electrical, oil and/or gas systems.
- .7 Non-dimensional layout showing locations of all electrical devices on mechanical equipment.
- .8 Complete parts list of assemblies showing manufacturer's names, addresses, nearest replacement sources and telephone numbers.
- .9 List of recommended spare parts and quantity of each item to be stocked.
- .10 Maintenance requirements: include preventative requirements; routine procedures and guide for troubleshooting; disassembly, repair, and reassembly instructions and alignment, balancing and checking instructions.
- .11 Manufacturer's warranties.
- .12 Lubricating instructions, list of lubricants and recommended cycle of lubrication.
- .13 Manufacturer's certified reports.
- .14 Field testing and commissioning reports.
- .15 Factory test reports.

- .16 Sequence of controls operation and control diagrams.
- .17 Contractor's coordination Drawings with installed colour coded piping diagrams.
- .18 Original manufacturer's parts list, illustrations, assembly Drawings and diagrams required for maintenance.
- .19 List of original manufacturer's spare parts, current prices and recommended quantities to be maintained in storage.
- .20 Additional requirements: Provide as specified in individual Specifications sections.
- .5 Requirements specified apply to component parts of equipment whether they are manufactured by Supplier of equipment or are supplied as a component part of an item of equipment.

4.4 **SUBMITTAL OF MANUALS**

- .1 Two months (two weeks) prior to anticipated date of Substantial Performance, submit to Consultant one hardcopy and one USB of completed manuals in final form.
 - .1 Copy will be returned with Consultant's comments.
 - .2 Revise contents of manuals as required prior to final submittal.
 - .3 Submit six (two) copies of revised manuals in final form within 14 days before Substantial Performance.
 - .4 USB shall contain PDF file copies in Adobe Acrobat Version 9 or later version, of all Building, Operating and Maintenance Manuals. Provide a file for each document, with bookmarking reference for each chapter or section in the document.

5 As-Builts

5.1 **AS-BUILT DRAWINGS AND CCTV**

- .1 Provide at own cost, additional sets of Drawing prints for use in maintaining "As-Built" information.
- .2 Be responsible for creating "As-Builts" from field data collected during the course of the Project. Neatly record complete with legible dimensions and notes.
- .3 "As-Built" Drawings are those prepared by the Contractor as it constructs the Project and upon which it documents the actual locations of the building components and changes to the original Contract Documents.
- .4 Field data is defined as information that is not available from the Contract Documents, addenda, Change Orders, or Site instructions. It is of importance that the Contractor record on the "As-Builts" all field information relating to concealed conditions.
- .5 "As-Built" information MUST have a high degree of accuracy in all respects.
- .6 Recording must be done on the same day that deviation is made to ensure that important information is not missed from the "As-Builts".

- .7 Hand-mark all recording using red ink. "Clouded" method is unacceptable and "As-Built" showing such method will be returned to the Contractor.
- .8 Identify as "Project As-Built Copy". Maintain in good condition; clean, dry and legible, and make available for inspection on Site by Consultant at all times.
- .9 Upon completion of the Work and prior to final inspection, submit a clean and legible copy of "As-Built" Drawings to Consultant.
- .10 CCTV:
 - .1 Submit a CCTV recorded video file in .mpg or .mp4 format showing storm drainage and sewer systems free from construction debris.

5.2 **PROGRESS PHOTOGRAPHS**

- .1 On commencement of the Work and at every two-week interval thereafter, supply the Consultant with minimum twelve (others) digital colour photographs, taken from different views, indicating status and progress of the Work by each section of Work. Indicate date photograph was taken with appropriate description and email to the Consultant or upload to FTP site or project website, where the latter exists.
- .2 Maintain a binder on site with 4 x 6 photographs for easy reference.

5.3 **PROGRESS VIDEO**

- .1 Provide internet capable camera and an active website, allowing off-site viewing of the Place of the Work twenty-four hours a day, seven days a week. Submit website address and security access code to Consultant.
- .2 Submit colour files in digital format, weekly with progress statement.
- .3 Frequency: At completion of building as directed by Consultant.

End of Section

Digital Transfer Agreement

This Digital Transfer Agreement (the “**Agreement**”) is made as of **[Month, Day, Year]**, between **[Insert Client Name]** and **[Insert correct IBI Group entity legal name]** as provided below:

[Insert Recipient Name Office Address City, Province/State, Country Postal/ZIP Code]	and	[Insert correct IBI Group entity name and address.]
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the “**Recipient**”

“**IBI Group**”

IBI Group and the Recipient are providing services for the **[insert project name and brief description]** (the “**Project**”). The Recipient and IBI Group wish to enter into this Agreement whereby IBI Group will provide digital documents to the Recipient to assist the Recipient in carrying out its Project-related services.

NOW THEREFORE, in consideration for being given access to information that is confidential and proprietary, and for other good and valuable consideration the receipt and sufficiency of which are hereby acknowledged, the parties hereby agree and covenant as follows:

Section 1 – Transfer of Files

- 1.01 IBI Group will, following execution of this Agreement **[and payment to IBI Group by the Recipient of \$X]**, transfer to the Recipient the digital files listed at *Schedule 1 – Digital Files* (the “**Files**”). By separate amendment executed by both parties hereto, the parties may agree to transfer additional Files to be included in additional schedules in the form attached hereto at Schedule 2.
- 1.02 The Recipient acknowledges and agrees that it:
- (a) may use the Files, and any portion or component thereof, only for its own use in relation to the Project, and only for the following express purposes:
 - (i) **[background on which to prepare design, shop or other drawings and other submittals]**
 - (ii) **[3D coordination / clash detection / schedule simulation (4D)]**
 - (iii) **[take offs / quantity estimates of specific items (list)]**
 - (iv) **[fabrication / procurement of components]**
 - (v) **[integration with Geographic Information System (GIS) or Asset Management System]**
 - (vi) **[insert other]**
 - (b) may not transfer, forward, sell, trade, distribute, or permit access to, the Files, to any third party, including without limitation Project contractors, subcontractors, consultants and sub consultants, unless IBI Group has expressly agreed to such transfer in writing, it being understood that such agreement will not be forthcoming from IBI Group unless and until such proposed third party has executed a digital transfer agreement similar to the terms contained herein in favour of IBI Group; and

- (c) may not alter, modify, amend or change in any manner the contents of Files, or separate any content, schedules, materials, wall types or legends which are included as elements within the Files, or in any portion of the Files.

Section 2 – Liability of IBI Group and Recipient Indemnity

- 2.01 The parties agree that IBI Group is not responsible for, and does not warrant or guarantee the accuracy, correctness or completeness of, the Files or the data contained therein, including without limitation any reference notes to “as-built” or similar. IBI Group offers no assurances that the information in the Files is reflective of previous contract or as-built conditions, and disclaims all responsibility for the accuracy or use of the data contained within the Files.
- 2.02 The Recipient agrees to verify and check all information contained within the Files and acknowledges it is solely responsible for fully ascertaining all site conditions and measurements relevant to its Project deliverables.
- 2.03 The Recipient agrees to waive any and all actions, claims, demands, proceedings, charges, fines, sanctions, penalties, damages, losses, consequential losses, damages related to loss of use, loss of profit, loss of opportunity, loss income or diminution of property value and the like, and costs and expenses (including legal and other professional fees) of whatsoever nature or kind (together “**Claims and Damages**”), that the Recipient, the entity procuring the Project and any third party involved in the Project, and each of their respective employees and agents (together “**Project Parties**”) may suffer, on any theory of liability, whether in contract, strict liability, tort, negligence, or otherwise (as against IBI Group), which arise out of or result from the Recipient’s use of or reliance on the Files or use of or reliance of the Files by the Recipient’s third party recipient, whether or not authorized as permitted hereunder.
- 2.03 The Recipient agrees to indemnify, defend and hold harmless IBI Group, and each of its related and affiliated companies, their officers, directors, unit holders, partners, associates, and employees (together “**IBI Group Indemnified Parties**”) from and against any and all Claims and Damages suffered by any IBI Group Indemnified Party, arising out of, in connection with, or result from use of the Files by the Recipient or its representatives.

Section 3 – IBI Group Retention of Rights

- 3.01 IBI Group retains all common law, statutory law and other intellectual property rights relating to the Files and the data contained therein, including, but not limited to, title, copyright, industrial design rights and moral rights.
- 3.02 The Recipient hereby assigns to IBI Group all copyrights in all materials produced from the Files and except with IBI Group’s prior written consent, the Recipient shall not use the Files or any part thereof to produce any materials not expressly required for the Project, including without limitation views, graphics, renderings, physical models or marketing materials, nor may the Recipient use those materials for any purpose other than the Project. If, in its sole discretion, IBI Group does consent to any other use, such

consent will be conditioned, at a minimum, to IBI Group receiving credit as the producer and (to the extent applicable) copyright holder.

Section 4 – Recipient Acknowledgments

- 4.01 While IBI Group has taken reasonable precaution to ensure that Files are “virus-free”, the Recipient takes full responsibility of assuring that this is the case, and that the Recipient shall have no entitlement to any Claims and Damages connected to damages to its computing systems and/or files in the transfer or use of the Files.
- 4.02 The Recipient acknowledges that:
- (a) the Files provide a representation of then dated design, are not construction documents, nor do the Files reflect construction or contract documents, and that there may be differences between the Files and any corresponding construction or contract documents, including but not limited to previously prepared construction or contract documents;
 - (b) the Files do not represent or confirm specific Project elements, including without limitation those relating to fire and life safety, assembly details, systems, building envelope assemblies or details and the like; and
 - (c) data contained in the Files may change subsequent to the issue of Files to the Recipient due to changes or additions, however IBI Group is under no requirement to advise the Recipient of any such changes or additions and no liability accrues to IBI Group for not advising the Recipient of any changes or additions.
- 4.03 The Recipient shall, at its sole expense, remove all references to the name and logo of IBI Group, the name and logo of any other consultant, and all professional seals, in the use of the Files. Furthermore, IBI Group reserves the right to remove all references to the name and logo of IBI Group, the name and logo of any other consultant, and all professional seals, in the Files provided to the Recipient.
- 4.04 If the Files are provided as linked components, the Recipient takes full responsibility for any ‘binding’ which may be required by the Recipient. The Recipient acknowledges that in some cases Files are linked because of size constraints, and agrees that file corruption which may be a consequence thereof is at the Recipient’s sole cost, risk and expense.

Section 5 – Term and Termination

- 5.01 Unless extended by mutual agreement of the Recipient and IBI Group, this Agreement will terminate on the earliest of: (a) **[DATE]**; and (b) the date of termination in accordance with this Section 5.
- 5.02 If the Recipient fails to comply with any of the terms or conditions of this Agreement, IBI Group may terminate this Agreement and all rights of the Recipient created herein.

- 5.03 Upon completion of the Project, or upon termination of this Agreement for whatever cause, all rights and privileges granted to the Recipient hereunder will immediately terminate and the Recipient shall immediately return to IBI Group, or destroy, the Files and all related copies and materials. IBI Group reserves the right to require a certificate of a Director of the Recipient attesting to the return or destruction of the Files and all related copies and materials.

Section 6 – Confidentiality

- 6.01 Recipient shall not divulge any specific information identified as confidential, communicated to or acquired, or disclosed by IBI Group. No such information shall be used by Recipient on any other project without the written approval of IBI. These obligations of confidentiality shall not apply to information which is in the public domain; which is provided to Recipient by a third party without obligation of confidentiality; which is independently developed by Recipient without use of IBI Group's information; or which is required to be disclosed by law or by court order.

Section 7 – Miscellaneous

- 7.01 The express rights and remedies of the parties set out in this Agreement are in addition to and will not limit any other rights and remedies available to the Recipient or IBI Group at law or in equity. Any failure by either party to insist on strict performance and compliance by the other of any term, right or remedy under this Agreement will not be construed as a waiver by such party its right to require strict performance of any such term, right or remedy, and the duties of the party with respect to such contractual performance will continue in full force and effect.
- 7.02 Neither party will transfer, sublet or assign any rights or duties under, or interest in, this Agreement, without the prior written consent of the other party.
- 7.03 If any term, condition or obligation of this Agreement, or the application of any term, condition or obligation to the parties or to any other persons (including firms, partnerships, corporations or any combination), is to any extent held invalid or unenforceable under any applicable legislation or rule of law, such holding will be applied only to that provision(s), with the remainder of this Agreement remaining in full legal force and effect.
- 7.04 The parties agree that this Agreement and legal actions concerning its validity, interpretation and performance will be governed and interpreted in accordance with **[INSERT JURISDICTION OF IBI Group ENTITY]**; and it is further agreed by the parties that any legal action arising under this Agreement will be brought in a court of competent jurisdiction in that jurisdiction.
- 7.05 This Agreement constitutes the entire agreement between the Recipient and IBI Group regarding the transfer of Files and cancels and supersedes any prior understandings and agreements, whether written or oral in respect of the same. Except as expressly provided in this Agreement, no other terms, conditions or warranties, express or implied, form a part of this Agreement. Amendments to this Agreement must be in writing and signed by both parties.

- 7.06 Notwithstanding any amendment, completion or termination of this Agreement, all indemnifications in favour of IBI Group will survive and will remain in full legal force and effect.
- 7.07 The Recipient and IBI Group agree to be bound, as are their respective successors, executors, administrators and legal representatives, in respect of all terms, conditions and obligations pursuant to this Agreement.
- 7.08 This Agreement may be signed in counterparts and each such counterpart will constitute an original document and such counterparts, taken together, will constitute one and the same instrument. This Agreement may be executed and delivered by electronic transmission and the Recipient and IBI Group may rely on such electronic signature as though such were an original signature.

This Agreement is executed with effect as of the date set out on the first page of this Agreement.

RECIPIENT

Name:	_____	Name:	_____
Title:	_____	Title:	_____

IBI GROUP

Name:	_____	Name:	_____
Title:	_____	Title:	_____

Schedule 1 – DIGITAL FILES

INSERT DESCRIPTION OF DIGITAL FILES INCLUDING FORMAT

Schedule 2 – ADDITIONAL DIGITAL FILES

The defined terms used in Schedule 2 have the meaning ascribed to them in the Agreement.

For and in consideration of good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereto agree that except for the addition of Files as described below, the provisions of Agreement shall remain in full force and effect and the Files described below shall be subject to the terms and conditions of the Agreement in full.

IBI Group will, following execution of this Agreement **[and payment to IBI Group by recipient of \$X]**, transfer to the Recipient the digital files listed at *Schedule 2 – Additional Digital Files* (the “Files”). By separate amendment executed by both parties hereto, the parties may agree to transfer additional Files to be included in additional schedules in the form attached hereto at Schedule 2.

RECIPIENT

Name:	_____	Name:	_____
Title:	_____	Title:	_____

IBI GROUP

Name:	_____	Name:	_____
Title:	_____	Title:	_____

**Attachment "A" to Specification Section 01 33 00
Standard Submittal Form**

Page 1

1. Submittal Title:												
2. To:		3. From:		4. Project Title & Location:			5. Submittal Date			6. New Resubmittal		
ATTN:		ATTN:		8. Specification Section No:			7. Submittal No.			10. Resubmittal No.		
							9. Partial Submittal No.					
11. Contract				12. Project No:					IBI/Owner Use Contract No:			
13. Page No.	14. Mfr/Contractor		15. Item I.D. Description		16. Electronic Copy (Yes) (No)		17. No. of Hard Copies				Date: Received:	
							Print	Cat.	Samp	Other	Action Code # Dept. File	
18. Contractor's Remarks:					The undersigned certifies that the above submitted items have been reviewed in detail and are correct and in strict conformance with all requirements of the Contract Documents, except as otherwise noted. Note: Approval of items submitted does not relieve Contractor from complying with all requirements of the Contract Documents. Name of Contractor _____ Signature _____					Action Codes: Refer to Section 01 33 00 for full text of codes below		
										1. Revise & Resubmit Revise and resubmit to the Consultant for further review 2. Reviewed as Noted Incorporate corrections or comments and proceed with construction		
Consultant Comment:			Route	Dept.	Ck'd by	Date	Action	Received				
				Civil								
				Arch.								
				Struc.								
				Mech.								
				Elect.								
				I & C								
				Process								
				PM								
Copies to:			Primary Dept. Checker					Review completed on				
			Control Administrator					Returned to Contractor on				
								By Date				
								IBI Group				

Attachment "A" to Specification Section 01 33 00
Standard Submittal Form

Page 2

Instructions for Use of Standard Submittal Form

1. Use an individual copy of this form for each and every required Project submittal.
2. Contractor shall fill in all blank spaces above the "Owner Comment" box and to the left of the "Action Codes", including the following:
 - Box 1 - Indicate generically what is being submitted i.e. "structural steel", "overhead doors", "plumbing fixtures", "wiring diagrams", etc.
 - Box 3 - Contractor's return address
 - Box 5 - Submittal date
 - Box 6 - Indicate "New" or "Resubmittal"
 - Box 7 - Submittal number
 - Box 8 - Specification section number submittal is in response to
 - Box 9 - Indicate if this is a partial submittal by using root number with part number (A5-00-01 – Part A, A5-00-01 – Part B, etc.)
 - Box 10 - Indicate if this is a resubmittal by using original root number with revision number
 - Box 11 - Indicate appropriate Contract name
 - Box 13 - Indicate Specification page number
 - Box 14 - Identify the manufacturer/Vendor/Subcontractor
 - Box 15 - Describe the submitted item
 - Box 16 - Indicate if electronic submittal
 - Box 17 - Indicate the quantity of submittal copies
 - Box 18 - Include appropriate remarks as required and sign the certification
3. The remainder of the submittal form will be completed by the Consultant, and returned to the Contractor with the submittal.

End of Attachment

- 1 Description
 - .1 This section covers Work for protection of environment as applicable to this Project.
 - .2 Provisions of this section supplement requirements of Contract Documents.
- 2 Environmental Practices
 - .1 Implement environmentally sound practices in this Project by incorporating Products that lessen burden on environment in production, use and final disposition. Support implementation of reduction, reuse and recycling strategies and use of environmentally sound Products. Promote use of environmentally responsible packaging practices by reducing and/or eliminating Products with excessive packaging in this Project where these practices do not negatively affect the proper protection of materials from inclement weather, especially water damage.
 - .2 Employ environmentally sound Products which are made, used and disposed of in a manner that significantly reduces harm to environment.
- 3 Surface Drainage and Watercourses
 - .1 Maintain ditches and watercourses for surface water drainage of Site and external properties during construction. Be responsible for damage due to negligence.
 - .2 Incorporate appropriate retention, detention and settling ponds, or similar methods, reviewed by Consultant, to control surface water run-off to adjacent ditches or other watercourses and to prevent oil, sediment or de-icing materials being carried into such ditches and/or watercourses. Tested quality of water discharged to ditches and/or watercourses shall not be of worse quality than that present in ditches and/or watercourses prior to any discharge of Site surface water. Monitor and test discharge water at least weekly and provide copies of test result to Consultant.
 - .3 Locate and protect stockpiles of semi-permanent nature to satisfaction of authorities having jurisdiction to ensure minimum environmental interference.
- 4 Noise Control
 - .1 Adhere to local noise bylaws.
 - .2 Equip vehicles and equipment with efficient noise attenuation devices (mufflers) to minimize noise levels in vicinity of Site.
 - .3 Where necessary place noise attenuation devices (barriers) around stationery pumps and compressors.
- 5 Dust Control
 - .1 Undertake control measures to prevent nuisances due to dust in any phase of construction.
 - .2 Application of calcium chloride shall be kept to a minimum and shall be restricted to vehicle right-of-way. In close proximity to watercourses, frequent application of water is preferred method. Obtain Consultant's approval before chemicals for dust control are used.
 - .3 Transport dusty materials in covered haulage vehicles.
 - .4 Transport wet materials in suitable watertight haulage vehicles.

- 6 Waste Management Practices
 - .1 Refer to Section 01 74 19.
- 7 Equipment Fuelling, Maintenance and Storage
 - .1 Obtain Consultant's acceptance of refueling areas.
 - .2 Procedures for interception and rapid clean-up and disposal of fuel spillages shall be submitted to Consultant for review prior to starting Work.
 - .3 Ensure that materials required for clean-up of fuel spillages are readily accessible on Site at all times.
 - .4 Carry out refueling of equipment at acceptable refueling areas.
 - .5 Ensure that water used for cleaning of equipment does not drain into streams, lakes or watercourses. Do not empty fuel, lubricants and/or pesticides into any watercourse, or on ground.
 - .6 Clean Construction Equipment prior to entering public roadways to prevent littering. Debris from cleaning equipment shall not be permitted into storm sewers or watercourses.
 - .7 Store equipment and materials in orderly manner and in location acceptable to Consultant.
- 8 Spills Reporting
 - .1 In event of spill or other emission of pollutant into natural environment, notify:
 - .1 Local office of the Ministry of Environment and MOE Spill Action Centre (SAC).
 - .2 Municipality or regional municipality within boundaries of which spill occurred.
 - .3 Person having control of pollutant, if known, of spill, of circumstances surrounding the spill and of any action taken or intended to be taken.
- 9 Contingency Plan for Control and Clean-Up of Spill
 - .1 Prior to commencing construction, prepare contingency plan for control and clean-up of spills. Contingency plan to include:
 - .1 Names and telephone numbers of persons in local municipalities and MOE to be notified forthwith of spill.
 - .2 Names and telephone numbers of representatives of fire, police and health departments of local municipalities who are responsible for responding to emergency situation.
 - .3 Names and telephone numbers of companies experienced in control and clean-up of hazardous materials that would be called upon in emergency involving spill.
 - .4 Contingency plan shall include provisions for spills of hazardous or unknown materials (i.e. puncturing on unmarked drain during excavation).
 - .5 Proposal for immediate containment and control of spill, clean up procedures to be initiated immediately and any other action to be taken to mitigate potential environmental damage while awaiting additional assistance.

- .6 Be responsible for preparing, implementing, directing and supervision of contingency plan.
- .2 Ensure immediate availability of Products with which to effect temporary repair to broken pipelines and other services so spill or other emission of pollutant is immediately controlled and stopped and to mitigate damages.
- .3 Submit for Consultant's review copy of contingency plan and make appropriate changes as requested.

End Of Section

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- 1 All equipment shall be guarded and safeguarded in compliance with the Industrial Regulations O.Reg. 851 and shall meet the latest revision of the applicable standard listed in tables 3 and 4 of the Guidelines for Pre-Start Health and Safety Reviews: How to Apply Section 7 of the Regulation for Industrial Establishments (available on the Government of Ontario website).
- 2 For all equipment that triggers a Pre-Start Health and Safety Review (PSR) as outlined in the Guidelines for Pre-Start Health and Safety Reviews: How to Apply Section 7 of the Regulation for Industrial Establishments and as specified in Section 7 of the Industrial Regulations O.Reg. 851, the Contractor shall provide a PSR report. Alternatively, the Contractor shall provide a Letter of Exemption complete with supporting documentation as outlined in the Guidelines and as specified in Section 7 of the Industrial Regulations O.Reg. 851.

End Of Section

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1 PROPOSED EQUIVALENT PRODUCTS

- .1 Whenever a material or article is specified or described by using the name of a proprietary Product or the name of a particular manufacturer or Vendor, the specific item mentioned shall be understood as establishing type, function, dimension, appearance, and quality of Product desired.
- .2 The words "or accepted equal", "or accepted equivalent" and "or accepted alternative" as used in the Specifications are to be regarded as synonymous in meaning, and are applicable to all Specifications unless specifically stated otherwise. Any material, Product, or equipment which will fully perform or meet the service or function and/or aesthetics represented by a specified Product will be considered for acceptance as a "substitution", provided the Contractor submits proof that such material, Product or equipment is of acceptable equivalent substance and function and is accepted by the Owner. The burden of proof of acceptability rests with the Contractor.

2 PROPOSED SUBSTITUTIONS

- .1 Requests for substitutions must be submitted in writing using Section 01 62 01 Substitution Request Form.
- .2 The net cost of proposed substitution, weighed versus the cost of review, will be a factor in the Owner's final decision.
- .3 Contractor is responsible to determine suitability of accepted substitute Products for general construction purposes and scheduling requirements.
- .4 Acceptability of proposed substitutions is at the sole discretion of the Owner. The Owner however, is under no obligation to consider any or all proposed substitutions. Acceptance of substitutions shall in no way be interpreted as a waiver from full compliance with other Specification requirements.
- .5 Contractor shall declare that such substitution will fit within all constraints of the intended location and operating system in the Work without modification, or clearly described and defined modification, to allied specified systems, materials or assemblies.
- .6 Contractor shall save harmless the Owner, Consultant and their Subconsultants from any costs or third party action as a consequence of accepted substitution. Failure to comply with these requirements will result in rejection of the request.

3 NOTIFICATION OF ACCEPTANCE

- .1 Materials and equipment accepted as substitutions will be formally notified to the Contractor by a Change Order, Supplementary Instruction (SI) or Shop Drawings, as the case may be.

End of Section

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Substitution Request Form (SRF) No.: _____ Date: _____

Project: _____

General Contractor: _____ Subcontractor _____

Owner's Authorization: _____ Proceed (per _____)

1

General

- .1 This section applies to proposed substitutions submitted after Contract award.
- .2 Within four (two) weeks of Contract award, the Consultant will receive requests for substitutions from General Contractor for consideration. Proposed substitutions received after the expiration of the specified period will be marked "substitution review expired" and returned to Contractor.
- .3 Copy Owner on all substitution requests. The Owner will forward authorized substitution requests to Consultant by email. Consultant will not proceed with review without Owner's authorization.
- .4 For the Consultant's services in reviewing submittal, pay a fee of \$180.00/hour plus HST, minimum three hours or \$540.00, per proposed substitution.
- .5 Upon receipt of request, the Consultant will assess time required to review. If up to three hours is required, the Consultant will email Contractor and the Contractor will acknowledge by return email, authorizing the Consultant to proceed.
- .6 If the Consultant requires additional time above the three hours, Consultant will email Contractor with proposed additional hours with a proper breakdown for Contractor's consideration. Contractor shall send an email response accepting the proposed budget to authorize Consultant to do the review.
- .7 The Consultant will complete its review and submit a response back to Contractor in a timely manner.
 - .1 If accepted, a Change Order or Supplementary Instruction is issued.
- .8 Whether rejected or accepted, the Consultant will invoice Contractor for the cost of the review, with a copy of the Contractor's email confirmation attached to the invoice.
- .9 The Owner is under no obligation to consider any or all proposed substitutions.
- .10 For substitutions where cost savings are proposed the cost saving amount proposed by the Contractor will be reduced by the cost for the review.
- .11 Contractor shall declare that such substitution will fit within all constraints of the intended location and operating system in the Work without modification, or clearly described and defined modification, to allied specified systems, materials or assemblies. The proposed substitute shall be equal to or superior to the specified item as determined by Consultant.
- .12 Save harmless the Owner, Consultant and their Subconsultants from any costs or third party action as a consequence of accepted substitution. Failure to comply with these requirements will result in rejection of the request.

- .13 Any system, Product or material utilized without acceptance from the Consultant shall be removed from the Work, and replaced with complete installation of those specified without adjustment of Contract Price or Contract Time.

2 Details of Substitution Request

.1 Specified Product

- .1 Section Number: _____
- .2 Section Title: _____
- .3 Paragraph Number: _____

.2 Proposed Substitution

- .1 Manufacturer: _____
- .2 Trade Name or Model Number: _____
- .3 Manufacturer's Address: _____
- .4 Contact Person: _____
- .5 Phone No.: _____ Email: _____

.3 Product History

- .1 ☐ New ☐ 2 to 5 yrs old ☐ 5 to 10 yrs old ☐ more than 10 yrs old
- .2 Similar Installations:
- .3 Project Name: _____
- .4 Address: _____
- .5 Consultant: _____
- .6 Owner: _____
- .7 General Contractor: _____

.4 Proposed Product Affects Other Parts of Work?

- .1 ☐ No ☐ Yes
- .2 If "Yes", explain:
- _____
- _____
- _____
- _____

.5 Differences between proposed substitution and specified Product:

-
-
- .6 Reason for not providing specified Product (substitution requests are considered under any of the following conditions only. Indicate conditions with a check (✓) mark):
- .1 ☐ Product(s) selected from those specified is/are unavailable.
 - .2 ☐ Method(s) specified is/are too intricate.
 - .3 ☐ Delivery date of Product(s), selected from those specified would unduly delay completion of Contract.
 - .4 ☐ Method(s) specified would unduly delay completion of Contract.
 - .5 ☐ Proposed substitute Product(s) or system(s) will result in a meaningful credit to the Contract Price.
- .7 Change to Contract Price
- .1 Add/Deduct \$ _____ (_____)
- .8 Change to Contract Time
- .1 Add/Deduct _____ days
- .9 Contractor's Declaration:
- .1 Proposed substitution has been fully investigated and determined to be equivalent or superior in all respects to specified Product, and complies with requirements of authorities having jurisdiction.
 - .2 Same warranty will be furnished for proposed substitution as for specified Product.
 - .3 Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
 - .4 Proposed substitution does not affect dimensions and functional clearances.
 - .5 Proposed substitution is compatible with adjacent materials and assemblies.
 - .6 Coordination, installation, and changes in the Work as necessary for accepted substitution will be the responsibility of the Contractor.

Signed By Contractor: _____

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Reports ☐ Other

3 Consultant's Review

.1 Substitution Accepted - Provide submittals per Specification requirements.

.2 Substitution Not Accepted.

.1 Reason: _____

Signed By Consultant: _____ Date _____

End Of Form

1 General

1.1 **REQUIREMENTS INCLUDED**

- .1 Product quality, availability, storage, handling, protection, handling on Site.
- .2 Manufacturer's instructions.
- .3 Workmanship, coordination, cutting, fastenings.
- .4 Existing facilities.

2 Products

2.1 **QUALITY**

- .1 Products, material, equipment and articles (referred to as Products throughout the Specifications) incorporated in the Work shall be new, not damaged or defective, and of the best quality, compatible with Specifications for the purpose intended.
 - .1 If requested, furnish evidence as to type, source and quality of Products provided.
- .2 Defective Products, whenever identified prior to the completion of Work will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is a precaution against oversight or error. Remove and replace defective Products at own expense and be responsible for delays and expense caused by rejection.
- .3 Should any dispute arise as to the quality or fitness of Products, the decision rests strictly with the Consultant based upon the requirements of the Contract Documents.
- .4 Unless otherwise indicated in the Specifications, maintain uniformity of manufacture for any particular or like item throughout the building.
- .5 Permanent labels, trademarks and nameplates on Products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms as approved by the Consultant.

2.2 **AVAILABILITY**

- .1 Immediately after award of Contract, review Product delivery requirements and anticipate foreseeable supply delays for any item. If delays in supply of Products are foreseeable, notify the Consultant of such, in order that substitutions or other remedial action may be authorized in sufficient time to prevent delay in performance of Work.
- .2 In the event of failure to notify the Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, the Consultant reserves the right to substitute more readily available Products of similar character at no increase in Contract Price.
- .3 Utilize Canadian materials and Products if available and equivalent in price and quality.

2.3 **STORAGE, HANDLING AND PROTECTION**

- .1 Handle and store Products in a manner to prevent damage, deterioration and soiling and in accordance with manufacturer's instructions where applicable.

- .2 Store packaged or bundled Products in original and undamaged condition with manufacturer's seals and labels intact. Do not remove from packaging, crating or bundling until required in the Work.
- .3 Store Products subject to damage from the elements, in weatherproof enclosures.
- .4 Store cementitious Products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for mortar or grout materials, clean and dry. Store sand on platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials and lumber on flat solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in a heated and ventilated room. Remove oily rags and other combustible debris from Site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged Products at own expense and to the satisfaction of Consultant.

2.4 **RECEIVING MATERIAL FURNISHED BY OWNER**

- .1 Owner furnished material or equipment are listed in the Specifications.
 - .1 Contractor shall be responsible for unloading and handling material or equipment furnished by Owner to the Site.
- .2 Contractor receiving such items shall give receipts for the item delivered and thereafter will be held responsible for the care and storage of such items and shall pay for the cost of replacing or repairing any items damaged, misplaced or found to be missing while in Contractor's care and custody.

2.5 **TRANSPORTATION**

- .1 Pay costs of transportation of Products required in the performance of Work.
- .2 Transportation cost of Products supplied by the Owner and delivered to Site will be paid for by the Owner.
 - .1 Contractor shall unload, handle and store such Products.

2.6 **MANUFACTURER'S INSTRUCTIONS**

- .1 Unless otherwise indicated in the Specifications, install or erect Products in accordance with manufacturer's instructions. Do not rely solely on labels or enclosures provided with Products.
- .2 Obtain written instructions directly from manufacturers.

2.7 **ALTERNATIVE MATERIALS**

- .1 Purchased items or materials must meet the requirements of the Specifications. Be responsible for all costs for any modifications required for use of such items.
- .2 To receive approval of substitution, the proposed substitute shall be equal to or superior to the specified item. Requests for substitution shall be accompanied by documentary proof of equality and difference in price and delivery.

- .3 Submit request to the Consultant in writing and provide all technical data, samples and other information requested. No substitution shall be made without the written authority of the Consultant whose decision shall be final.
- .4 Products shall be applied, installed, connected, erected, cleaned and conditioned in accordance with the manufacturer's instructions or directions, unless specified to the contrary elsewhere in the Contract Documents.
- .5 Assume responsibility for any additional material or installation costs resulting from the approved use of equivalent materials or equipment.

2.8 **EXPEDITING**

- .1 The Contractor shall submit, when requested by Consultant, an updated material procurement/expediting record indicating clearly the status of material delivery and fabrication. Particulars to be covered by this record shall include the item identification, sub-vendor, order date, order number, Shop Drawing submission date(s) and review date(s), required delivery date, promised delivery date, date received, date checked and general remarks.
- .2 The Contractor shall accumulate and submit similar records from (assigned) Subcontractors and shall ensure that Subcontractors are properly and frequently expediting all equipment and material to meet delivery deadlines to suit installation schedule.
- .3 The Contractor shall allow the Owner, Consultant, or their representative free access to the Contractor's plant and to Subcontractor's plants for visual inspection of allotted material and/or progress of the Work.

3 **Workmanship**

3.1 **GENERAL**

- .1 Workmanship shall be of the best quality, executed by workers experienced and skilled in the respective duties for which they are employed. Immediately notify the Consultant if required Work is such as to make it impractical to produce required results.
- .2 Do not employ any unfit person or anyone unskilled in their required duties. The Consultant reserves the right to require the dismissal from the Site of workers deemed incompetent, careless, insubordinate or otherwise objectionable.
- .3 Decision as to the quality or fitness of workmanship in cases of dispute rests solely with the Consultant whose decision shall be final.
- .4 Whenever possible, give preference to the use of local labour. Establish rates of wages, and hours of work in accordance with provincial regulations and as generally recognized and accepted in the locality.

3.2 **CO-ORDINATION**

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

3.3 CONCEALMENT

- .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation, inform Consultant if there is an existing contradictory situation. Install as directed by Consultant.

3.4 CUTTING AND REMEDIAL WORK

- .1 Perform cutting and remedial Work required to make the parts of the Work come together.
 - .1 Coordinate the Work to ensure this requirement is maintained.
- .2 Should Work performed outside this Contract necessitate cutting and/or remedial Work to be performed, the cost of such Work will be valued by the Consultant.
- .3 Perform cutting and remedial Work by specialists familiar with the materials affected. Perform in a manner to neither damage nor endanger any portion of Work.

3.5 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent material unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dipped galvanized steel fasteners and anchors for securing exterior Work, unless stainless steel or other material is specifically requested in the affected Specification section.
- .4 Space anchors within their load limit or shear capacity and ensure that they provide positive permanent anchorage. Wood or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

3.6 PROTECTION OF WORK IN PROGRESS

- .1 Adequately protect Work completed or in progress. Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by the Consultant, at no increase in Contract Price.
- .2 Prevent overloading of any part of the Work or building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of the Consultant.

3.7 EXISTING UTILITIES

- .1 Connect to existing services or utilities at times directed by Owner or local governing authorities, with a minimum of disturbance to Work, building occupants, pedestrian and vehicular traffic.

- .2 Protect and maintain existing active services. When inactive services are encountered cap off in a manner approved by authority having jurisdiction and stake or otherwise record location of capped service.

End of Section

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1 General

1.1 **DESCRIPTION**

.1 This section includes administrative and procedural requirements for construction waste management activities including the following:

- .1 Salvaging nonhazardous construction waste.
- .2 Recycling nonhazardous construction waste.
- .3 Disposing of nonhazardous construction waste.

1.2 **DEFINITIONS**

- .1 CDL: Construction, Demolition and Landclearing.
- .2 Construction Waste: Building and Site improvement materials and other solid waste resulting from construction operations. Construction waste includes packaging.
- .3 Disposal: Removal off-site of construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- .4 Recycling: The process of sorting, cleaning, treating, and reconstituting materials for the purpose of using the material in the manufacture of a new Product.

1.3 **SUBMITTALS**

- .1 Recycling and processing facility records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- .2 Landfill and incinerator disposal records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.4 **QUALITY ASSURANCE**

- .1 Regulatory requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- .2 Surplus materials, removals, grindings and other debris shall be disposed of offsite. No separate payment shall be made for the costs associated with this Work. The Owner will not make arrangements for the disposal of surplus materials or supply bills of lading. Stockpiling of excavated material is not permitted and shall immediately be disposed of upon removal.

2 Products

Not Used

3 Execution

3.1 **GENERAL**

- .1 Site access and temporary controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - .1 Designate and label specific areas on Project site necessary for separating materials that are to be recycled.
 - .2 Comply with Project requirements for controlling dust and dirt, environmental protection, and noise control.

3.2 **RECYCLING AND CONSTRUCTION WASTE, GENERAL**

- .1 Provide containers for CDL waste that is to be recycled clearly labeled as such with a list of acceptable and unacceptable materials. The list of acceptable materials must be the same as the materials recycled at the receiving material recovery facility or recycling processor.
- .2 Provide containers for CDL waste that is disposed in a landfill clearly labeled as such.
- .3 Use detailed material estimated to reduce risk of unplanned and potentially wasteful cuts.
- .4 Include in material purchasing agreements, a waste reduction provision requesting that materials and equipment be delivered in packaging made of recyclable material, that they reduce the amount of packaging, the packaging be taken back for reuse or recycling, and to take back all unused product. Ensure that Subcontractors require the same provisions in their purchase agreements.
- .5 Conduct regular visual inspections of dumpsters and recycling bins to remove contaminants.
- .6 Recycle paper and beverage containers used by on-site workers.
- .7 Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
 - .1 Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin. Inspect containers and bins for contamination and remove contaminated materials if found.
 - .2 Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - .3 Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - .4 Store components off the ground and protect from the weather.
 - .5 Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

3.3 **RECYCLING CONSTRUCTION WASTE**

.1 Packaging

- .1 Cardboard and boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
- .2 Polystyrene packaging: Separate and bag materials.
- .3 Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
- .4 Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

.2 Wood Materials

- .1 Clean cut-offs of lumber: Grind or chip into small pieces.
- .2 Clean sawdust: Bag sawdust that does not contain painted or treated wood.
- .3 Gypsum board: Stack large clean pieces on wood pallets and store in a dry location.
 - .1 Clean gypsum board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.4 **SOURCE SEPARATION WASTE**

- .1 General: Separate recyclable materials by type from CDL waste.
- .2 Provide containers, clearly labeled, by type of separated materials or provide other storage method for managing recyclable materials until they are removed from Project site.
- .3 Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
- .4 Stockpile materials away from demolition area. Do not store within drip line of remaining trees.
- .5 Store components off the ground and protect from weather.

3.5 **CO-MINGLED RECYCLING**

- .1 General: Do not put CDL waste that will be disposed in a landfill into a co-mingled CDL waste recycling container.

3.6 **DISPOSAL OF WASTE**

- .1 General: Except for items or materials to be recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - .1 Except as otherwise specified, do not allow waste materials that are to be disposed of to accumulate on-site.
 - .2 Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

- .2 Burning: Do not burn waste materials.
- .3 Disposal: Transport waste materials off Owner's property and legally dispose of them.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

.1 Labour, Products, equipment and services necessary to complete the Work of this section.

.2 Restore damaged or disturbed Work.

.3 Be responsible for providing and performing items required and necessary other than specified, in order to complete the Work.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

.1 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **SUBMITTALS**

.1 Submit a demolition plan for Consultant's review. Demolition plan shall be prepared by a qualified Professional Engineer licensed in the Province of Ontario.

.2 Submit copies of certified weigh bills receipts from authorized disposal sites and reuse and recycling facilities for all material removed from Site upon request of Consultant. Written authorization from the Consultant is required to deviate from the haulers facilities receiving organizations listed in waste reduction workplan.

1.4 **MAINTAINING ACCESS**

.1 Maintain and preserve Owner's access requirements to and from existing buildings in areas where demolition and removal Work is carried out and throughout the existing structures.

.2 Do not close, obstruct, place or store material in Owner's driveways and passageways. Conduct operations with minimum interference to roads, streets, driveways and passageways.

.3 Provide and erect barriers, maintain lights, and traffic control as required by the Owner, municipal traffic regulations or building by-laws.

.4 Maintain access to fire exits.

1.5 **HAULING OPERATIONS**

.1 Haul and move machines, vehicles and equipment over designated route and within Work areas as designated by Consultant.

.2 Maintain roadways and paving in the hauling areas clean on a daily basis and as required by municipal authorities.

.3 Location of chutes, rubbish containers, hoisting equipment and the like shall be subject to approval by Owner and such that they will not unduly impede pedestrian or vehicular traffic and will not obstruct entrances and exits.

1.6 INTERRUPTIONS TO OWNER'S OPERATIONS

- .1 There will be absolutely no interruptions to Owner's operations permitted. Execute machine and equipment movements, deliveries and removals at time or times that will permit uninterrupted Owner's operations in and around buildings, including parking, deliveries and Site access and egress.
- .2 Carry out Work in such a manner to cause a minimum of noise or interference to adjoining operations and approval of Owner obtained before proceeding with any Work which may cause interference.
- .3 Service lines to be modified, if any, must be kept in service throughout the construction period except for brief change-over periods.
- .4 Maintain such services. Prepare sketches and detailed schedule of Work, and submit to Consultant for review.

1.7 PROJECT/SITE CONDITIONS

- .1 Existing Conditions
 - .1 The Demolition Drawings indicate the physical dimensions, existing levels and similar items being indicated where known and shall be read in conjunction with the new Drawings. Not all demolition Work may be shown in its entirety; the Contractor shall include for any demolition required to complete the new Work specified and on the Drawings.
 - .2 All information relative to existing conditions is offered to assist the Contractor in evaluation of the Work, but with no specific representation, either expressed or implied, as to completeness or accuracy. Be responsible for any deductions or conclusions made on the basis of this information and that of any additional Site inspections, if made.
- .2 Prior to beginning field construction Work, survey and record the condition of existing conditions to remain in place that might be affected by the demolition operations. After demolition operations are completed, survey the conditions again and restore existing facilities to their pre-demolition condition.
- .3 Protection
 - .1 Protect Work to remain against damage. Repair or replace damaged Work.
 - .2 Maintain in service and protect from damage, the existing utilities that are to remain.
 - .3 Conduct demolition operations to ensure safety of all persons and to prevent damage to existing structures and utilities, construction in progress, and other property.
 - .4 Conduct demolition operations and remove debris to disposal areas in a manner to ensure maximum safety and minimum interference with other operations.
 - .5 Protect building floor and roof against damage from operations under this section, including lifting, moving, rolling, etc., of materials. Use 13 mm thick plywood covers with ends mechanically joined, over floor for any such handling. Over roof, provide 19 mm thick plywood underlaid with 25 mm thick polystyrene

- insulation board adhered to same. Provide same when working from, or over roof surfaces. Be responsible for repairs of any damage caused.
- .6 Provide temporary sheeting, shoring, bracing, underpinning and other protective measures, as required to prevent movement, collapse of, or damage to unsupported walls and other facilities as a result of demolition operations.
 - .7 Support affected structures and, if safety of structure being demolished or adjacent structures or services appears to be endangered, take preventative measures and then cease operations and notify Consultant.
 - .8 Remove and dispose of all temporary Work when no longer required.
 - .9 Should material resembling spray or trowel applied asbestos or any other designated substance listed be encountered in the course of demolition, stop Work, take preventative measures, and notify Consultant immediately. Do not proceed until written instructions have been received.
 - .10 Prevent extraneous materials from contaminating air beyond application area, by Providing temporary enclosures during demolition Work.
 - .11 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on temporary roads.
 - .12 Provide temporary means of exit as required for affected exits or entrances.
 - .13 Protect existing air intakes for existing building ventilation system. Carry out all operations so as to prevent dust entering these intakes, using dampening abatement measures and protection.
 - .14 Pay particular attention to prevention of fire and elimination of fire hazards which would endanger the Work or adjacent buildings and premises.
 - .15 Keep and maintain fire extinguishers throughout the Work at all times to the approval of the fire marshal, and located at convenient and accessible points.

1.8

COORDINATION

.1 Mechanical

- .1 This clause is supplementary and complementary to demolition requirements specified in the mechanical divisions. Where there is conflict between this section and the mechanical divisions, the requirements of the mechanical divisions shall govern.
- .2 Coordinate the Work to facilitate removal of walls and cutting of new openings. Disconnect, remove, cap off and relocate existing lines interfering with such Work. Remove and/or relocate equipment as required.
- .3 Carry out alterations to existing mechanical systems as shown on Drawings and as required to interconnect new and existing systems.
- .4 Do all cutting, patching and making good of existing structure required to complete mechanical Work.
- .5 Refer to mechanical division for specific requirements.

.2 Electrical

- .1 This clause is supplementary and complementary to demolition requirements specified in the electrical divisions. Where there is conflict between this section and the electrical divisions, the requirements of the electrical divisions shall govern.
- .2 Coordinate to facilitate demolition, removals, and alteration in existing building, disconnecting, removing and/or relocating existing wiring, fixtures and devices interfering with such Work.
- .3 Carry out all alterations to existing electrical, signal, and fire alarm systems as shown on Drawings and as required to interconnect new and existing systems.
- .4 Do all cutting, patching, and making good of existing structure and finishes as required to complete electrical Work. Remove and replace existing acoustic tile ceilings where required. Be responsible for replacement of any tile soiled or marred as a result.

.3 Owner

- .1 The Owner will remove, handle, store and/or temporarily relocate the following from areas undergoing renovations and alterations:
 - .1 All furnishings, files, portable machines and office equipment, records, storage cabinets, adjustable shelving, pictures and art works, clocks, signage, and the like.
 - .2 Drapery and track.
 - .3 Communications equipment.

2 Products

2.1 **MATERIALS**

- .1 Temporary wood studs: Construction grade spruce.
- .2 Polyethylene sheet: 0.152 mm, thick, clear, stapled in place.
- .3 Plywood: Douglas fir plywood.

3 Execution

3.1 **TEMPORARY PARTITIONS OR SCREENS**

- .1 Dust proof partitions or screens: Before any Work proceeds in any particular area in the existing building, temporarily enclose the area and access thereto, with light stud and plywood, clean polyethylene sheet material or, clean polyethylene sheet screen overlapped 100 mm and taped at floor, ceiling and doors, walls or intersecting members, in a manner to prevent dust and dirt infiltration into the adjoining areas. Take every possible precaution to prevent dust and dirt resulting from the Contract operations from entering Owner's operational areas. Adjust and relocate such partitions or screens as required for the various operations under the Contract.

.2 Weather Protection

- .1 Provide weather protection screens similar to above in areas where existing building interior is exposed to the elements.
- .2 Provide protection in the form of tarpaulins, plywood or polyethylene for temporary roof and wall openings and other exposed areas, before final construction is in place.
- .3 Provide weather protection screens similar to above in areas where existing plant interior is exposed to the elements.
- .4 Provide protection in the form of tarpaulins, plywood or polyethylene for temporary roof and wall openings and other exposed areas such as during removal of windows, doors or parapets, equipment to be relocated, etc., before final construction is in place.

3.2 **DEMOLITION AND REMOVALS**

- .1 Carry out demolition Work, removal of existing materials and equipment, and disposal of resultant debris. Proceed with demolition of or alteration to any portion of existing building ONLY after thorough protection of existing building has been achieved.
- .2 During demolition operations, keep Work wetted down with fog sprays to prevent dust and dirt rising. Provide temporary water for this purpose. Use covered chutes, watered down.
- .3 During demolition operations, keep Work wetted down with fog sprays to prevent dust and dirt rising. Provide heavy duty water hose for this purpose; connect to Owner's existing water source where directed by Consultant.
- .4 Where Work includes cutting of roof openings, Provide a plywood catchboard immediately under the areas to be cut so as to protect the building interior from falling debris. Provide catchboard in combination with weather screens previously specified.
- .5 Confine operations and workmen to those parts of the building which are defined on Drawings, and exercise great care not to damage existing construction beyond that necessary for carrying out new Work and make good any such damage in every respect.
- .6 At end of each day's Work:
 - .1 Leave Work in safe and stable condition. Protect interiors of parts not to be demolished from exterior elements at all times.
 - .2 Leave Work in safe condition so that no part is in danger of toppling or falling.
 - .3 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.
 - .4 Ensure that demolition Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .5 Do not dispose of waste or volatile materials such as: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout Project.

- .7 Materials to be reused: Where designated on Drawings to be removed and stored for future use, remove, handle and transport such items to point of storage. Perform such Work carefully and with diligence to prevent any damage to the items during removal and in storage.

- .8 Cutting

- .1 Use power operated cutting devices. Chipping will not be allowed. Commence breaking out operations only after sawcutting of the cut-off points has been performed in order to prevent damage to remainder of structure and to obtain straight and clean junctions of new and existing works.
 - .2 Use a saw blade which will achieve superior sawing performance. Spalling of remaining concrete at sawcut points will be judged as defective and shall be rectified at no increase in Contract Price. Do not overcut corners (i.e. avoid "intersecting" sawcuts).
 - .3 Demolish masonry and concrete in small sections.
 - .4 Coordinate with mechanical trade and sawcut and breakout existing floor or wall to accommodate new mechanical piping. Have mechanical trade lay out and supervise Work.

- .9 Cutting of Precast Wall Panels

- .1 Examine the Site to verify existing precast wall panel condition.
 - .2 Engage the original precast wall panel manufacturer or a licensed professional structural engineer to determine the extent of cutting and to design the structural support at the opening, unless design is noted on Drawings.
 - .3 Have cutting performed under the supervision of the above.

3.3 **DISPOSAL OF MATERIALS, RUBBLE AND DEBRIS**

- .1 Surplus materials: Take ownership of surplus materials and remove from Site daily, unless such materials are designated to be reused (or turned over to Owner).
 - .2 Rubble and debris: Clean up rubble and debris as they are generated. Dispose of same at end of each day's Work or place in waste disposal bins and empty on a regular basis.
 - .3 Stockpiling of surplus materials, rubble and debris on Site will not be permitted.
 - .4 Do not burn material on Site.

3.4 **CLEAN-UP**

- .1 Vacuum clean and wet mop floors and wipe clean wall surfaces free of dust on completion of Work.

End of Section

- 1 General
- 1.1 **SUMMARY**
 - .1 Section Includes
 - .1 Labour, Products, equipment and services necessary to complete the Work of this section.
- 1.2 **REFERENCES**
 - .1 MTRCA - Metro Toronto Region Conservation Authority
 - .2 AODA - Accessibility for Ontarians with Disabilities Act, latest edition
- 2 Products

Not applicable.
- 3 Execution
- 3.1 **DISPOSAL OF UNCONTAMINATED MATERIAL**
 - .1 This clause applies to the disposal of "Reusable Fill".
 - .2 "Reusable Fill" is defined as soil which meets the guidelines for commercial/industrial land use, as specified in the latest edition "Guidelines for the Decommissioning and Clean-Up of Sites in Ontario" published by the Ministry of the Environment and Energy, Ontario.
 - .3 Select appropriate disposal or reuse sites, and all surplus soils and other materials at such sites. The Contractor may elect to use the Keele Valley landfill site located at Maple, Ontario.
 - .4 Submit to the Consultant for approval, details of all locations where surplus soils and other materials are to be disposed of or reused. Include for each disposal/reuse site and type of surplus soil or other material the following information:
 - .1 Location of the disposal/reuse site
 - .2 The operator's name and business address
 - .3 Type of license under which the site operates
 - .4 Criteria used by the site to access the suitability of the surplus material for disposal
 - .5 If Contractor proposes to dispose of reusable fill as cover material to the Keele Valley or Brock West landfill sites, the Contractor shall be responsible for confirming with the landfill operators the quantity of reusable fill that the latter will accept, and the rate at which fill will be accepted.
 - .6 Within forty-eight hours of a load of surplus soil or other material leaving the Site, submit to Consultant waybills or other documentation recording the time and place of disposal/reuse of that load of surplus soil or other material.

- .7 The results of the soil testing carried out prior to the award of Contract are provided in the geotechnical documents. Carry out any further testing required, as a condition of disposal/reuse, by the operators of the disposal/reuse sites.
- .8 Where soil contains construction rubble, roots or organic materials, separate the soil from the rubble by sieving or other approved means.
- .9 If the Contractor proposes to dispose of reusable fill as lakefill, the Contractor shall be responsible for obtaining bills of lading from the lakefill site operator. All of the tested soil showing exceedance for one or more parameters of the MTRCA lakefill criteria, and no reusable fill shall be disposed of as lakefill unless the MTRCA accepts the reusable fill as suitable for lakefill.
- .10 Reusable fill may be rejected as lakefill because of excessive water content (based on the slump test). Such a rejection shall not be considered a basis for changing the designation of the material as reusable fill.

3.2 **DISPOSAL OF CONTAMINATED WASTE MATERIAL**

- .1 This clause applies to excavated "Waste".
- .2 "Waste" is defined as that material which does not meet the criterion for reusable fill given above, and which would not be classified as construction rubble or topsoil. Waste material is subdivided into three classifications depending on the results of acid leach tests carried out in accordance with the Ontario Environmental Protection Act, Regulation 347 Leachate Quality Criteria, Ontario Ministry of the Environment and Energy, 1993. Two waste classifications are given below.
 - .1 "Non-hazardous, Non-registerable Waste": Material where the leachate concentrations are less than ten times the values given in Schedule 4 of Regulation 347.
 - .2 "Non-hazardous, Registerable Waste": Material where the leachate concentrations are between ten and one hundred times the values given in Schedule 4 of Regulation 347.
- .3 If there is any visual or other indication that a waste is encountered, immediately inform the Consultant. Stockpile material suspected of being a waste on Site to allow further testing by the Consultant. Chemical test results obtained by the Consultant will be forwarded to the Contractor.
- .4 Remove waste from the Site in accordance with provincial regulations.
- .5 The application of the "Guidelines for Decommissioning and Clean-Up Sites in Ontario" is subject to interpretation of the following parameters. Soil which is reused as a lakefill, backfill, or as landfill cover shall not be considered as waste and shall only be disposed of as waste if it is not acceptable to reuse it.
- .6 Sections 3.9.2 to 3.9.5 inclusive noted in the above guidelines also apply to this section.

End of Section

Group 8 Abatement Summary

Assumptions:

For every single doorway to be widened - less than 1 sq. m. of the adjacent wall will be removed, less than 1 sq. m. of the adjacent flooring will be removed and the ceiling tile within the area will not be disturbed.

Address	Site Visit Date	Drawings Provided	ACM on site?	ACM Abatement Required? *	Abatement Type (based on assumptions)	Area to be removed	No. of areas	Spec.	Any other ACM near work area?
1009 Sheppard Avenue West	March 18	March 16	Assumed	No					Pipe fitting insulation near ceiling
1026 FINCH AVE W - bldg A	March 23	March 16	Yes	Yes	Tan Caulking	24 LF	1	2.1	
1026 FINCH AVE W - bldg B	March 23	March 16	No	No					
1026 FINCH AVE W - bldg D	March 23	March 16	Yes	Yes	Cream Door Caulking	260 LF	7	2.1	
1300 Sheppard Ave West	March 18	March 16	Yes	Yes	Grey Door Caulking	65 LF	1	2.1	
20 BEFFORT RD	March 18	March 16	Assumed	No					Pipe fitting insulation in next room
4100 KEELE ST	March 19	March 16	No	No					
4330 Dufferin St	March 22	March 16	Assumed	No					
4330 DUFFERIN ST - parking	March 22	March 16	No	No					
5700 BATHURST ST	March 19	March 16	Yes	Yes	Vinyl Floor Tile	4 SF	2	2.1	

No. of areas = No. of abatement containments required (areas are indicated on the drawings included in the DSS report)

* All painted surfaces should be treated as lead containing

* Fire doors may contain asbestos-containing thermal insulation inside the door panel (Type 1) follow Spec 2.1.

**The values and figures in the table are estimates, actual abatement to be verified by the contractor on site after the work is awarded.
The contractor is to perform the minimum amount of asbestos and lead abatement as possible.**

1 General

1.1 **GENERAL CONDITIONS AND RELATED WORK**

- .1 This section forms a part of the Contract Document and should be read in conjunction with Section 02 82 00.01 City of Toronto Asbestos Management Policy, Section 02 82 00.02 City of Toronto Asbestos Management Plan and all other Divisions in order to comply with the requirements of the General Conditions of the Contract. Sections 02 82 00.01 and 02 82 00.02 take precedence where there is a conflict in this section.
- .2 It is the intent that work performed as outlined in this specification will result in the removal and disposal of asbestos-containing materials (ACM), lead-containing materials (LCM) and materials that become contaminated by asbestos or lead, as a result of the required work activities.
- .3 Dispose of all waste as specified in applicable sections of the specifications document.
- .4 The Environmental Consultant may perform area air monitoring to verify the effectiveness of dust suppression methods used by the Contractor. Contractor's personnel shall co-operate with the Environmental Consultant in collecting the required air samples.
- .5 This project and all work associated with it is regulated by The Occupational Health and Safety Act, the Regulation Respecting Asbestos on Construction Projects and in Buildings and Repair Operations, Ontario Regulation 278/05; the Designated Substances Regulation, Ontario Regulation 490/09; the Regulation for Construction Projects-Ontario Regulation 213/91; and other applicable regulations, manuals, and guidelines.
- .6 Provide all equipment, material, services, supervision and labour required or specified to complete the scope of work of this project as described in the Contract and Specifications Documents.
- .7 In cases of conflict between procedures outlined in this document, the more stringent requirement will apply.

1.2 **DESCRIPTION OF WORK**

- .1 **Before submitting a bid, confirm the scope of work of the project by visiting the site and reading the entire specification documents and associated drawings. The estimated quantity and other information presented in supporting documents should not be used as the only basis for submitting a bid. It is the abatement contractor's responsibility to confirm all quantities and measurements during the mandatory site meeting.**
- .2 **Each Work Area:** dependant of type of ACM and/or LCM in this Work Area will determine the abatement method best suited for the scope of work. Refer to Table 1 (attached) for a list of the suitable methods based on the abatement scope of work. The following preparations applies to all methods.
 - .1 Pre-clean and remove all moveable objects and items present in the work area.
 - .2 Remove all non-asbestos containing building materials that may be impeding reasonable access to the ACM to be abated, prior to preparations of any abatement work.
 - .3 Pre-clean and remove all debris on the floor prior to preparations of the abatement work.
 - .4 The abatement Contractor shall install scaffolding, if it is required, to access the materials to be cleaned, as required.

- .5 The abatement Contractor shall be responsible for providing their own temporary lighting, if it is required.
- .6 The abatement Contractor shall be responsible for abatement enclosures that are set up in occupied area(s) to be supervised 100% of the time or a secondary lockable barrier (hoarding) needs to be installed.
- .7 Protect the floor in the immediate vicinity of the Work Area using rip-proof poly drop-sheets.
- .8 Maintain the fire alarm and other life/safety systems in operation. Immediately advise the Project Manager in case the systems are damaged during the execution of the work.
- .9 All the asbestos waste generated in the Work Area shall be double bagged using asbestos labelled yellow bags and disposed as asbestos waste.

The abatement Contractor shall be responsible for the disposal of all waste generated as part of the subject project. This includes the costs related to the procurement of waste bins and the associated handling, transportation and disposal fees. The disposal of waste includes, but is not limited to ACM or LCM, as well as general waste and debris. The abatement Contractor shall ensure that the disposal and recycling of wastes is accounted for in their bid submitted for the project.

1.3 DEFINITIONS

- .1 Abatement: Procedures to control fibre release from asbestos containing building materials. Includes encapsulation, enclosure, and removal.
- .2 Amended Water: Water containing a wetting agent or surfactant that is added for the purpose of reducing water surface tension to allow proper wetting of asbestos material.
- .3 Asbestos: The term includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite, and any of these that have been chemically treated and/or altered.
- .4 Airlock: A system for ingress or egress without permitting air movement between a contaminated area and an uncontaminated area, consisting of two curtained doorways at least 6 feet apart.
- .5 Area Monitoring: Sampling of asbestos fibre concentrations within the asbestos control area and outside the asbestos control area which is representative of the airborne concentrations of asbestos fibers which may reach the breathing zone.
- .6 Asbestos Work/Control Area: An area where asbestos removal operations are performed which is isolated by physical boundaries to prevent the spread of asbestos dust, fibers, or debris.
- .7 Air Monitoring: The process of measuring the asbestos fibre content of a specific volume of air in a stated period of time.
- .8 Asbestos Containing Material (ACM): Any material analyzed and found to contain 0.5 percent more asbestos either alone or mixed with other fibrous or nonfibrous materials.
- .9 Asbestos Fibers: For this specification, asbestos fibers are those fibers 5 microns or longer having an aspect ratio of at least 3:1.
- .10 Authorized Visitor: The building Owner or his representative, persons of any regulatory or other agency having jurisdiction over the project and the asbestos abatement Consultant or his representative.
- .11 Barrier: Any surface that closes up the work area to prevent the movement of fibres.

- .12 **Curtained Doorway:** A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms, constructed by placing two overlapping sheets of rip-proof plastic over an existing or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of one along one vertical side of the doorway, and securing the vertical edge of the other sheet along the opposite vertical side of the doorway. The free bottom edge of the plastic sheets shall be weighted to ensure proper closure. The plastic sheets shall overlap by no less than 1.5 meters.
- .13 **Critical Barrier:** One or more layers of plastic sealed over all openings into a regulated area or any other similarly placed physical barrier sufficient to prevent airborne asbestos in a regulated area from migrating to an adjacent area.
- .14 **Chemical Stripping Agent Neutralizer:** Chemical stripping agent neutralizers may be used on exterior surfaces only. Neutralizers shall be compatible with and not harmful to the substrate that they are applied to and the stripping agent that has been applied to the surface substrate.
- .15 **Chemical Stripping Removers:** Chemical removers shall contain no methylene chloride products and shall be compatible with and not harmful to the substrate that they are applied to.
- .16 **Clean Room:** An area or room which is part of the worker decontamination enclosure system used for changing into uncontaminated protective clothing, putting on respiratory equipment, storing clean clothing and, after showering, for dressing in street clothes. No asbestos-contaminated items are allowed in this room.
- .17 **Contractor/Supervisor:** An individual who supervises asbestos abatement work and has the proper qualifications and training as specified in this document.
- .18 **Control Area:** An area which is considered uncontaminated and is suitable for regular occupancy.
- .19 **Disposal:** Procedures necessary to transport and deposit the asbestos contaminated material stripped and removed from the building, piping, and equipment in an approved waste disposal site in compliance with the applicable environmental regulations.
- .20 **Demolition:** The razing, removing or wrecking of any building component, assembly or system together with any associated handling operations.
- .21 **Decontamination Area:** An enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.
- .22 **Diocetylphthalate (DOP) Test:** A test method that uses Diocetylphthalate aerosol to challenge a HEPA filter-equipped negative pressure unit to determine its integrity and effectiveness to filter out asbestos fibres.
- .23 **Dirty Room:** A contaminated area or room which is part of the worker decontamination enclosure system, with storage for contaminated clothing and equipment.
- .24 **Emery 3004** – a compound (a poly-alpha olefin) that may be substituted for DOP in HEPA filter testing.
- .25 **Encapsulant:** A liquid material which can be applied to ACM and which controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant). A third type of encapsulant (removal encapsulant) is a penetrating encapsulant and is designed to be applied during the removal of asbestos-containing materials to minimize the release of fibres.
- .26 **Disposal Bag:** A 0.15 mm 6 mil thick, leak-tight plastic bag, pre-labeled as containing asbestos waste and used for transporting asbestos waste from containment to disposal site.

- .27 Disturbance: Activities that disrupt the matrix of ACM, crumble or pulverize ACM, or generate visible debris from ACM.
- .28 Encapsulation: Procedures necessary to coat all asbestos-containing materials with an encapsulant to control the possible release of asbestos fibers into the ambient air.
- .29 Enclosure: All herein specified procedures necessary to complete enclosure of all hazardous materials behind airtight, impermeable, permanent barriers.
- .30 Equipment Room: A contaminated area or room which is part of the worker decontamination enclosure system, with storage for contaminated clothing and equipment.
- .31 Friable Asbestos Material: Material that when dry can be crumbled, pulverized or powdered by hand pressure and includes material that is crumbled, pulverized or powdered.
- .32 Filtration System for Water: A multistage system for filtering water from the decontamination shower and wastewater. The system is usually manufactured with two filters: a primary filter and a secondary filter. The primary filter collects and retains particles that are 20 microns or larger and the secondary filter removes particles that are 5 microns or larger.
- .33 Glove Bag System: A portable asbestos abatement system designed for the isolation of an object from which materials containing asbestos are to be removed.
- .34 HEPA Filter Equipment: High efficiency particulate air filtered vacuuming equipment with a filter system capable of collecting and retaining asbestos fibers. Filters shall be capable of trapping and retaining at least 99.97 percent of 0.3 micrometer diameter particles.
- .35 Lead: The term includes elemental lead, and/or inorganic and organic lead compounds derived from chemically treated and/or altered elements (i.e. paints, plastics, pigments, glasses, and rubber compounds).
- .36 Lead Cleaning Agent: A cleaning agent suitable for lead dust. Acceptable detergents include products with a high phosphate content (containing at least 5% trisodium phosphate) and/or phosphate-free lead dissolving agents such as Ledisolv™ or similar product.
- .37 Lead Leachate Material: Any material analyzed and found to have a concentration equal to or greater than 5.0 milligrams per litre (mg/l) or 100 milligrams per kilogram (mg/kg)/ micrograms per gram (µg/g) as per the Regulation Respecting Hazardous Materials (R.S.Q., c.Q-2, r.32).
- .38 Lead Surface Contamination: Any surfaces analyzed and found to have a concentration equal to or greater than 40 micrograms per square feet (µg/ft²) or 4 micrograms per 100 square centimetres (µg/cm²) for floors, 250 µg/ft² (25 µg/cm²) for window sills, and 400 µg/ft² (40 µg/cm²) for window troughs as per the U.S. Environmental Protection Agency (EPA) Lead, Identification of Dangerous Levels of Lead, Final Rule, January 2001 (40 CFR Part 74).
- .39 Lead Waste Container: An impermeable container acceptable to a disposal site and Ministry of Sustainable Development, Environment, and Parks. It shall be labelled as required by the Ministry of Sustainable Development, Environment, and Parks and Transport Canada.
- .40 Lead Work Area: An area where lead removal operations are performed which is isolated by physical boundaries to prevent the spread of lead dust or debris.
- .41 Negative Pressure Fan System: An air purifying fan system located within or outside the isolated work area, which draws air out of the work area through a HEPA filter and discharges this air directly to the exterior of the building, thus keeping the static air pressure in the work area lower than in adjacent areas and preventing infiltration of contaminated air from work area to adjacent areas. This system shall be equipped with an alarm to warn of system breakdown, shall maintain a minimum pressure differential of 0.02" water gauge relative to adjacent areas outside of work areas and shall be equipped with an instrument to continuously monitor and automatically record pressure differences.
- .42 Non-friable Asbestos Material: Material that contains asbestos in which the fibers have been locked in by a bonding agent, coating, binder, or other material so that the asbestos is well

bound and will not release fibers during any appropriate use, handling, demolition, storage, transportation, processing, or disposal.

- .43 Negative Pressure Respirator: A respirator in which the air inside the respiratory inlet covering is negative during inhalation in relation to the air pressure of the outside atmosphere and positive during exhalation in relation to the air pressure of the outside atmosphere.
- .44 Powered Air Purifying Respirator (PAPR): A full-face mask into which filtered air is pumped at approximately 100 – 150 litres per minute (4 – 6 cubic feet per minute). The PAPR consists of a full-face mask, a battery pack, an air pump, high efficiency filter and hoses.
- .45 Personal Monitoring: Sampling of asbestos fibre concentrations within the breathing zone (within 12 inches of the mouth) of an employee.
- .46 Personnel: Supervisors, Contractor employees, subcontractor employees.
- .47 Positive Pressure Respirator: A respirator that maintains a positive pressure inside the facepiece during inhalation and exhalation in relation to the atmospheric pressure.
- .48 Shower Room: A room between the clean room and the equipment room in the worker decontamination enclosure system, with hot and cold or warm running water and arranged for complete showering during decontamination. The shower room comprises an airlock between contaminated and clean areas.
- .49 Supplied-air respirator – an accepted respirator and air-supply hose with a hood/helmet, a tight fitting facepiece that is supplied with compressed breathing air from a compressed breathing air system.
- .50 Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.
- .51 Tape-Sealed Polyethylene Sheets: Rip-proof polyethylene sheets or polyethylene sheets of type and thickness as specified, sealed with tape along the edges, around objects, over cuts and in other locations as required to provide a continuous polyethylene membrane to protect underlying surfaces from water damage and damage by sealant and to prevent the escape of asbestos fibres through the sheeting into a clean area.
- .52 Wet Cleaning: The process of eliminating asbestos from building surfaces and objects by using cloths, mops, or other cleaning tools dampened with water.
- .53 Work Decontamination Enclosure System: A decontamination system for workers, consisting of a clean room, a shower room, and an equipment room. One entrance to the clean room shall be outside of the contaminated area. One entrance to the equipment room shall be connected directly to the contaminated area.
- .54 Work: Includes all labour, supervision, materials and equipment required for the complete execution of the project as specified in the contract.

1.4 **WORK SCHEDULE**

- .1 It is the responsibility of the contractor to provide the necessary manpower and work shifts to meet the schedule.
 - .1 The start date for the project is to be determined by the Owner (IBI Group)
- .2 The Contractor shall, at no extra cost to the Owner, be responsible for the completion of work required or scheduled to be performed on weekends, holidays and after regular hours and shall be carried out as required to meet the schedule specified.

1.5 **SUBMITTALS**

- .1 All submittals must be received by the Consultant or his representative before the work is allowed to commence.
- .2 The Contractor shall submit the following:

- .1 Proof that the Contractor has made arrangement for the transport and disposal of asbestos waste. The proof shall be satisfactory to the Consultant.
- .2 Proof satisfactory to the Consultant that each Supervisor scheduled to work on the project has successfully completed an approved asbestos abatement course and can provide an up to date training certificate issued by a competent entity.
- .3 One supervisor shall remain on site while asbestos removal or cleanup is being carried out.
- .4 Copies of Insurance certificates and Workplace Safety and Insurance Board status.
- .5 D.O.P test results and performance data for negative air unit systems.
- .6 Proposed work schedule.
- .7 Work force expected to be present on site daily or according to the schedule.
- .8 Proposed number of shifts.
- .9 Layouts of proposed platforms and hoardings for the Consultant's review and approval.
- .10 Layout of proposed waste and worker decontamination facilities and asbestos work area enclosures.
- .11 Proof that all workers have successfully completed an approved asbestos abatement course and can provide an up to date training certificate issued by a competent entity.
- .12 Proof that all workers have received Workplace Hazardous Material Information System (WHMIS) training.
- .13 A WHMIS information package containing documentation addressing test results, flammability and fire data and Safety Data Sheets (SDSs) for products, chemicals and materials used on site during the course of the asbestos abatement project.
- .14 Proof satisfactory to the Consultant that each worker scheduled to work on the project has been fit tested for the appropriate respirator to be used.
- .15 Code of practice for respiratory protection.
- .16 Pressure differential monitoring data – to be submitted on a daily basis.

1.6 **QUALITY ASSURANCE**

- .1 Ensure that work progresses according to schedule.
- .2 Ensure that work complies with all the requirements of the applicable regulations, guidelines and manuals.
- .3 Ensure that no water runoff or airborne asbestos material contaminates areas outside the asbestos removal work area enclosures. The Consultant has been given authorization by the Owner to stop any work where contamination of areas outside enclosures is suspected. The Contractor shall be responsible for all costs to rectify the problem.
- .4 Use only skilled and qualified workers for all trades required to work on this project.
- .5 Only the asbestos abatement Contractor, and never the Consultant, is responsible for the following:
 - .1 Safety programs and precautions required by applicable regulations for the work being performed.
 - .2 Control over the acts and omissions of the Contractor's workers, agents, subcontractors and other employees of the Contractor required to perform work on the project.

- .3 Control over construction techniques, methods, means or procedures.

1.7 **SUPERVISION**

- .1 The Contractor shall provide a trained and qualified shift supervisor for each and every shift during which asbestos removal is being carried out. The Owner reserves the right to stop all work if this requirement is not complied with, at no additional charge to the Owner.
- .2 The shift supervisor shall have the authority to make decisions and take actions with respect to production, manpower and equipment.

1.8 **REGULATIONS**

- .1 The Contractor shall comply with all local, provincial and federal requirements relating to asbestos and lead,
- .2 In case of conflict among the above mentioned requirements or with these specifications, the more stringent requirements shall apply.
- .3 Perform work following the requirements of the various regulations in effect at the time the work is being carried out.
- .4 The regulations shall include, but are not limited to:
- .1 Ontario Occupational Health and Safety Act.
 - .2 Ontario Regulation 278/05, Regulation Respecting Asbestos on Construction Projects and in Building and Repair Operations.
 - .3 The Designated Substances Regulation, Ontario Regulation 490/09.
 - .4 Ontario Ministry of Environment Regulation 347 (as amended) for the disposal of asbestos waste made under the Environmental Protection Act.
 - .5 Health and Safety Guideline: Lead on Construction Projects, Published by the Ministry of Labour.
 - .6 Health and Safety Guideline: Silica on Construction Projects, Published by the Ministry of Labour.
 - .7 Standard Construction Document, Canadian Construction Association, CCA 82 - 2004.
 - .8 Regulations respecting the Handling, Offering for Transport and Transportation of Dangerous Goods.
 - .9 WHMIS Regulations.

1.9 **NOTIFICATIONS**

- .1 The Contractor shall be responsible for notifying the appropriate regulatory bodies before any work on this project commences:
- .2 The Contractor shall notify an approved industrial land fill site equipped to accept hazardous waste and one which has agreed to accept the waste:
- .3 The Fire Marshall, in cases where the execution of the work will result in blocking building exists or when turning off, removing or temporarily altering fire alarms.
- .4 Prior to conducting any planned abatement work, the Contractor shall notify human resources' occupational health and safety team and the joint health and safety committee of the proposed work schedule.

1.10 **PROSCRIPTIONS**

- .1 The use of compressed air for removal or clean up of asbestos dust and debris from any surface is not allowed.
- .2 Smoking, eating, drinking or chewing is not allowed in the work area.
- .3 Unauthorized persons or persons not using proper personal protective equipment shall not be allowed to enter the work area.
- .4 No entry into the work area shall be permitted to any person who has facial hair growth that prevents the establishment of a proper seal between the respirator and the skin.
- .5 The use of torches, propane-fired heaters and other open flames shall not be permitted in the abatement work area.

1.11 **WORKER AND VISITOR PROTECTION**

- .1 Instruct all personnel (workers and visitors) in all aspects of work procedures and protective equipment before allowing entry into the asbestos and lead abatement work areas.
- .2 A competent person (as defined by the Occupational Health and Safety Act) shall provide all the training and instructions.
- .3 Instructions and training shall include, but shall not be limited to, the following:
 - .4 Entry and exit from asbestos abatement work areas.
 - .5 Work practices and personal hygiene.
 - .6 The use, cleaning and care of respirators and protective clothing.
 - .7 Protective measures and work procedures.
- .8 Asbestos work area entry and exit procedures shall be posted in the clean room of the decontamination unit.
- .9 Respiratory Protection:
- .10 All personnel required to wear respirators shall be fit tested either by a qualitative or quantitative fit testing method.
- .11 Each worker or visitor required to enter an asbestos abatement work area shall be provided with a personally issued respirator that is:
 - .12 Appropriate for the work that is being carried out.
 - .13 Acceptable to the Ministry of Labour, Occupational Health and Safety Division.
 - .14 The worker shall be responsible for wearing a respirator that is issued by the Contractor.
- .15 The following criteria, as outlined in Table 2 of O. Reg. 275/05, shall be followed when selecting an appropriate respirator.
- .16 Respirator shall be stored in a clean location such as the clean room of the decontamination unit. This room can also be used for charging PAPR batteries.
- .17 The procedures specified by the equipment manufacturer shall be followed while using and maintaining the respirators.
- .18 Respirators shall be cleaned and inspected at the end of each shift. All damaged and deteriorated parts found during the inspection shall be replaced before the respirator is used again.
- .19 Appropriate combination cartridges shall be used if substances other than asbestos are to be handled inside the asbestos removal work area.

- .20 Used filters shall be tested and replaced as specified by the manufacturer or as specified below. The more stringent testing and replacement protocol shall be followed.
- .21 Cartridges for negative pressure respirators should be replaced every 16 hours of actual usage.
- .22 Cartridges for PAPRs should be replaced every 8 hours.
- .23 Cartridges shall be treated as asbestos waste and shall be disposed of accordingly after usage inside an asbestos removal work area.
- .24 Protective Clothing:
- .25 The Contractor shall provide every worker and authorized visitor with full body disposable coveralls.
- .26 All personnel shall wear the protective coveralls before they are allowed to enter into the asbestos removal work area.
- .27 Coveralls shall be equipped with head covering (hood), foot covering and tight fitting cuffs at the neck, ankles and wrists.
- .28 The disposable coveralls shall be made up of materials that do not readily permit the penetration of asbestos fibers.
- .29 Disposable coveralls shall be immediately repaired (using duct tape) or replaced once torn.
- .30 Coveralls shall be disposed of as asbestos waste once they are worn inside an asbestos abatement area.
- .31 Workers are allowed to wear reusable protective clothing provided that the clothing is left in the equipment room until the end of the asbestos abatement project. The clothing shall then be disposed of as asbestos waste.
- .32 Safety shoes, hard hats and additional body protection equipment shall be used as necessary to meet the requirements of applicable safety regulations.

1.12

INSPECTIONS

- .1 The Environmental Consultant will be present on site to carry out quality control inspections for the entire duration of the project. The inspections will be performed during the preparation phase, removal phase and a final inspection upon completion of the abatement work. The inspection will be carried out inside and outside the work areas.
- .2 The purpose of the inspections is to ensure that the work is being carried out following the requirements and procedures outlined in the specification documents and applicable regulations.
- .3 The Environmental Consultant will issue written or verbal instructions to the asbestos abatement Contractor throughout the duration of the project. The instructions will authorize the Contractor to proceed to next phase of work. The general phases of work will consist of the following: Pre-cleaning, set-up and preparation of the work area, removal of specified materials, clean-up of work area and tear down of containment.
- .4 The Contractor shall not proceed to the next phase of work without obtaining authorization from the Environmental Consultant.
- .5 The Environmental Consultant has been given authorization by the Owner to order a shutdown of work in case contamination of areas adjacent to controlled work areas has occurred.
- .6 In all non-controlled areas where it is determined by the Environmental Consultant (through visual inspection or air monitoring) that contamination has leaked, the Contractor shall be

responsible to the complete isolation and cleaning of such areas under the direction of the Environmental Consultant and at no extra charge to the Owner.

- .7 The Environmental Consultant has been given authorization by the Owner to ensure that the Contractor adheres to specified procedures and materials and to inspect for completion and final cleanliness. Any additional work (including labour and material charges) specified by the Environmental Consultant to achieve completion of work to the level specified shall be carried out by the Contractor at no additional charge to the Owner.
- .8 The Contractor shall ensure that all equipment and materials to be used on the project are acceptable to the Environmental Consultant. Unacceptable materials and equipment shall be replaced by the Contractor at no additional charge to the Owner.
- .9 The Contractor shall be responsible for all additional inspection charges which are carried out as a result of a failure by the Contractor to meet set criteria relating to schedule, health and safety and quality.

1.13 **AIR MONITORING**

- .1 Air samples will be collected by the Environmental Consultant (on behalf of the owner) from the start of work until the completion of the tear down operations, both inside and/or outside the controlled work areas.
- .2 The objective of air monitoring is to detect defects in the containment of controlled areas and to ensure that any contamination of building spaces beyond the controlled areas is discovered and rectified immediately.
- .3 Any contamination of areas outside the limits of the controlled work areas (as determined by air monitoring) shall be contained and shall be thoroughly cleaned to the Consultant's satisfaction.
- .4 Air monitoring will be carried out following procedures specified in the latest edition of the National Institute for Occupational Safety and Health (NIOSH) method 7400A. The samples will be analyzed by the Phase Contrast Microscopy (PCM) technique as specified in NIOSH method 7400A.
- .5 Air monitoring may also be carried out according to either, or both NIOSH methods described below:
- .6 The latest edition of the National Institute for Occupational Safety and Health (NIOSH) Method 7082. The samples will be analyzed by the Flame Atomic Absorption Spectrophotometer technique as specified in the above noted NIOSH method.
- .7 The Contractor shall cooperate with the Environmental Consultant during air monitoring and shall:
- .8 Ensure that the workers exercise care and avoid damaging the Consultant's equipment.
- .9 Ensure that the samples and equipment are not tampered with.
- .10 Air samples will be analyzed by the PCM method. The area will be considered clean and clear for public occupancy only if the fibre levels are less than 0.01 fibres/cc.
- .11 In case the fibre levels are equal to or greater than 0.01 fibres/cc, the Contractor shall be responsible for re-cleaning the asbestos work area and re-applying the lock-down agent. This process will have to be repeated until the fibre levels are below the specified limit.
- .12 Re-occupancy air samples may be collected and analyzed by NIOSH method 7082 or 77032. The area will be considered clean and clear for public occupancy only if the airborne concentrations levels are less than 0.005 mg/m³ (5 µg/m³).
- .13 In case the concentration levels are equal to or greater than 0.005 mg/m³ (5 µg/m³), the Contractor shall be responsible for re-cleaning the lead work area. This process will have to be repeated until the concentration levels are below the specified limit.

1.14 **WASTE TRANSPORT AND DISPOSAL**

- .1 All hazardous materials, including but not limited to, asbestos or lead containing materials, and equipment and systems containing mercury, existing asbestos or lead contaminated materials and materials that become contaminated by asbestos or lead, as a result of the work, shall be disposed of as prescribed by Ontario Regulation 347, Waste Management Regulation, made under the Environmental Protection Act and the provincial and federal regulations for the Transportation of Dangerous Goods.
- .2 All wash water generated from decontamination activities shall be treated as asbestos waste and shall be disposed of accordingly.
- .3 All non-asbestos containing waste generated during demolition activities inside an asbestos work area shall be treated as asbestos waste.
- .4 Non-porous materials that can be washed and properly cleaned can be disposed of as clean waste.
- .5 All sharp asbestos-contaminated materials (such as hangers, T-bars, wood, etc) that could rip or damage a 6mil polyethylene waste disposal bag shall be disposed of in a sealed solid asbestos waste container.
- .6 The waste must be stored and transported in an enclosed, lockable waste bin.
- .7 Every vehicle used for the transportation of asbestos waste shall display a Class 9 Label.
- .8 Both sides of the vehicle used for the transportation of asbestos waste and every waste bag and container shall display the word CAUTION in letters not less than 10 cm in height and the words:

CONTAINS ASBESTOS FIBRES

Avoid Creating Dust

Asbestos May Be Harmful to Your Health

Wear Approved Protective Equipment

- .9 The transport vehicle must be properly equipped to deal with asbestos waste spills. Equipment shall include, but not limited to, respiratory protective equipment, disposable protective clothing, 6 mil polyethylene bags, shovel and broom and wetting agent.
- .10 For asbestos waste of unknown material or an asbestos type other than Chrysotile, the words Asbestos, Blue, Product Identification Number must be displayed on every waste container.
- .11 For Chrysotile asbestos, the words Asbestos, White, Product Identification Number must be displayed on every waste container.

1.15 **WIPE SAMPLING (WHEN REQUIRED)**

- .1 Wipe samples may be collected by the Environmental Consultant (on behalf of the Owner) following a 2 hour settling period as part of the clearance inspection once the final cleaning procedures have been completed inside the work area(s).
- .2 The objective of wipe sampling is to verify the effectiveness of the cleaning procedures and to ensure that any contamination on surfaces inside the lead work area(s) is discovered and rectified immediately.
- .3 Wipe sampling will be carried out following procedures specified in the latest edition of the National Institute for Occupational Safety and Health (NIOSH) Method 9100 or the American Society for Testing of Materials (ASTM) Standard E1728-99. The samples will be analyzed by either the Flame Atomic Absorption Spectrophotometer technique as specified in NIOSH

method 7082 or Graphite Furnace Atomic Absorption Spectrophotometer technique, NIOSH method 7105.

- .4 The clearance standards for settled lead dust inside a lead work area is 40 µg/ft² (4 µg/100cm²) for floors, 250 µg/ft² (25 µg/100cm²) for interior window sills, and 400 µg/ft² (40 µg/100cm²) for window troughs.
- .5 In case the dust levels are equal to or greater than the specified clearance standards, the Contractor shall be responsible for re-cleaning the lead work area. This process will have to be repeated until the concentration levels are below the specified limit.

2 Execution

ASBESTOS

2.1 TYPE 1 REMOVAL OPERATION

- .1 Initial Preparation and Isolation of Work Areas: Unless otherwise specified, work carried out as part of this phase shall proceed as follows:

- .1 Carry out a survey of the work areas to compile an inventory of existing damages and provide a copy to the Consultant.
- .2 The Contractor is responsible for moving materials and objects which are present in the work areas.
- .3 Prevent the spread of dust from the work area using measures appropriate to the work to be done.
 - .1 Shut off, lock out and seal all ventilation duct vents with the application of one layer of 6 mil (0.15mm) thick clear polyethylene sheet sealed with tape.
 - .2 Use FR polyethylene drop sheets over all flooring in work areas where dust and contamination cannot otherwise be thoroughly cleaned. This does not apply if work involves the removal of asbestos-containing floor tiles.
 - .3 Use one layer of 6 mil (0.15 mm) thick clear polyethylene sheets to cover walls.
 - .4 Separate parts of the building required to remain in use from the work area by polyethylene drop sheets at the perimeter of the work area.
 - .5 Separate the work area with clearly visible warning signs advising of the hazards of asbestos dust and that entry is restricted to authorized trained personnel wearing personal protective equipment.
 - .6 Erect scaffolding or platforms where necessary to perform the removal work. All platforms that exceed 25 feet in height will require the submission of a shop drawing stamped by a professional engineer for approval by the inspector within a minimum of 5 days prior to commencing the work. Guard rails shall be provided around all platforms or scaffolding where practicable. Cover the floor area of the scaffold or platform with one layer of FR polyethylene. Extend the floor of scaffolding or platform under an item being removed to act as a receptacle. Polyethylene sheeting shall be suitably braced and/or restrained so that billowing or failure of the polyethylene sheeting or taped joints does not occur.

- .2 Entry and Exit Procedures from Asbestos Removal Work Areas: the following general procedures shall be adhered to when entering into and exiting from asbestos abatement work areas:

- .1 Work Area Entry Procedures:

- .1 Every worker and visitor planning to enter the work area should remove all street clothing and should store them in a designated clean change room.
 - .2 The person shall then put on disposal coverall with head covering, respirators with clean filters and foot covering and shall proceed to the work area.
- .2 Work Area Exit Procedures:
 - .1 Each worker shall decontaminate their protective clothing, boots and respirator by first HEPA vacuuming and then by damp wiping using soap and water.
 - .2 The removed disposable coveralls shall be disposed of as asbestos waste in a 0.15 mm (6 mil) labelled waste bag. Respirator filter inlets shall be sealed in tape or disposed of as asbestos waste.
- .3 Asbestos Removal Procedures
 - .1 Asbestos Removal shall not commence until:
 - .1 The work area is effectively separated from clean areas of the building.
 - .2 Warning signs are posted outside the removal work areas.
 - .3 All surfaces which are not possible to clean are sealed with polyethylene sheeting and tape.
 - .4 Arrangements have been made for waste disposal, landfill site operator has been contacted and storage bin is on site.
 - .5 Tools equipment and materials are on hand and in the work area.
 - .6 Facilities for the washing of hands and face are available for workers leaving the work area.
 - .2 Before beginning work remove visible dust from surfaces in the work area where dust is likely to be disturbed during the course of the work. Use HEPA vacuum, or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate. Do not use compressed air to clean up or remove dust from any surface.
 - .3 Wet materials containing asbestos to be cut, ground, abraded, drilled, or otherwise disturbed with amended water. Use garden type low velocity fine mist sprayer. Perform work in a manner to reduce dust creation to lowest levels practicable. Spray asbestos material repeatedly during the work process to minimize asbestos fibre release.
 - .4 Additional cement board removal procedures.
 - .1 Cement board shall be removed intact where possible.
 - .2 When not possible to remove intact, the board shall be cut with hand saws where necessary and dust shall be collected with a HEPA vacuum cleaner nozzle held under the cut area.
 - .3 Drop sheets shall be used no more than 0.5 metres below the cutting location and shall be constructed in such a manner that any dust not removed by the HEPA vacuum is collected.
 - .5 Remove material in sections as intact as possible.
 - .6 Frequently during the work and immediately after completion of the work, clean up dust and waste containing asbestos using a HEPA vacuum or by damp wiping.
- .4 Final Clean

- .1 When removal is complete, clean the entire work area by HEPA vacuuming and wet wiping.
- .2 The work area shall be deemed clean by the Inspector when there is no visible residue, dirt, film, stain, or discolouration resulting from either asbestos removal or cleaning activities.
- .3 After completion of the initial cleaning and after the Inspector has passed the visual inspection, spray sealant on all surfaces in the work area, including, but not limited to:
 - .1 Where asbestos material has been removed.
 - .2 Polyethylene sheeting used on walls, floors and ceilings.
- .4 Sealant should be sprayed using a garden reservoir type low velocity fine mist sprayer. The sprayer cannot be used if the nozzle is partially obstructed, or if a uniform fine mist spray cannot be obtained.
- .5 After the area is declared clean and written approval to proceed has been received from the Inspector:
 - .1 Dismantle boundaries and isolating barriers as asbestos waste. Drop sheets shall be wetted and folded to contain dust and then placed in waste bags.
 - .2 Immediately before their removal from the work area, and disposal, clean each filled labelled waste bag using damp cloths or HEPA vacuum and place in second clean clear polyethylene waste bag.
 - .3 Dispose of waste as per procedures specified in subsection 1.14 Waste Transport and Disposal.
- .6 Repair or replace objects damaged in the course of the work. Re-establish objects moved to temporary locations in the course of the work, in their proper positions. Re-secure mounted objects removed in the course of the work in their former positions.

2.2

TYPE 2 REMOVAL OPERATION: FOR WORK IN ENCLOSURES

- .1 Initial Preparation and Isolation of Work Areas: Unless otherwise specified, work carried out as part of this phase shall proceed as follows:
 - .1 Carry out a survey of the work areas to compile an inventory of existing damages and provide a copy to the Consultant.
 - .2 The Contractor is responsible for moving materials which are present in the work.
 - .3 Prevent the spread of dust from the work area using measures appropriate to the work to be done.
 - .1 Shut off, lock out and seal all ventilation duct vents with the application of one layer of 6 mil (0.15 mm) thick clear polyethylene sheet sealed with tape.
 - .2 Clean all moveable objects within proposed work area using a HEPA vacuum.
 - .3 Clean fixed casework, plant, and equipment within proposed work area, using a HEPA vacuum and cover with polyethylene sheeting sealed with tape.
 - .4 Clean proposed work areas using, where practicable, HEPA vacuum cleaning equipment. Do not use methods that raise dust, such as dry sweeping, or vacuuming using other than HEPA filter-equipped vacuums.
 - .5 Cover and seal airtight light fixtures, duct openings and other suspended ceiling objects using clear 6 mil polyethylene sheeting and tape.

- .6 Erect scaffolding or platforms necessary to perform the removal work. All platforms that exceed 25 feet in height will require the submission of a shop drawing stamped by a professional engineer for approval by the inspector within a minimum of 5 days prior to commencing the work. Guard rails shall be provided around all platforms or scaffolding where practicable.
- .7 Cover floor area of scaffold or platform with one layer of FR polyethylene.
- .8 Extend scaffolding or platform under the item being removed to prevent material from falling.
- .9 Separate parts of the building required to remain in use from the work area by polyethylene drop sheets at the perimeter of the work area.
- .10 Set up an airtight enclosure around the work area where the work on friable asbestos- containing material is to be carried out. Enclosure should be set up using 1 layer of FR polyethylene sheeting to cover the floors, and 1 layer of 6 mil (0.15 mm) thick clear polyethylene sheeting to cover the walls. Two layers of FR polyethylene sheeting should be used to cover carpeted floors. Polyethylene on the walls should be made to overlap with the polyethylene on the floor a minimum of 300 mm.
- .11 Polyethylene sheeting shall be suitably braced and/or restrained so that excessive billowing or failure of the polyethylene sheeting or taped joints does not occur as a result of the negative pressure differential created by the vacuums.
- .12 Erect a temporary structure made of wooden studs to support polyethylene sheeting where necessary.
- .13 Insert a hose of a HEPA filter equipped vacuum into the enclosure to provide negative air pressure inside the enclosure.
- .14 Entrance to the enclosure should be covered with two pieces of overlapping polyethylene sheeting.
- .15 Separate the work area with clearly visible warning signs advising of the hazards of asbestos dust and that entry is restricted to authorized trained personnel wearing personal protective equipment.
- .2 Entry and Exit Procedures from Asbestos Removal Work Areas: the following general procedures shall be adhered to when entering into and exiting from asbestos abatement work areas:
 - .1 Work Area Entry Procedures:
 - .1 Every worker and visitor planning to enter the work area should remove all street clothing and should store them in a designated clean change room.
 - .2 The person shall then put on disposal coverall with head covering, respirators with clean filters and foot covering and shall proceed to the work area through the flaps covering the entrance to the enclosure.
 - .2 Work Area Exit Procedures:
 - .1 Each worker shall decontaminate their protective clothing, boots and respirator by first HEPA vacuuming and then by damp wiping using soap and water.
 - .2 The removed disposable coveralls shall be disposed of as asbestos waste in a 0.15 mm (6 mil) labelled waste bag. Respirator filter inlets shall be sealed in tape or disposed of as asbestos waste.
- .3 Asbestos Removal Procedures

- .1 Asbestos Removal shall not commence until:
 - .1 The work area is effectively separated from clean areas of the building.
 - .2 Warning signs are posted outside the removal work areas.
 - .3 All surfaces which are not possible to clean are sealed with polyethylene sheeting and tape.
 - .4 Arrangements have been made for waste disposal, landfill site operator has been contacted and storage bin is on site.
 - .5 Tools equipment and materials are on hand and in the work area.
 - .6 Facilities for the washing of hands and face are available for workers leaving the work area.
- .2 Before beginning the work remove visible dust from surfaces in the work area. Use HEPA vacuum, or damp cloths where damp cleaning is considered more appropriate. Do not use compressed air to clean up or remove dust from any surface.
- .3 Wet materials containing asbestos to be removed, disturbed, or sealed with amended water. Garden reservoir type low velocity fine mist sprayer may be used. Perform work in a manner to reduce dust creation to lowest levels practicable. Spray asbestos material repeatedly during the work process to minimize asbestos fibre dispersion.
- .4 Removed material has to be placed directly in waste bags. Wherever possible, asbestos- containing material should be removed in sections as intact as possible.
- .5 Areas that used to be covered with the asbestos-containing material should be cleaned after the material is removed, using brushes, steel wool, or any other tools suitable.
- .6 Frequently during the work and immediately after completion of the work, clean up dust and waste containing asbestos using a HEPA vacuum or by damp wiping.
- .7 All labelled waste bags should be placed in clean clear 6 mil poly bags before they are taken out of the enclosure.
- .4 Final Clean
 - .1 When removal is complete, clean the entire work area by HEPA vacuuming and wet wiping.
 - .2 All tools and equipment used in the removal process such as hook knives, extension cords, scrapers, wire brushes, garden sprayers etc, should be washed and cleaned and placed in 6 mil polyethylene bags.
 - .3 The work area shall be deemed clean by the Inspector when there is no visible residue, dirt, film, stain, or discolouration resulting from either asbestos removal or cleaning activities.
 - .4 After completion of the initial cleaning and after the Inspector has passed the visual inspection, spray sealant on all surfaces in the work area, including, but not limited to:
 - .1 Where asbestos material has been removed.
 - .2 Polyethylene sheeting used on walls, floors and ceilings.
 - .5 Sealant should be sprayed using a garden reservoir type low velocity fine mist sprayer. The sprayer cannot be used if the nozzle is partially obstructed, or if a uniform fine mist spray cannot be obtained.

- .6 Enclosure should be left standing until all the sealant has dried or, if required, until an air sample is taken inside the enclosure, and the fibre concentration level is below 0.05f/cc.
- .7 After the area is declared clean and written approval to proceed has been received from the Inspector:
 - .1 Dismantle boundaries and isolating barriers and treat as asbestos waste. Drop sheets shall be wetted and folded to contain dust and then placed in waste bags.
 - .2 Immediately before their removal from the work area, and disposal, clean each filled labelled waste bag using damp cloths or HEPA vacuum and place in second clean clear polyethylene waste bag.
 - .3 Dispose of waste as per procedures specified in subsection 1.14 Waste Transport and Disposal.
- .8 Repair or replace objects damaged in the course of the work. Re-establish objects moved to temporary locations in the course of the work, in their proper positions. Re-secure mounted objects removed in the course of the work in their former positions.

2.3 TYPE 2 REMOVAL OPERATION: FOR WORK USING GLOVE BAGS

- .1 Initial Preparation and Isolation of Work Areas: Unless otherwise specified, work carried out as part of this phase shall proceed as follows:
 - .1 Carry out a survey of the work areas to compile an inventory of existing damages and provide a copy to the Consultant.
 - .2 Prevent the spread of dust from the work area using measures appropriate to the work to be done.
 - .1 Shut off, lock out and seal all ventilation duct vents with the application of one layer of 6 mil (0.15 mm) thick clear polyethylene sheet sealed with tape.
 - .2 Use FR polyethylene drop sheets over flooring such as carpeting that absorbs dust and over all flooring in work area where dust and contamination cannot otherwise be safely contained.
 - .3 Separate parts of the building required to remain in use from the work area by polyethylene drop sheets around the perimeter of the work area.
 - .4 Separate the work area with clearly visible warning signs advising of the hazards of asbestos dust and that entry is restricted to authorized trained personnel wearing personal protective equipment.
- .2 Worker Protection Procedures
 - .1 Before proceeding to the work area:
 - .1 Each worker shall don respirator and disposable coveralls, including head covering and suitable foot wear. Removal of street clothes in a designated clean room before wearing the disposable coveralls is recommended.
 - .2 Before leaving the work area:
 - .1 Each worker shall decontaminate their protective clothing, boots and respirator by first HEPA vacuuming and then by damp wiping using soap and water.
 - .2 The removed disposable coveralls shall be disposed of as asbestos waste in a 6 mil (0.15 mm) labelled waste bag.

- .3 The worker shall proceed to clean their hands and arms. The waste water should be collected and filtered using a filter that passes particles 5 microns in size and smaller, before it is discharged into the municipal sewer system.

.3 Asbestos Removal Procedures

- .1 Asbestos Removal shall not commence until:

- .1 The work area is effectively separated from clean areas of the building by polyethylene drop sheets and the placing of rope barriers at the boundary of the designated work area. The boundaries of the work area shall be a minimum of 10 feet from the location of the insulation being removed.
 - .2 Warning signs are posted outside the removal work areas.
 - .3 All surfaces which are not possible to clean are sealed with polyethylene sheeting and tape.
 - .4 Arrangements have been made for waste disposal, landfill site has been contacted and storage bin is on site.
 - .5 Tools equipment and materials are on hand and in the work area.
 - .6 Facilities for the washing of hands and face are available for workers leaving the work area.
- .2 Before beginning work remove visible dust from surfaces in the work area where dust is likely to be disturbed during the course of the work. Use HEPA vacuum, or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate. Do not use compressed air to clean up or remove dust from any surface.
 - .3 Remove all obstructions from around pipe. Where access is required above plaster ceilings, provide sufficient openings to gain access.
 - .4 Friable material containing asbestos to be removed or disturbed shall be thoroughly surface wetted before and during work unless wetting creates a hazard or causes damage. Use garden type low velocity fine mist sprayer. Sprayers that are partially clogged, or that does not produce uniformly fine mist will not be accepted. Perform work in a manner to reduce dust creation to lowest levels practicable.
 - .5 Inspect all glove bags for defects before using. A defective bag shall not be used.
 - .6 Ensure that the following tools are used:
 - .1 Knife shall have a retractable blade.
 - .2 Saw shall be a flexible wire type.
 - .3 Brushes shall not have metal bristles.
 - .7 After written authorization has been received from the Inspector to proceed perform the removal using the following procedures.
 - .1 Place tools necessary to remove insulation, in tool pouch. Wrap the bag around pipe and close zippers. Seal bag to pipe with restraining nylon straps. Welds and folds of glove bag are to remain intact without modification to manufacturers design.
 - .2 Place hands in gloves and use necessary tools to remove insulation. Cut or remove exterior insulation covering where applicable to expose asbestos pipe covering. Wet exposed pipe or duct covering with sufficient mixture to suppress any dust. Arrange insulation in bag to obtain full capacity of bag.
 - .3 Insert nozzle of spray pump prefilled and primed with water and surfactant into bag through valve and wash down pipe and interior of bag thoroughly,

use cloth or sponge to aid in washing process. Wet surface of insulation in lower section of bag.

- .4 Waste material in bags intended for use at more than one location and which are equipped with internal zippers to seal off waste, shall have the upper section of bag thoroughly cleaned then shall be sealed off in lower sections of bag before bag is removed from pipe. Reinstall bag in new location before opening zip lock.
- .5 If bag **(Only if bag is a Safe-T-Strip)** is to be moved along pipe, loosen straps, move bag, re seal to pipe using double pull zipper to pass hangers. Repeat stripping operation.
- .6 To remove bag after completion of stripping wash top section and tools thoroughly. Seal off waste in lower section of bag using zipper. Pull polyethylene waste container over glove bag before removing from pipe. Release one strap and remove freshly washed tools. Place tools in water. Remove second strap and zipper. Fold over into appropriately labelled waste disposal bags and seal.
- .7 Prior to removal of bag ensure that pipe is free of all residue. Remove all residue using wet cloths as necessary. Ensure that surfaces are free of sludge which after drying could release asbestos dust into atmosphere. Seal exposed surfaces of pipe and ends of insulation with slow drying sealer to seal in any residual fibres.
- .8 Upon completion of work, cover exposed ends of remaining pipe insulation with polyethylene tape.
- .9 If the glove bag is ripped, cut or opened in any way, work that may disturb friable material shall cease immediately. If the rip, cut or opening is small and easy to repair then the glove bag shall be repaired forthwith with tape. Work may continue once the repairs are complete. If the rip, cut or opening is not small and cannot be easily repaired, place the glove bag forthwith in a suitable asbestos waste container. Any spilled material containing asbestos shall be cleaned up and removed by using a vacuum equipped with a HEPA filter.
- .8 All work will be subject to visual inspection and air monitoring. Any contamination of surrounding areas indicated by visual inspection or air monitoring will require the complete enclosure and clean up of affected areas.

.4 Cleanup:

- .1 Frequently during the work and immediately after completion of the work clean up dust and waste containing asbestos using a HEPA vacuum or by damp mopping.
- .2 Place dust and waste containing asbestos in sealed dust tight waste bags. Drop sheets and disposable protective clothing shall be treated as asbestos waste and shall be wetted and folded inward to contain dust and then placed in waste bags.
- .3 Glove bags, disposal bags, drop sheets, cloth rags and any porous materials are to be considered as asbestos waste and handled according to disposal subsection.
- .4 Immediately before their removal from the work area, and disposal, clean each filled waste bag using damp cloths or HEPA vacuum and place in second clean waste bag.
- .5 Seal and remove double bagged waste from site. Dispose of in accordance with procedures specified in subsection 1.14 Waste Transport and Disposal.
- .6 Perform final thorough cleanup of work areas and adjacent areas affected by the work using HEPA vacuums.

2.4 TYPE 3 REMOVAL OPERATION

- .1 Initial Preparation and Isolation of Work Areas: Unless otherwise specified, work carried out as part of this phase shall proceed as follows:
- .1 Carry out a survey of the work areas to compile an inventory of existing damages and provide a copy to the Consultant.
 - .2 The Contractor is responsible for moving materials and objects which are present in the work areas.
 - .3 Separate the asbestos removal work areas from other areas in the mechanical room required to remain in use as follows by erecting rip-proof polyethylene sheeting and plywood sheeting. The polyethylene sheeting should extend from floor to ceiling and the plywood hoarding should extend 8ft from the floor on the separation side of the enclosure. Use one layer of rip proof poly on the exterior side of the wood stud framing under the plywood sheets. Use two layers of poly on the interior side of the wood frame. The inner layer shall be made up of clear 6 mil poly sheets. The outer layers shall be made up of rip proof poly.
 - .4 All surfaces, equipment and objects located in the work areas and not scheduled for removal shall be pre-cleaned by HEPA vacuuming or wet wiping and shall be protected by one layer of rip proof poly sheeting unless otherwise specified. Dry sweeping or vacuuming with units not equipped with HEPA filters shall not be allowed.
 - .5 All equipment, objects and articles scheduled for removal shall be taken out of the work area only if its removal will not disturb any asbestos-containing materials.
 - .6 Ensure that smoke detectors, fire alarms, heat detectors and other life safety equipment remain active and operating as installed.
 - .7 All specified clean demolition work can be carried out before the Type 3 enclosure is set up on condition that the demolition work does not disturb any asbestos-containing materials.
 - .8 Construct the decontamination enclosure systems for workers and for equipment and materials as specified.
 - .9 Independently seal off all openings leading to the work area using polyethylene sheeting and duct tape. Such openings include, but are not limited to, windows, doorways, corridors, skylights, diffusers, grills and air ducts. Also seal all floor openings independently before covering the entire floor with polyethylene sheeting. Ensure that the individual seals are air tight and water tight.
 - .10 Cover floors with two independently sealed layers of polyethylene sheeting and seal with duct tape. Poly on the floor shall extend a minimum of 30 cm up all vertical surfaces located in the work area.
 - .11 Cover walls with one layer of 6 mil rip-proof polyethylene sheeting (unless specified otherwise). Overlap floor poly with wall poly by a minimum of 30 cm at each layer. The layers of wall poly shall always overlap the layers of the floor poly.
 - .12 Ensure that adjoining sheets of poly used on walls and floors overlap by at least 30 cm.
 - .13 Ensure that poly sheets are properly supported to avoid excessive billowing and failure of the enclosure as a result of applying negative pressure differential. Brace the poly in case of excessive billowing using 1"x2" straps.
 - .14 Use flame resistant polyethylene sheeting near heat sources.

- .15 Create negative pressure in the work area using HEPA-filtered negative air unit distributed evenly (horizontally and vertically) within the work area. Supply any necessary platforms as required to elevate the negative air unit.
- .16 Provide enough negative air units to be able to exchange the air volume of the work area at least once every 20 minutes (three air changes per hour) and to maintain a minimum of 0.02" water gauge differential.
- .17 The pressure differential shall be continuously monitored using an automatic recorder as specified. Place the monitor outside the contaminated work area. A backup negative air unit shall be set up and ready for operation in case one of the original units fail.
- .18 Operate the negative air units from the start of the preparation and isolation phase until completion of the final clean up work and air testing.
- .19 Ensure that the necessary make up air is supplied to the work area through flaps installed in the perimeter seal.
- .20 Replace pre-filters and HEPA filters as necessary to maintain the proper flow rate and to ensure that the unit continues to function properly.
- .21 Contaminated air from the work area shall be exhausted directly to the outside through sealed ducts. Where necessary, remove existing windows and replace with a plywood panel. Secure panel in place and make weather tight using caulking. Install appropriately sized openings for exhaust (typically 12"). Replace windows upon completion of work.
- .22 All negative air units which are set up to discharge inside the building shall be leak tested in place using the DOP method.
- .23 The Contractor is allowed to connect to the Owner's existing water supply for use in the asbestos work areas and in the temporary shower and decontamination facilities. The Contractor shall be responsible for making all the connections using vacuum breakers and other backflow preventers.
- .24 The Contractor shall use copper pipes and fittings and high pressure hoses when making connections to the main water supply. The Contractor shall also install a main shut-off valve on the clean side of the decontamination enclosure. All connections shall be made down stream from the main shut-off valve. Ensure that the pressure in the temporary water distribution system is relieved if the system is to be left unattended. Ensure that no leaks are present around hose pipe connections. Minimize the possibility of water damage through spills or leaks by providing drip pans of suitable size and by ensuring that the drip pans are drained regularly.
- .25 Ensure that all water from the drainage facilities installed on the shower and other decontamination enclosures is passed through filtration systems as specified.
- .26 Test all temporary piping installed during this project and ensure that they are watertight. All temporary pipe installation shall remain water tight for the duration of the project. Pipes shall be installed parallel to walls and shall be temporarily secured to existing structures. Ensure that all piping is removed upon completion of work. Avoid damaging or altering the owner's existing water equipment and piping.
- .27 All electrical work shall be performed by a licensed electrician in compliance with all applicable regulations. Isolate, disconnect and lockout all power supplying or passing through the work area. Ensure that power supply to the remaining areas of the building is not disrupted during work in asbestos contaminated areas.
- .28 Unless specified, the use of the existing power and lighting circuits shall not be allowed. Use temporary electrical panels to provide power and lighting to the decontamination facilities and the work area. One electrical panel shall be provided

for every 5000 square feet of contained asbestos work areas. Electrical panels shall be equipped and sized to handle all electrical equipment required for the completion of the project. The Contractor shall also be required to provide other additional electrical equipment such as temporary lighting, circuit breakers, panels, transformers and switch gears.

- .29 The contractor shall be responsible for establishing and maintaining fire and emergency exits from the work area that are acceptable to the Provincial Fire Marshall and other authorities having jurisdiction. The emergency exits shall be sealed in a manner that will not hinder the use of the doors during an evacuation and shall be clearly marked by using proper exit signs.
- .30 Battery powered emergency lighting shall be installed by the Contractor to provide general lighting throughout the work area in case of loss of power supply to the ground fault panel and to ensure that the emergency exits and the exit routes remain lit during the power failure.
- .31 Ensure that fire extinguishers are installed throughout the asbestos work area at each of the emergency exits and on both sides of the decontamination facilities. All fire extinguishers installed inside the work area shall be protected by clear polyethylene sheets and shall be easily accessible in case of an emergency.
- .32 The Contractor shall place warning signs at all access points leading to the contained work area. The signs shall be posted at the curtained door ways and shall read:

CAUTION
ASBESTOS HAZARD AREA
NO UNAUTHORIZED ENTRY
WEAR ASSIGNED PROTECTIVE EQUIPMENT
BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM

- .33 Once the initial clean preparation and isolation of the work area is completed, the Contractor shall request an inspection from the Consultant before proceeding to next phase. Notify the Consultant 24 hours before the inspection is needed.
- .34 Once authorization is obtained from the Consultant, proceed to setting up critical seals that might become accessible once removal operations commence.
- .35 Shut off and lock out the HVAC system serving the subject work area. Ensure that all work requiring the complete shut down of the HVAC system is carried out during the time when the building is not occupied.
- .36 Unless otherwise specified, all electrical systems scheduled to remain inside the work area during asbestos removal activities shall be sealed using duct tape and poly sheets. Examples of such systems include speakers, wiring, smoke and heat detectors, alarm equipment, communication systems, PA systems, junction boxes, etc.
- .37 Once all the preparation work is complete, the contractor shall ensure that the work area is maintained neat and organized. All the enclosures shall be inspected by the supervisor before and after the completion of each work shift to ensure that the hoarding walls, polyethylene barriers and enclosures are intact. Any damaged discovered during the inspection shall be repaired immediately. Maintain an inspection log book on site to document when (date and time) the inspection was carried out and by whom (name and signature of the person). Summarize any problems encountered during the inspection.
- .38 Ensure that the negative air units and the associated ducting and exhaust openings are regularly inspected during the work shift. The pressure differential monitoring unit shall be also inspected regularly during the work shift to ensure that the specified negative pressure inside the work area is maintained.

- .2 Entry and Exit Procedures from Asbestos Removal Work Areas: the following general procedures shall be adhered to when entering into and exiting from asbestos abatement work areas:
 - .1 Work Area Entry Procedures:
 - .1 Every worker and visitor planning to enter the work area shall remove all street clothing including undergarments and shall store them in the clean change room.
 - .2 All uncontaminated articles such as clothing, footwear, towels, personal effects, etc. shall be store in the clean room of the decontamination facility.
 - .3 The person shall then put on disposal coverall with head covering, respirators with clean filters and foot covering and shall proceed to the work areas through the shower and then the equipment and access room.
 - .2 Work Area Exit Procedures:
 - .1 Using HEPA vacuuming or wet wiping, remove all gross contamination from personal protective equipment (disposable coveralls, boots, hard hats, safety glasses, exterior of respirator, etc.) in the work area and then proceed to the equipment and access room.
 - .2 In the equipment and access room, remove all protective clothing except the respirator and proceed to the shower. All disposal contaminated clothing shall be placed in asbestos disposal bags. Reusable items shall be stored neatly in the equipment and access room for use during the next shift.
 - .3 Proceed naked to the shower while still wearing the respirator. While showering, clean the outside of the respirator with soap and water. Seal the openings in the filter as per the manufacturer's instruction or using duct tape. Alternatively, the filters can be disposed of as asbestos waste. Continue showering by thoroughly wetting and washing the body and the head. Wet and clean the inside of the respirator. Filters shall not be allowed in the clean room if not properly sealed.
 - .4 Upon completion of showering and drying off, proceed to the clean room and dress in street clothing.
- .3 Asbestos Removal Procedures
 - .1 Asbestos removal work shall not commence until the following requirements have been met:
 - .2 All work areas have been and contained as specified, decontamination enclosure systems have been set up and occupied areas of the building have been properly isolated.
 - .1 All required notifications have been made and a notice of project has been posted in a visible area.
 - .2 Warnings signs have been displayed at all potential access points into the work area.
 - .3 All arrangements have been made with the waste disposal facility.
 - .4 All equipment, materials and tools needed inside the work area are available and in working condition.
 - .5 Appropriate negative pressure differential have been established inside the work area with proper allowance for make up air.
 - .6 All building security arrangements have been made.

- .7 Written authorization has been obtained from the Consultant to commence asbestos removal work.
- .3 Using an airless sprayer, spray the asbestos-containing material with water mixed with a wetting agent. Apply enough amended water to ensure that the material is wet all way through to the substrate. Avoid dripping. Etch the surface of the material being wetted in cases where the water does not penetrate the outer layer of the material.
- .4 Remove the wet asbestos-containing materials in layers and/or small sections while maintaining exposed surfaces of insulation in a wet condition. Spray the material regularly throughout the removal work to maintain saturation and to minimize the generation and dispersion of dust. Ensure that the wet material does not dry out.
- .5 Ensure that the removed material and other waste generated during the removal process is collected and bagged immediately. Place the material in yellow labelled bags. Ensure that the waste water is also collected regularly. Avoid pooling of water. Dispose of the waste water in labelled 6 mil polyethylene bags (or other suitable rigid containers) or pump it straight into the sanitary sewer after passing it through the specified two stage filters.
- .6 Dispose of waste in accordance with procedures specified in subsection 1.14 Waste Transport and Disposal
- .7 Mist the air during the removal process using an airless sprayer capable of producing a fine mist and amended water to keep the airborne fibres levels as low as possible. Monitor the air inside the work area during removal. Airborne fibre levels in excess of 2.5 fibres/cc require the utilization of more airless sprayers.
- .8 Remove deck mounted objects and other obstructions as necessary to facilitate the removal of the asbestos-containing materials. Ensure that the removal work includes all asbestos-contaminated materials specified for removal.
- .9 After completion of gross asbestos removal work, perform a more thorough cleaning of all surfaces that used to be covered by asbestos to remove all visible residue and fibrous materials. Cleaning shall be carried out using wire brushing (stiff bristle brushes such as nylon or fibre bristles not metal), wet sponging and vacuuming. Ensure that the surfaces remain wet during the performance of this work.
- .10 Notify the Consultant in cases where asbestos-containing materials is encountered which cannot be properly removed without demolishing building structural members or removing major service elements. The Consultant will advise the Contractor in writing regarding the next course of action. If sealing the material in place is the recommended course of action, apply a penetrating sealer onto the material and ensure that it penetrates all the way to the substrate.
- .11 Continue with the wet thorough cleaning activities and include other surfaces in the work area including, but not limited to, decontamination facilities, polyethylene sheeting, walls and floor surfaces, equipment, containers, piping, ducts, conduits and poly surfaces used in the equipment and access room and the equipment decontamination facilities. Pre- filters used on the negative air units shall be removed and shall be disposed of as asbestos waste.
- .12 Request a visual clearance inspection by the Consultant once all the cleaning activities are completed. The level of cleanliness shall be acceptable to the Consultant before a written authorization is issued to apply the lock-down material.
- .4 Procedures for Handling of Materials and Waste
 - .1 Seal all filled asbestos waste containers and clean the exterior of the containers and other items by wet sponging. Move the containers from the filling area to a temporary

storage area located within the enclosure and close to the equipment waste decontamination facility.

- .2 Move the item to the container cleaning room, clean by wet sponges and pass it through the curtained doorway to a second worker stationed in the holding room. The second worker shall be fully protected (similar to the removal workers) and can only leave by going through the work area and exiting through the worker decontamination facility (after taking a shower). The second worker shall then clean or double bag and seal the item and shall pass it through the curtained doorway to a third worker stationed in the transfer room. The third worker enters the transfer room from the clean side and does not need to use personal protective equipment. The third worker is then responsible for transferring the item to the disposal bin or to the Contractor's temporary storage room or truck.
 - .3 All waste generated within the asbestos work area shall be treated as asbestos-contaminated waste and shall be disposed of accordingly. Non-porous materials which can be properly washed and cleaned can be disposed of as normal waste after cleaning.
 - .4 The contractor shall use a combination of a rigid container with 6 mil poly bag to transport and dispose of waste containing sharp materials which could rip two 6 mil poly bag.
 - .5 Transportation of waste and materials through occupied areas of the building shall be limited to a time when the building is not occupied. The Contractor shall use covered carts to transport the waste inside the building. Predetermined transport routes shall be approved by the Owner or his representative.
 - .6 Workers transporting the waste shall be equipped with spill kits and full personal protective equipment and shall be trained to contain and clean any spilled asbestos-containing materials resulting from a failure in the waste containers.
 - .7 Ensure that waste transport routes, loading areas and garbage bin storage areas are kept clean at all times. Garbage bins shall be of the fully enclosed type and shall be locked at all times when not in use. Garbage bins shall be placed only in locations specified and approved by the Owner or his representative.
 - .8 Schedule garbage bin pick up and drop off times in consultation with the Consultant and ensure that the scheduled times do not interfere with the operations of the building Owner or his tenants.
 - .9 Transport and dispose of asbestos waste as procedures specified in subsection 1.14 Waste Transport and Disposal.
- .5 Procedures for Locking-Down of Work Area
- .1 Upon completion of clean up operations and after receiving written authorization from the Consultant to proceed, apply a lock-down agent acceptable to the Consultant on all surfaces in the work area such as areas where asbestos materials has been removed, pipes, ducts and other exposed objects present in the work area, polyethylene sheeting and other exposed walls, ceilings and floors, etc. Ensure that the sprayed material covers all surfaces. Apply twice as much lock-agent on areas that used to be covered by asbestos-containing materials.
 - .2 Ensure that proper respiratory protective equipment is used during the application of the lock-down agent since, depending on the nature of the sealer used, potentially hazardous materials could be generated during the application process.
 - .3 Restrict access to the work area for a period of 24 hours after completion of the lock-down application to allow for the dust to settle and for the lock-down agent to dry off. Clearance air samples will then be collected inside the work area.

- .4 The work area shall be considered acceptable for public occupancy only if the airborne fibre levels inside the work area are less than 0.01 fibres/cc. Levels above 0.01 fibres/cc requires that the entire area be re-cleaned and another coat of lock-down agent be applied by the Contractor on all surfaces in the work area. Re-sampling will be carried out and the entire process shall be repeated until the fibres levels are less than 0.01 fibres/cc.
- .5 The Contractor shall be responsible for all charges associated with re-cleaning work and other associated requirements as specified.
- .6 Procedures for Work Area Teardown and Dismantling
 - .1 Proceed with the teardown of the work area only after obtaining written authorization from the Consultant. Ensure that Type 3 procedures remain in effect during this phase of work. The worker and equipment and material decontamination units shall remain fully operational. The negative air units shall continue to operate throughout the duration of the teardown work.
 - .2 Start by removing polyethylene sheeting by carefully folding it away from the walls to the centre of the work area making sure that any loose debris is trapped within the poly. Also remove all enclosures, duct tape, caulking, polyurethane foam and other materials used in setting up the enclosure. Ensure that one layer of polyethylene sheeting is kept in place in situations where re-application of fireproofing is required. Polyethylene and other materials used in setting up enclosures shall be disposed of as asbestos-contaminated waste.
 - .3 Clean all vacuum units, fittings, hoses and other small tools used during the removal work inside the work area, seal in 6 mil poly bags and remove from the work area through the equipment and materials decontamination unit. Wash down and clean other equipment used during the work and remove from the work area.
 - .4 Clean up the asbestos work area including all surfaces and all decontamination enclosures. Remove negative air units pre-filters and dispose of as asbestos waste. Seal the exterior of the unit on all sides with poly and remove from the work area.
 - .5 Remove all waste bags containing polyethylene sheets and other materials used to set up the enclosures and dispose of as specified.
 - .6 Remove all hoarding walls separating the work area from occupied areas except in locations where the walls are set up adjacent to other areas that still contain asbestos. Obtain approval of Consultant before dismantling hoarding walls.
 - .7 Dismantle the remainder of the enclosure including scaffolding, platforms, decontamination facilities, tunnels, etc. Final clean the work area using HEPA vacuuming and wet wiping. Clean and remove all ground fault panels and temporary lighting.
- .7 Procedures for Re-Establishment of Objects and Systems
 - .1 Re-establish mechanical and HVAC systems and install new clean air filters where previously removed. Re-establish all electrical system and return to as found condition unless otherwise specified.
 - .2 Repair, replace and make good on all damages not identified during the per-removal survey.
 - .3 Unless otherwise specified, all items and objects removed during the initial preparation phase of the work shall be returned to their original position and shall be properly mounted and secured.

TABLE 1

Asbestos Containing Building Material	ACM Abatement Scope of Work	Required Abatement Method	Specification Section
Sprayed Fireproofing	< 1m ²	Type 2	2.2
Thermal Insulation / Vermiculite	> 1m ²	Type 3	2.4
Plaster	< 1m ²	Type 2	2.2
Texture Finish	> 1m ²	Type 3	2.4
Drywall Joint Compound	< 1m ²	Type 1	2.1
	> 1m ²	Type 2	2.2
Pipe Insulation – Aircell	< 1m ² or can be contained in a glove bag for removal	Type 2 or Type 2 Glove Bag	2.2 or 2.3
	> 1m ²	Type 3	2.4
Pipe Insulation – Parging Cement	< 1m ² or can be contained in a glove bag for removal	Type 2 or Type 2 Glove Bag	2.2 or 2.3
	> 1m ²	Type 3	2.4
Duct Insulation	< 1m ² or can be contained in a glove bag for removal	Type 2 or Type 2 Glove Bag	2.2 or 2.3
	> 1m ²	Type 3	2.4
Acoustic Ceiling Tile	< 7.5 m ²	Type 1	2.1
	> 7.5 m ²	Type 2	2.2
Cement Products like	Hand Tools	Type 1	2.1
Transite pipe/board	Power Tools	Type 3	2.4
Vinyl Floor Tile	Hand Tools	Type 1	2.1
Vinyl Sheet Flooring	Power Tools	Type 3	2.4
Door/Window Caulking		Type 1	2.1
Putty		Type 1	2.1
Gaskets		Type 1	2.1
Fire Doors		Type 1	2.1
Asphalt		Type 1	2.1

End of Section

Purpose

It is the policy of the City of Toronto to:

- eliminate, or minimize to the extent possible, the potential for worker and tenant exposure to airborne asbestos fibres, thereby protecting their health, and
- maintain compliance with legislative requirements by appropriately managing asbestos in buildings on an ongoing basis as well as during any construction and renovation work that may potentially disturb any asbestos-containing material.

Application

This policy applies at all City-owned or leased facilities at which asbestos-containing materials are, or may be, present.

Specifically, it outlines owner responsibilities for implementing and maintaining asbestos management programs in every building with material which may contain asbestos. During construction projects, it outlines responsibilities of the constructor, every employer and workers engaged in or on the project, as well as responsibilities of the owner of the project. During repair, alteration, maintenance or demolition of a building, it outlines responsibilities of all workers and employers involved, as well as, responsibilities of the owner.

Definitions

Asbestos	Any of the following fibrous silicates: actinolite, amosite, anthophyllite, chrysotile, crocidolite or tremolite. Asbestos is most commonly found in sprayed-on insulation or fireproofing, fibrous or corrugated paper pipe insulation, cement pipe, drywall and drywall joint compound, floor and ceiling tiles.
Asbestos-containing material	Material that contains 0.5% or more asbestos by dry weight.
Building	Means any structure, vault, chamber or tunnel including, without limitation, the electrical, plumbing, heating and air handling equipment (including rigid duct work) of the structure, vault, chamber or tunnel.
Building asbestos record	A document that details the current location (by room, hallway, stairwell, etc.), type, condition and whether material is friable or non-friable of asbestos-containing material(s) in a facility, as well as associated inspection and repair records.
Building asbestos assessment and report	A document (showing material likely to be handled, disturbed or removed during demolition, alteration or repair work, whether or not material is asbestos-containing material, its condition, whether friable or non-friable and drawings, plans and specifications showing location of material in question) that is prepared in addition to the building asbestos record and provided to prospective contractors prior to

asking for tenders.

Friable material	Material that when dry can be crumbled, pulverized, or powdered by hand pressure and any material which is crumbled, pulverized or powdered. It is important to recognize that damage or deterioration may cause non-friable material to become friable.
Competent person	An individual meeting the definition of “competent person” under the Occupational Health and Safety Act. It means a worker who, (a) is qualified because of knowledge, training and experience to perform the work, (b) is familiar with the Act and with the provisions of the regulations that apply to the work, and (c) has knowledge of all potential or actual danger to health or safety in the work.
HEPA filter	A high efficiency particulate aerosol filter that is at least 99.97% efficient in collecting a 0.3 aerosol.
Homogenous material	Material that is uniform in colour and texture.
Owner	Includes a trustee, receiver, mortgagee in possession, tenant, lessee, or occupier of any lands or premises used or to be used as a workplace, and a person who acts for or on behalf of an owner as an agent or delegate.
Type 1 operations	Installing or removing ceiling tiles that are asbestos-containing if the tiles cover an area less than 7.5 square metres and are installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated. Installing or removing non-friable asbestos-containing material, other than ceiling tiles, if the material is installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the material is wetted to control the spread of dust or fibres and the work is done only by means of non-powered hand-held tools. Removing less than one square metre of drywall in which joint filling compounds that are asbestos-containing material have been used.
Type 2 operations	Removing all or part of a false ceiling to obtain access to a work area, if asbestos-containing material is likely to be lying on the surface of the false ceiling.
Type 2 operations (ctd)	Removal or disturbance of one square metre or less of friable asbestos-containing material during the repair, alteration, maintenance or demolition of all or part of machinery or equipment or a building, aircraft, locomotive, railway car, vehicle or ship. Enclosing friable asbestos-containing material. Applying tape or a sealant or other covering to pipe or boiler insulation that is asbestos-containing material.

Installing or removing ceiling tiles that are asbestos-containing material, if the tiles cover an area of 7.5 square metres or more and are installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.

Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material, if the material is not wetted to control the spread of dust or fibres and the work is done only by means of non-powered hand-held tools.

Removing one square metre or more of drywall in which joint filling compounds that are asbestos-containing material have been used.

Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the work is done by means of power tools that are attached to dust-collecting devices equipped with HEPA filters.

Removing insulation that is asbestos-containing material from a pipe, duct or similar structure using a glove bag.

Cleaning or removing filters used in air handling equipment in a building that has sprayed fireproofing that is asbestos-containing material.

An operation that is not mentioned previously and may expose a worker to asbestos and is not classified as a Type 1 or Type 3 operation.

Type 3 operations

The removal or disturbance of more than one square metre of friable asbestos-containing material during the repair, alteration, maintenance or demolition of all or part of a building, aircraft, ship, locomotive, railway car or vehicle or any machinery or equipment.

The spray application of a sealant to friable asbestos-containing material.

Cleaning or removing air handling equipment, including rigid ducting but not including filters, in a building that has sprayed fireproofing that is asbestos-containing material.

Repairing, altering or demolishing all or part of a kiln, metallurgical furnace or similar structure that is made in part of refractory materials that are asbestos-containing materials.

Type 3 operations (ctd)

Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material, if the work is done by means of power tools that are not attached to dust-collecting devices equipped with HEPA filters.

Repairing, altering or demolishing all or part of any building in which asbestos is or was used in the manufacture of products, unless the asbestos was cleaned up and removed before March 16, 1998.

Conditions

Because of its fire-resistant properties, asbestos was extensively used in buildings as insulation around pipes and boilers, in sprayed-on fireproofing, in thermal/acoustic insulating boards, in ceiling and floor tiles, and in cement pipes.

The Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations (Ontario Regulation 278/05), made under the Occupational Health and Safety Act, outlines requirements for the management of asbestos (friable and non-friable) in buildings and safe work measures and procedures during construction and renovation. The requirement to incorporate non-friable asbestos-containing materials in building management programs comes into effect as of November 1, 2007.

Where the City of Toronto is the facility owner, all requirements of the regulation apply and must be complied with. Any City of Toronto division responsible for acquiring and maintaining City facilities [e.g. divisions who maintain their own facilities (e.g. Toronto Water, Parks, Forestry and Recreation); Facilities and Real Estate who acquire and maintain a number of City-owned facilities] in which asbestos-containing material is present must assume asbestos-related “owner” obligations under the Occupational Health and Safety Act and the Regulation respecting Asbestos on Construction Projects and Repair Operations.

When a City division is the tenant only, divisional management continues to assume the employer responsibility for protecting the health of employees. However, responsibilities are more limited as building management (whether external or another City division) assumes owner responsibilities.

On projects that are carried out on City-owned facilities, even where the City has not been deemed to be the constructor, the City maintains owner responsibilities and employer responsibilities for protecting the health of any employees located on-site.

Responsibilities

Division heads responsible for maintaining City-owned facilities will ensure that:

- responsibilities for asbestos management are clearly established and communicated for all plants/facilities/complexes/buildings, including multi-tenanted locations.

Management of divisions which acquire and maintain City-owned facilities will establish a system to ensure the following steps are taken:

- A list of buildings, indicating whether asbestos is present, is prepared and maintained.
- Funds are budgeted for preparing a building record (where previously none was required) or for updating an existing building record (to ensure compliance with current legislative requirements).
- Funds are budgeted for updating asbestos records at least annually.
- Funds are budgeted for asbestos remediation projects, as deemed necessary during asbestos inspections. If maintaining a facility where abatement is required for another City division, that division’s senior manager is advised of the need to budget for abatement.

In addition to the above, management of divisions which acquire and maintain City-owned facilities will also ensure the following actions are taken:

Building Acquisition or Lease

- When purchasing, leasing or otherwise acquiring facilities, every reasonable effort is made to ensure that acquired buildings are asbestos-free. In circumstances where this is not feasible or achievable, building asbestos records are obtained, wherever possible. At a minimum, if building asbestos records are not obtained during the acquisition process, asbestos inspections are performed by competent persons and building asbestos records are prepared prior to building occupancy.

Asbestos Record

- Evaluate the need for a building record according to new legislative requirements (whether friable or non-friable material containing 0.5% asbestos or greater is present). Should a record now be required, ensure building record is prepared by November 1, 2007.

- Review existing building record and revise as required to include non-friable in addition to friable asbestos-containing material by November 1, 2007.
- Review existing building records to ensure minimum number of bulk samples as defined by legislation have been collected by a competent person from an area of homogenous material and analyzed using specified method.
- Retain the master copy of each building asbestos record.
- Provide a copy of each building asbestos record to the corporate Occupational Health, Safety and Workers' Compensation Unit.
- Provide a copy of each building asbestos record to the senior manager(s) responsible for the work location and updates, as necessary. These senior managers are to ensure that a copy of the building asbestos record is available and maintained on site and that business unit health and safety staff are advised of the location of these records.

Asbestos Management Program

- Periodic routine inspections of asbestos-containing materials are performed by competent persons in facilities in which asbestos is present to determine its condition and results of these inspections are incorporated into building asbestos records. Reports are made accessible to the joint health and safety committee/health and safety representative for that location.
- Asbestos records are updated at least annually and if new information is available.
- Any incidents of accidental disturbance of asbestos-containing material are promptly abated.
- Repair orders, generated as a response to recommendations of joint health and safety committees/health and safety representatives, building users, health and safety staff and/or those employees who conduct periodic routine inspections, are promptly addressed.
- Employees, who work in the vicinity of asbestos-containing material, including employees of contractors, are advised of its presence.
- If friable material has fallen and is being disturbed such that exposure is likely, no further work is done until it is determined whether it is asbestos-containing material. The fallen material is cleaned up, removed and appropriately disposed of. If it is likely that the material will continue to fall, then it is repaired, sealed, removed or permanently enclosed.

Before Requesting Tenders or Arranging Work

- A detailed building asbestos assessment and report is provided to prospective contractors prior to asking for tenders, this is in addition to the building asbestos record.
- If the work of service providers may result in disturbance of asbestos-containing materials, they are advised of the existence of such materials, as well as required work protocols and procedures.
- Employees who perform work, which may disturb asbestos-containing material, are advised of the need to consult building asbestos records for work locations prior to beginning work.
- Arrangements for removal of asbestos-containing material as part of major renovations are made, whenever possible. At a minimum, all damaged or deteriorating material is removed during renovations.
- In the case of demolition work, remove to the extent practicable any asbestos-containing material that may be disturbed during the work.

Asbestos Work

- Written notification is provided to senior on-site managers prior to initiation of scheduled asbestos-abatement work. When work is of an emergency nature, E-mail or fax notification is provided.
- Asbestos remediation work is classified as Type 1, 2 or 3 as specified in Regulation 278/05 and appropriate work procedures are developed and implemented.
- The Ministry of Labour (MOL) is notified in advance by telephone and in writing of all Type 3 work and all glove bag work exceeding 1 square meter.
- Outside contractors retained for asbestos abatement work and their staff are competent and possess all

necessary registrations and permits before undertaking any work. As of November 1, 2007 all workers and supervisors involved in Type 3 work must have successfully completed an Asbestos Abatement Worker training program and Asbestos Abatement Supervisor training program, respectively, approved by the Ministry of Training, Colleges and Universities.

- Project managers who oversee the work of asbestos abatement contractors are appropriately trained and competent.
- Project managers are to review and revise, as appropriate, contract language to ensure that contractors hired by the City to conduct asbestos abatement are competent. Project managers are to seek confirmation (e.g. written documentation), as appropriate, that contractors hired by the City to conduct asbestos abatement are in compliance with legislative requirements (e.g. staff have successfully completed approved asbestos training programs as of November 1, 2007, staff wear appropriate respiratory protection and have been successfully fit-tested, specified work procedures are followed, required clearance air monitoring is conducted etc.). Project managers are to take immediate corrective action, either directly or indirectly, depending on constructor status, if any violations of safe working procedures are noted.
- Asbestos waste is transported and disposed of in accordance with regulatory requirements.
- If, in the course of work, material is discovered which was not identified in the asbestos assessment and report but which may be asbestos-containing material, work is stopped and the material is analyzed for asbestos content. The MOL and joint health and safety committee or health and safety representative are immediately advised by telephone and in writing.
- Written notice is provided in advance to the joint health and safety committee or health and safety representative if varying a measure or procedure from legislation. Varied measures or procedures must afford at least equal protection to workers.

Additional Requirements if Asbestos Work Conducted by City Staff

- All employees likely to be engaged in asbestos-related work are trained in (i) asbestos hazards, (ii) personal hygiene and appropriate work practices and (iii) use, care and disposal of respirators and protective equipment, including limitations, inspection and maintenance, proper fitting, respirator cleaning and disinfection. Training records are maintained. Retraining is completed on a routine and as-needed basis.
- Advise joint health and safety committee/health and safety representative of time and place that the above worker training is to be carried out.
- As of November 1, 2007, all workers and supervisors engaged in Type 3 work must have completed training programs approved by the Ministry of Training, Colleges and Universities.
- Asbestos work reports are completed for any workers engaged in Type 2 or Type 3 operations at least once every 12 months and immediately on termination of employment, or, for any employees who experience accidental exposure to asbestos. Reports are submitted to Employee Health staff with responsibility for the asbestos biomedical surveillance program.
- All workers engaged in cleaning and/or removing filters used in air handling equipment in a building with asbestos-containing sprayed fireproofing must have been trained in and follow Type 2 procedures.
- Ensure workers follow legislatively required procedures.
- Ensure workers are provided with appropriate personal protective equipment. For respiratory protective equipment, ensure these are provided within the context of a written respiratory protection program (which includes respirator fit testing).
- For type 3 work, ensure that a copy of clearance air test results are posted in the workplace and in a common area (if the building contains other workplaces) and a copy is provided to the joint health and safety committee/health and safety representative within 24 hours after the test results are received. The owner shall keep a copy of the clearance air test results for at least one year.

Management of all divisions that occupy buildings where asbestos is present will:

- Obtain and maintain the building asbestos record in an accessible location on-site.
- Supply a copy of the building asbestos record to the joint health and safety committee/health and safety representative responsible for the location and notify workers potentially exposed.
- Develop, in consultation with health and safety staff, job-specific safe working procedures for asbestos-related work.
- Schedule with health and safety staff asbestos training of (i) workers who may work in close proximity to asbestos-containing material and who may disturb this material and (ii) joint health and safety committee members/health and safety representatives who visually inspect accessible asbestos materials of which they are aware.
- Notify building management when they suspect damaged asbestos-containing material, requesting investigative and/or corrective action.
- Report and seek immediate corrective action if any violations of safe working procedures are noted.
- Advise employees and tenants of any scheduled or emergency asbestos-related work.

The Occupational Health, Safety and Workers' Compensation Unit's occupational hygiene staff will:

- Lead in the development of procedures, guidelines and training programs to facilitate compliance with this policy.
- Retain copies of building asbestos records, as provided by divisions, and maintain database of locations.
- Provide, or assist in provision of, asbestos training for those employees potentially exposed to asbestos.
- Assist in addressing employee asbestos-related concerns.
- Assist divisions in asbestos-related communications with the Ministry of Labour.

Health and Safety Consultants will:

- Monitor frequency of management's inspections.
- Based on joint health and safety committee/health and safety representative inspection reports and/or occupational health and safety staff inspections, recommend appropriate remedial actions or seek an occupational hygiene assessment.
- Assist in the provision of training and development of safe work procedures.

Employee health staff in Human Resources' Employee Health, Rehabilitation and Employee Assistance Unit will:

- Develop and assist City divisions in implementing an asbestos biomedical surveillance program.
- Co-ordinate asbestos-related health assessments with appropriate health care practitioners, in response to needs identified by departments.
- Review and communicate results of these assessments to employees and, to the extent legislatively required, with departments.
- Submit asbestos work report forms to the Ministry of Labour at the frequency required by legislation.

Joint health and safety committees/health and safety representatives representing employees at locations with identified asbestos-containing materials will:

- Inspect readily visible asbestos-containing material as part of their routine workplace inspections
- Bring deficiencies, if any, to the attention of area supervisors and occupational health and safety staff.

Workers will:

- Follow asbestos safe work procedures applicable to the work they perform.
- Advise their supervisors of any asbestos-related occupational health and safety issues or concerns.

- For workers engaged in Type 2 or 3 work, voluntarily participate in biomedical surveillance program.

The Occupational Health and Safety Co-ordinating Committee will:

- Monitor the implementation and effectiveness of this policy

Authority

The Regulation Respecting Asbestos on Construction Projects and in Buildings and Repair Operations
(O. Reg. 278/05)

Hazardous Waste Regulation (O. Reg. 347 as amended)

Corporate Asbestos Management Program

**ENDORSED BY: Occupational Health & Safety Co-ordinating Committee, (OHSCC),
June 6, 2007**

**APPROVED BY: City Manager
July 23, 2007**

ASBESTOS MANAGEMENT PLAN



Prepared by:
City of Toronto

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ASBESTOS MANAGEMENT PLAN



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City of Toronto

GLOSSARY OF TERMS

Amended Water	Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of ACM.
Asbestos-Containing Material(s) (ACM)	A material that contains 0.5% or more asbestos as measured by U.S. Environmental Protection Agency Test Method EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials, June, 1993.
Asbestos	Any of the following fibrous silicates: Actinolite; Amosite; Anthophyllite; Chrysotile; Crocidolite; Tremolite.
Asbestos Plan Manger	Also known as the District Manager of Operations, or Director of Operations or designated City of Toronto employee.
Asbestos Work Area	Area where work is being performed which will or may disturb ACM including overspray and fallen material or settled dust that may contain asbestos.
Building	means any structure, vault, chamber or tunnel including, without limitation, the electrical, plumbing, heating and air handling equipment (including rigid duct work) of the structure, vault, chamber or tunnel.
City	City of Toronto
Competent Worker	<p>In relation to specific work, means a worker who,</p> <ul style="list-style-type: none">• is qualified because of knowledge, training and experience to perform the work• is familiar with the Occupational Health & Safety Act and with the provisions of the regulations that apply to the work, and• has knowledge of all potential or actual danger to health or safety in the work.
Encapsulation	The application of a liquid sealant to asbestos-containing materials; the sealant may penetrate and harden the material (penetrants) or cover the surface with a protective coating (bridging sealants). Also called encasement. This is generally not advisable.

GLOSSARY OF TERMS

Enclosure	<p>Enclosure of ACM means the construction of solid enclosure (walls, ceiling, bulkhead etc.) around ACM, or</p> <p>An Enclosure means the site isolation including hoarding walls, polyethylene sheeting and seals that isolates an Asbestos Work Area.</p>
Facility Manager	Also known as the Property or Building Manager. May be a City of Toronto employee or an employee of City of Toronto's Facility Management Service Provider.
Friable Material	<p>Material that:</p> <ul style="list-style-type: none">• when dry, can be crumbled, pulverized or powdered by hand pressure or• is crumbled, pulverized or powdered.
Glove Bag Removal	A method of removing friable insulation from a piping system using a prefabricated bag which isolates the section of insulation being removed. This is a Type 2 Procedure.
HEPA Filter	High Efficiency Particulate Aerosol filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.
HEPA Filtered Negative Pressure Unit:	Portable air handling unit which extracts air directly from the Asbestos Work Area and discharges the air to the exterior of the building after passing through a HEPA filter.
JHSC	<p>Joint Health and Safety Committee.</p> <ul style="list-style-type: none">▪ a joint health and safety committee established under section 9 of the Act,▪ a similar committee described in subsection 9 (4) of the Act, or▪ the workers or their representatives who participate in an arrangement, program or system described in subsection 9 (4) of the Act;
MOE	Ontario Ministry of the Environment.
MOL	Ontario Ministry of Labour.

GLOSSARY OF TERMS

Phase Contrast Microscopy (PCM)	A method which uses an optical microscope to determine airborne fibres, normally in an occupational setting. Particles are observed for shape and size. Results are presented as a number of fibres per cubic centimetre or millilitre of air (f/mL). The method of analysis in Ontario is based on the US National Institute for Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Method 7400, issue 2, Asbestos and Other Fibres by PCM (August 15, 1994).
Transmission Electron Microscopy (TEM)	A method which uses an electron microscope to determine airborne asbestos fibres. Results are presented in fibres per cubic centimetre of air (f/cc). The method of analysis in Ontario is The U.S. National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Method 7402, Issue 2: Asbestos by TEM (Aug 15, 1994).
Type 1, 2 and 3 Procedures	Procedures defined under Ontario Ministry of Labour Regulation 278/05. The specific operations and their classification into these procedures are described under the Classification of Work Section.
US EPA	United States Environmental Protection Agency.

SECTION 1.0

1.0 INTRODUCTION

Asbestos is a designated substance in Ontario, governed by legislation under the Occupational Health and Safety Act, Regulation 278/05, *Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations*. This Asbestos Management Plan (AMP) has been prepared to ensure that asbestos containing materials (ACM) found in the building are not disturbed without taking appropriate precautions to protect the health and safety of City of Toronto staff, tenants and the general public. The AMP identified in this document will formally outline the current administration of the program, training requirements, detail safe guards and work procedures for asbestos in any of the buildings associated with City of Toronto. This AMP in present or revised form must remain in effect until all ACM have been removed from the building.

The substance “Asbestos” is one component of a group of dangerous chemical substances and biological agents that are customarily addressed in an overall Health and Safety program. The presence of asbestos in a building does not mean that the health of building occupants is necessarily endangered. As long as ACM remains in good condition and is not disturbed, exposure is unlikely. Where the material is handled or removed in an appropriate manner with safe guards to contain airborne fibre and protect the work force, exposure to the work force and to building occupants is also minimal.

It should be understood that the following are fundamental in the management of asbestos in buildings:

- Although asbestos fibres are hazardous, the risk of asbestos-related disease depends upon inhalation exposure to airborne asbestos fibres.
- Based upon available data the average airborne asbestos levels in buildings seem to be very low where ACM are not being actively disturbed. Accordingly, the health risk to most building occupants also appears to be very low. However it should be noted that personnel engaged in asbestos related work or those nearby suffer the greatest risk to exposure.
- Removal is often not a building owner's best course of action to reduce asbestos exposure. In fact an improper removal can create a dangerous situation where none previously existed. Full scale asbestos removal is only required in order to prevent significant public exposure to airborne asbestos fibres during building demolition or renovation activities.

Refer to Appendix A for further information regarding asbestos.

1.1 PURPOSE AND SCOPE

The AMP provides information and procedures for Asbestos Management in various City owned buildings. It applies to all categories of property with the exception of vacant lands. The AMP applies to all City of Toronto staff as well as all service providers and contractors performing work in City of Toronto facilities.

The AMP outlines the responsibilities of City staff in their roles as the Owner of buildings containing Asbestos-Containing Material (ACM), as tenants of a building with ACM and outlines requirements

for City personnel involved in acquisition of property which may contain ACM.

The AMP is a management system to control disturbance of asbestos-containing materials during demolition, renovation, alteration, maintenance, repair or other activities.

The AMP incorporates the following elements:

- Asbestos Assessments and Reassessments. These documents are part of the AMP and can be found at each facility and in Facility Manager's Office.
- Regulatory Requirements and the City of Toronto Policies.
- Roles and Responsibilities.
- Notifications.
- Training Requirements.
- Emergency Reaction and Procedures.
- Work Practices (Type 1, 2 and Glove Bag work).
- Record Keeping.
- Contractor Requirements.

1.2 PROGRAM STATEMENT

The City of Toronto's first concern is the health and safety of all tenants, employees and everyone who enters a City of Toronto property. City of Toronto is also committed to operate in compliance with the Ontario Ministry of Labour Regulation 278/05, *Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations* made under the Occupational Health and Safety Act and all other applicable regulations.

The City has established certain policies which exceed the minimum requirements of O. Reg. 278/05 as follows:

- Due to future management issues and additional costs incurred over the life of the material, if practical, the City will not utilize any ACM in new construction or installations.
- When remedial action is undertaken on friable sprayed ACM, the City will generally opt for removal of the ACM. Encapsulation or encasement will not be undertaken unless removal is not practicable in specific locations.
- When remedial action is undertaken on friable mechanical insulation both removal and repair (re-jacketing or encapsulation of mechanical insulation) will be considered depending on the extent of work required.

- Prior to leasing properties, (if practical) the City will have asbestos assessments performed in buildings constructed prior to 1986.
- Prior to leasing properties, if practical, the City requires that the Landlord remove all friable ACM at the Landlords sole expense.
- At existing properties when ACM is discovered during any improvement, addition, renovation, demolition, maintenance, repair of any kind, or at any other time, the City shall promptly remove the ACM from the Premises or the Building.
- No City staff shall undertake any asbestos operations as defined as Type 3 in O. Reg. 278/05 other than as required by an emergency situation.
- All Type 3 asbestos operations shall be undertaken by an Asbestos Abatement Contractor.
- Type 1 and Type 2 work may be undertaken by either City staff (if they have employees with appropriate training, as per the City of Toronto's asbestos management policy dated July 2007, on site) or an Asbestos Abatement Contractor.

1.3 PROGRAM ELEMENTS

1.3.1 Asbestos Inventory

A record of the locations of friable and non-friable ACM has been established for the building in a Hazardous Materials Survey. This document is to be made available to all persons that enter the building and are likely to work in close proximity, disturb or handle ACM.

The Asbestos Survey will be available in the building with the Building Manager or Maintenance office. Additionally, the document will be maintained by the Asbestos Plan Manager in the main offices of City of Toronto.

A description of ACM in this facility is included in Designated Substance Survey that is available in the Facility Manager's Office. If assessments have not been performed for a building (and hence is not in compliance with Regulation 278/05), use the information in this section as a minimum for an asbestos assessment.

All City Facilities shall have an asbestos assessment report that includes friable and non-friable ACM. The survey shall be conducted on a room by room basis and shall indicate the location, condition, friability, accessibility and type of asbestos present in the Facility as outlined below.

As the survey will be typically performed for maintenance purposes it will not usually include destructive sampling that may destroy the material or damage the building. Typical materials that will not be part of the assessment include: roofing felts, drywall, window caulking and mechanical gaskets.

The survey must include the information gathered on a room-by-room basis together with recommendations for asbestos management, control or removal for each material detected in each location. The location of materials suspected to contain asbestos but shown by analysis to be non-

asbestos shall be reported. The original laboratory report of all analyses shall be provided as part of the report. Samples are to be collected at a rate that is in compliance with the requirements of O.Reg. 278/05, which states a minimum number of samples are to be collected and analyzed from each area of homogeneous material for the material to be considered non-asbestos. This frequency is indicated in the table below. A homogeneous sampling area is defined by the US EPA as containing material that is uniform in texture and appearance, was installed at one time and is unlikely to consist of more than one type or formulation of material.

Type of Material	Size of Homogeneous Material	Minimum Number of Bulk Samples
Surfacing material, including without limitation material that is applied to surfaces by spraying, by troweling or otherwise, such as acoustical plaster on ceilings, fireproofing materials on structural members and plaster	Less than 90 square metres	3
	90 or more square metres, but less than 450 square metres	5
	450 or more square metres	7
Thermal insulation, except as described below	Any size	3
Thermal insulation patch	Less than 2 linear metres or 0.5 square metres	1
Other materials	Any size	3

1.3.2 Administration

The administration of the AMP is provided in Section 2.0 of this document and includes various flow charts.

1.3.3 Operations and Maintenance

This segment of the AMP deals with the day-to-day operations where the ACM will remain in the building. An Operations and Maintenance Program will remain in effect until all ACM are removed from the building.

Elements of the Operation and Maintenance Program, found in Section 3.0 of this document, includes:

- a) Periodic Building Inspection and Annual Assessment of ACM,
- b) Notification of Tenants,
- c) Training,
- d) Employee Protection,
- e) Medical Surveillance,
- f) Work Authorization,
- g) Waste Disposal
- h) Air Monitoring,
- i) Equipment.

It is City of Toronto's intent at this time that no employees will be required to handle or remove any Type 3 Abatement of ACM. Those employees who may be required to work in close proximity to ACM will undergo awareness-training sessions. The Asbestos Plan Manager, Building Manager and Maintenance Supervisors may be required to have additional training as detailed in Section 3.9.

An Asbestos Training Manual has been developed to reflect the content of the training sessions. In addition the Occupational Health and Safety division will maintain a list of personnel having received in-house training.

1.3.4 Work Procedures

Prescribed procedures for the handling and removal of ACM are provided in Section 4.0 of the AMP. Appendix G addresses major and minor removal projects undertaken by an abatement contractor. .

1.4 REGULATORY REQUIREMENTS

At present three regulations govern the control, handling, transport and disposal of asbestos in Ontario.

Refer to Appendix B for further reference materials regarding regulatory requirements.

TABLE 1.1 – Summary of Legislation

STATUTE AND REGULATION	REGULATION REFERENCE	REGULATION AMENDMENTS
Occupational Health and Safety Act - R.S.O. 1990, c.O.1 <ul style="list-style-type: none"> <i>Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations</i> http://www.elaws.gov.on.ca/DBLaws/Regs/English/050278_e.htm 	R.O. 278/05	No amendments.
Environmental Protection Act - R.S.O. 1990, c.E.19 <ul style="list-style-type: none"> <i>General – Waste Management</i> http://www.elaws.gov.on.ca/DBLaws/Regs/English/900347_e.htm 	R.R.O. 347	Regulation of Ontario 183/92, 240/92, 501/92, 555/92, 457/93, 507/93, 105/94, 190/94, 298/94, 299/94, 512/95, 128/98, 157/98, 191/98, 460/99, 558/00, 501/01, 323/02, 326/03, 461/05.
Dangerous Goods Transportation Act - R.S.O. 1990, c.D.1 <ul style="list-style-type: none"> <i>General</i> http://www.tc.gc.ca/acts-regulations/GENERAL/T/tdg/regulations/tdg001/part_1.htm 	R.R.O. 261	Regulation of Ontario 269/92, 190/95, 252/02.

1.4.1 *Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations*

The AMP outlines procedures to maintain compliance with Ontario Regulation 278/05, *Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations*, made under the Occupational Health and Safety Act. Ontario Regulation 278/05 applies to maintenance, renovation or demolition work where ACM is or may be disturbed.

The major requirements to building owners under this regulation include:

1. Provision of establishing an asbestos survey report outlining the locations, quantity, condition and content of asbestos in material in the building to all prospective

contractors who are likely to handle or disturb the material.

2. The asbestos survey report shall contain the following information,
 - The location of material,
 - Whether the material is friable or non-friable,
 - In the case of friable sprayed-on material, for each location, i) if the material is known to be ACM, the type of asbestos, if known, or ii) in any other case a statement that the material will be treated as though it contained a type of asbestos other than chrysotile.
3. Advising workers of the building owner who may work in close proximity to ACM and who may disturb the material.
4. Periodic inspection of the material to determine its condition, including an annual update of the asbestos survey report.
5. Implementation of appropriate control measures, where required, following the precautions and procedures prescribed by the Regulation (Type 1, Type 2 or Type 3 operations). The classification of the work depends on the type of material, procedures used and the quantity of material to be disturbed. Refer to Table 1.2 Classification of Asbestos Work for further information.
6. Establishment of a training program for employees of the owner who are likely to handle ACM.
7. Annual submission of an asbestos work report form for each employee working in a Type 2 or Type 3 operation.
8. Removal of ACM, to the extent practicable, prior to demolition of a building, or part thereof.

There are more than 3,000 uses of asbestos reported in the literature; most of these are hard or non-friable materials. Ontario Regulation 278/05, effective November 1, 2007, does require that the location of non-friable materials be included in the report. Work on non-friable materials including installation, removal, breaking, cutting, drilling, abrading, grinding, sanding and vibrating is covered in the Regulation and procedures for such work are specified. Before any major renovation work or demolition is performed, non-friable materials suspected of containing asbestos (roofing materials, floor tile, ceiling tile, etc. which have not previously been identified) which could be disturbed should be analysed for asbestos content.

The assessments did not include a number of non-friable materials that may contain asbestos (vinyl floor tiles, plaster surfaces, roofing felts, window caulking, elevator brakes, etc.) nor did it include demolition of walls, ceilings etc. to check on concealed conditions. The City of Toronto requires that all non-friable materials are to be assumed to contain asbestos unless sampling indicates otherwise. The City of Toronto recommends that prior to renovations, maintenance work or building demolition, materials that

may potentially contain asbestos, which have been sampled for the purpose of the survey report, must be sampled and analyzed to determine the asbestos content.

1.4.2 Environmental Protection Act, General - Waste Management

Ontario Regulation 347, as amended, under the *Environmental Protection Act, General - Waste Management*, regulates asbestos waste from the location of generation, transportation to and acceptance at an approved land fill site.

The major requirements to the building owner are as follows:

- To ensure that all asbestos waste is packaged and labelled as prescribed;
- That the transport vehicle is placarded as prescribed; and
- That the asbestos waste arrives at the landfill site on the same day as received by the waste transporters and by the most direct route.

1.4.3 Dangerous Goods Transportation Act

The Dangerous Goods Transportation Act, R.S.O. 1990, Chapter D.1, governs the packaging mode of transport labelling, placarding and documentation of the asbestos waste while in transport. These requirements are in addition to Ontario Regulation 347.

The building owner is also responsible for the waste while in transport.

SECTION 2.0

Administration

2.0 USE OF THIS MANUAL

This manual contains the information and procedures required for administering, implementing and maintaining an effective AMP for any building.

Procedures for the safe handling, repair, and removal of ACM are detailed for staff, outside contractual forces and service personnel. All parties involved in the program should review those sections of the document appropriate to their level of work and thoroughly understand their requirements and responsibilities. Additional procedures for employee protection and waste disposal are provided and referenced in numerous locations in the repair/removal procedures. When this information is referenced, it should be reviewed before proceeding with the work so that the correct safety procedures are followed.

The detailed Asbestos Survey document must be referred to prior to doing any work, if there is any doubt concerning the location of ACM. Sections of the manual may be issued as instructions to service or maintenance personnel or asbestos abatement contractors to ensure compliance with City of Toronto procedures. The program itself is dynamic in that the manual can be modified and altered to reflect changes in regulatory requirements, administration or work procedures.

2.1 ADMINISTRATION OF THE ASBESTOS MANAGEMENT PLAN

An effective management system is essential to ensure that all planned and unplanned disturbances of ACM are handled according to established procedures. This AMP consists of three distinct facets as follows:

- Asbestos location documentation delineating where asbestos is found within the building;
- An Operation and Maintenance Program to deal with the ACM that are left in place until removal is contemplated; and
- Procedures for major abatement projects where the ACM are removed from all or major segments of the building due to deterioration, for renovation or for other reasons.

The AMP for City of Toronto will be administered by an assigned site representative who will be responsible for the co-ordination and effectiveness of the Program. The co-ordinator for the Program will be referred to as the “Asbestos Plan Manager” in this document.

The following City personnel have responsibilities for establishing and maintaining the AMP.

2.1.1 Personnel Involved in Acquisition or Leasing to the City of Toronto

Personnel involved in Acquisition or Leasing to the City shall:

- 3 Prior to leasing or acquiring properties, City staff will have asbestos assessments performed in buildings.
- 4 Prior to leasing properties, if practical, City staff requires that the Landlord remove all friable ACM at the Landlords sole expense.
- 5 Prior to occupying acquired properties, City selected Abatement Contractor will remove ACM in any spaces renovated by City, or will negotiate to have vendor remove ACM prior to purchase. Preference is that asbestos abatement work be done under City supervision to ensure thoroughness.

2.1.2 Personnel Leasing To City Of Toronto Tenants:

Personnel involved in Leasing to City Tenants shall:

1. Ensure all leases signed by tenants of City include reference to this AMP and that tenants are to follow the requirements of the AMP.
2. City will remove accessible ACM that may be disturbed, from spaces to be leased, prior to tenant occupying space and performing renovations.

2.1.3 Facility Manager

The Facility Manager shall:

1. Ensure that an asbestos assessment has been performed for all facilities constructed or occupied prior to 1986. Where such a survey has not been performed in pre-1986 facilities, arrange for a room-by-room survey of the facility. For facilities constructed after 1986, asbestos assessment will be performed for all non-friable materials that may be present (i.e. transite rain water leaders and sheets, gaskets and roofing materials). Notify the JHSC representatives and employer in the building to ensure that all aspects of committee involvement are complied with.
2. Ensure the asbestos assessment report is available on site.
3. Notify in writing all existing and new Tenants of City (Management Representatives) at the location of asbestos, of the information in this record (modify and issue Tenant Notification Letter as appropriate – Appendix C).
4. Notify staff and outside contractors or service providers who may work with or may disturb the material in the record of its presence and location (issue Contractor Notification Letter as appropriate – Appendix D).
5. Measures are implemented to prevent accidental disturbance or further damage to ACM;

6. Arrange for the reassessment of asbestos-containing materials at regular intervals and ensure the asbestos assessment report is updated at least annually, or when new information is obtained as ACM is removed or it's condition changes.
7. He or she is informed of all upcoming work;
8. Arrange for the abatement of deteriorated ACM reported in the asbestos assessment report or in reassessment reports using the appropriate procedures (Type 1, Type 2 or Type 3 procedures).
9. The work is properly arranged for and scheduled;
10. Ensure all Project Managers, Architects, Engineers and others arranging for or planning work in the Facility are provided with necessary information on ACM and a copy of the Asbestos Survey or record. Ensure that an intrusive pre-construction assessment for friable and non-friable ACM is performed prior to any renovation, alteration or demolition. Ensure this information is provided to Constructor in plans, drawings or specifications. Such assessments shall include destructive investigation where necessary.
11. The person(s) scheduled to perform the work are trained (as per approved training developed by the Ministry of Training, Colleges and Universities or equivalent in the case of Type 3 work), and in the case of a Contractor, that the firm is qualified;
12. The person(s) responsible for overseeing the work has/have been advised;
13. Ensure that Tenant Management Representatives, JHSC and/or building occupants are informed in advance of projects which will require asbestos abatements.
14. Arrange for training for City staff (refer to Training Section 3.9).
15. Proper procedures are being followed for the handling, storage and disposal of ACM waste;
16. Arrange for awareness training on asbestos for building occupants as required to respond to concerns over the presence of asbestos or planned asbestos work when required.
17. Ensure that procedures are in place in the Facility to respond to emergencies involving asbestos by using City Personnel or an Asbestos Abatement Contractor.
18. Maintain all documentation required by this program, including but not limited to: Asbestos Management Program, Asbestos Assessment Reports and Reassessments, Tenant Notification Letters, Contractor Notification Forms, Asbestos Project Work Records, Training Certificates and Respiratory Protection Programme – i.e. records of fit testing.
19. Upon unexpected discovery of suspect ACM, or upon an uncontrolled asbestos spill or disturbance, follow the emergency procedures of Appendix E. Ensure all City personnel

that may report an emergency are aware of contact names and numbers.

20. Arrange for the inspection and air monitoring of asbestos work in the facility as required by O. Reg. 278/05 and this AMP, when contracted by Facility Manager.
21. At the completion of the work, to allow updating of the asbestos assessment report to reflect altered location and condition of ACM, complete the Asbestos Project Work Record in Appendix F for each project during which asbestos is removed that is managed by the Facility Manager.
22. Inform JHSC committee of any sampling or testing as they have a right to be present during testing if desired.
23. When major renovations or demolitions are undertaken, the procedures outlined in Figure 2.4 should be followed. Asbestos documentation may include but not be limited to the following:
 - Periodic Inspection Reports,
 - Damage Reports,
 - Emergency Response Reports,
 - Record of Asbestos Repair or Removal,
 - Asbestos Bulk Sample Reports,
 - Air Monitoring Reports,
 - Ministry Correspondence,
 - Contractor Correspondence,
 - Requests for Information,
 - Asbestos Contracts and Specifications,
 - Training Courses,
 - Joint Health and Safety Committee Reports.

2.1.4 *Project Manager*

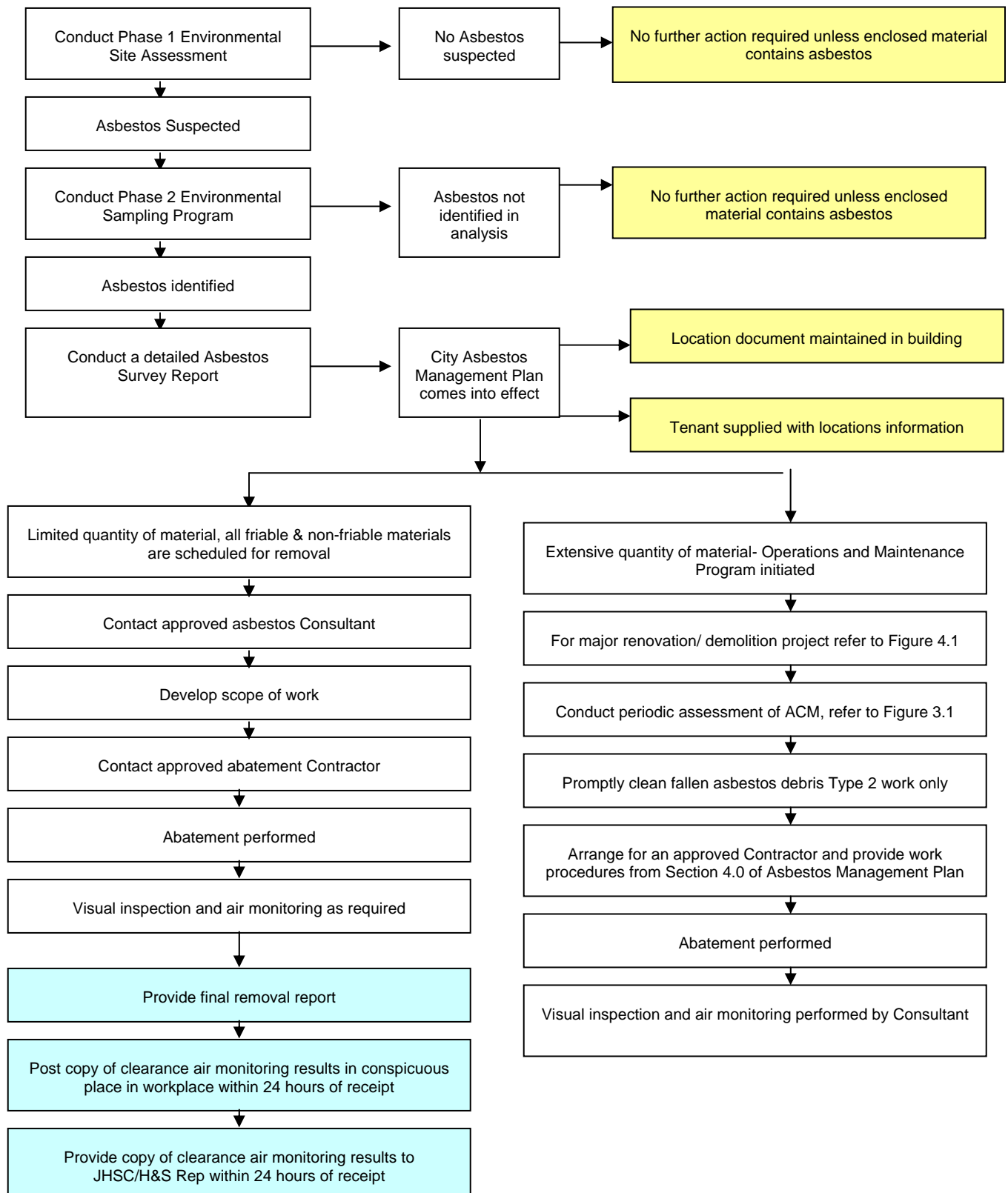
Project Managers (may also include Building Maintenance Managers) who plan, arrange for or oversee work in the facility shall:

1. Ensure that an intrusive pre-construction assessment for friable and non-friable ACM is performed prior to any renovation, alteration or demolition. Ensure this information is provided to Constructor in plans, drawings or specifications. Such assessments shall include destructive investigation where necessary.
2. Based on the results of the pre-construction assessment report, provide or arrange for the provision of appropriate specifications (Type 1, 2 or 3 operations) to Constructor to remove ACM from the work area.
3. Ensure all asbestos work in the facility is performed by Consultants and Asbestos Abatement Contractors who specialize in asbestos work and who have appropriate experience, equipment and insurance.
4. Arrange for the inspection and air monitoring of asbestos work in the facility as required by O. Reg. 278/05 and this AMP, when contracted by Project Manager.
5. Notify the Facility Manager of work requiring asbestos abatement precautions sufficiently in advance of work to allow Tenant notification.
6. Ensure all necessary notification of the Ministry of Labour for Type 2 and 3 Projects have been performed by the contractor prior to start of work and that all necessary forms are posted on site.
7. At the completion of the work provide information to Facility Manager to allow updating of the asbestos assessment report to reflect altered location and condition of ACM. Complete Asbestos Project Work Record in Appendix F for each project during which asbestos is removed or disturbed and submit to Facility Manager. The local JHSC must also be notified.

2.1.5 Facility Occupants And Tenant Representatives

All persons in the Facility who may arrange for maintenance or alteration of the Facility are to be made aware of the presence of ACM and shall:

1. Ensure all personnel who may work near the location of ACM are aware of its presence and follow the procedures outlined in this AMP.
2. Avoid unnecessary contact with or disturbance of ACM.
3. Report any disturbance, damage or deterioration of ACM to the Facility Manager.

FIGURE 2.1 – OVERVIEW OF ASBESTOS MANAGEMENT PLAN

2.2 RECORD KEEPING AND DOCUMENTATION OF AMP

The following records are to be kept by the Facility Manager for all sites with ACM:

- Asbestos Assessment Reports.
- Reassessment Reports.
- Tenant Notification Letters.
- Contractor Notification and Acknowledgement Forms.
- Asbestos Project Work Records.
- Inspection reports during abatement from Hazardous Materials Consultants.
- Bulk sample analytical results from any sampling.
- Abatement or emergency response project records.
- Air monitoring reports. Note clearance air monitoring reports must be retained for a minimum of one year.

This AMP is to be re-evaluated each time there is a substantial change to the Asbestos Regulation (O.Reg. 278/05).

2.3 CONTRACTOR REQUIREMENTS

Contractors hired by City are to meet the following minimum requirements:

- Must maintain a Comprehensive General Liability Policy, provided on an “occurrence” basis, for a minimum of \$5,000,000 in coverage.
- Must maintain an Asbestos Liability or Pollution Liability Policy, provided on an “occurrence” basis, for a minimum of \$5,000,000 in coverage.
- Must maintain an Automobile or Fleet Policy, and Non-owned Automobile Policy for a minimum of \$2,000,000 in coverage.
- Maintain a valid Workplace Safety and Insurance Board Clearance Certificate.
- All supervisors and workers performing Type 3 work are to have attended an approved Ministry of Training, Colleges and Universities, or equivalent, course regarding asbestos, as of November 1, 2007.

- All workers are to be fit tested for respirators and trained in respirator care.
- If City is signatory to any of the Labourers Union, Insulators Union or Painters and Allied Trades Unions, union labour must be provided by the contractor.
- For large projects, the Project Manager may wish to ask for references for 5 previous projects of similar scope and cost.

2.4 CUSTODIAL WORK

Where exposed asbestos-containing sprayed fireproofing is present, or exposed and badly damaged asbestos-containing materials are present, Custodial Staff are not to clean the area by dry sweeping. Instead, Custodial Staff are to call Facility Manager and arrange to have the Asbestos Abatement Contractor use a HEPA vacuum to clean floors. This is not an asbestos procedure, but a precautionary procedure to fully protect Custodial Staff from unexpected disturbance in the event that debris is present and unseen. Mopping is acceptable.

2.5 LOCATION OF ACM DOCUMENTATION

2.5.1 Introduction

City of Toronto will maintain up to date asbestos survey documents of their facility. Initial and subsequent surveys of the building will be performed using safe procedures that will not unnecessarily disturb existing ACM. The survey documents for the building will be maintained on site together with the AMP. Survey documents will be updated at least annually or more frequently where the condition or extent of ACM has changed and will continue to remain in effect until all ACM are removed from the building.

It is required that each property managed by City of Toronto be surveyed for the presence of friable and non-friable ACM. The findings of the survey shall be maintained in the form of a report, which will be kept on the premises and at the City of Toronto main offices.

The document will be provided in various forms to serve the various needs of the building or specific targeted group's special needs. The various document forms may include any of the following:

1. A master copy which details all known ACM in the building;
2. An overall floor plan, which indicates those locations in the building that have some kind of ACM; and
3. A summary of each individual Commercial or Residential Rental Unit for submission to the tenant or lessee whose premises will not be managed and maintained by City of Toronto.

The Asbestos Plan Manager shall administer the inventory of ACM in the building. The Program Manager shall be responsible for maintaining the inventory of the location of all ACM contained in the building. They will also schedule, co-ordinate, and authorize action necessary to complete initial and interval inspections of all buildings.

The reports will be modified and updated to reflect changes in the presence of ACM in the building as a result of removal, repair, damage, maintenance, construction, demolition, etc. The inventory shall be made available for inspection to Ontario Ministry of Labour Inspectors and to any building occupants as required by legislation.

The Asbestos Plan Manager may appoint the services of a Consultant specialized in the inspection of buildings for ACM as the need arises to provide building audits or to update existing surveys.

2.6 ASBESTOS SURVEYS

Regulation 278/05, *Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations*", made under the *Occupational Health and Safety Act*, requires building Owners to identify materials which may contain asbestos by either analysis or manufacture's documentation. The analysis is required only where work will be performed on building materials or where material is deteriorating and falling. Where asbestos is identified in building materials the building owner is required to implement a program to manage the ACM. Part of this program includes asbestos sampling to identify ACM and implementation of procedures for the periodic assessment, control, handling and disposal of the ACM. Asbestos identification in building materials is also a component of a designated substance list that must be issued to Contractors or service personnel prior to performing work.

2.7 BULK SAMPLE COLLECTION PROCEDURES

Bulk samples collected during the initial survey and all samples collected for future testing shall be collected following the procedures provided in Ontario Regulation 278/05. Following these procedures, samples can be collected by City staff, or by an Asbestos Consultant, under the direction of the Facility Manager or Project Manager.

2.8 BULK ANALYSIS

Bulk samples will be analysed for asbestos in accordance with O. Reg. 278/05 section 3(1)1. All analyses shall be performed by laboratories accredited in the US National Voluntary Laboratory Accreditation Program (NVLAP) or the American Industrial Hygiene Association (AIHA) asbestos in bulk sample programs.

2.9 OVERALL SITE FLOOR PLAN

Purpose

The purpose of the individual floor plan is to allow the Asbestos Plan Manager and the Maintenance Staff immediate recognition if a particular location in the building has ACM. For the type of material, location and asbestos content the information will have to be referenced in the “Asbestos Survey Report”.

Document Format

Individual floor plans will be provided for each floor of the building in standard building plan size. All areas where ACM are found will be shaded to clearly show where the asbestos is present in a room or area. The location of the ACM will be approximated as close to the location where it is found in the building as is reasonably permitted by visual observation. Legends will be developed depending on need and materials present.

Document Location

Copies of the floor plan will be maintained in the City of Toronto offices, with the Asbestos Plan Manager and with each Property Manager and with each building manager. Additional copies will be distributed on an as required basis.

Alternate Documentation

In the absence of a floor plan drawing, the Asbestos Survey Report will document the location of ACM in a clear and descriptive manner.

2.10 TENANT SUMMARY DOCUMENTATION

Purpose

The tenant summary document for individual commercial retail units or residential tenants will provide notification to all small commercial or residential tenants that will be managed and maintained by the tenant. This information is required under the Regulations so that the tenant can readily recognize the location of ACM and safeguard their staff against possible exposure to asbestos fibres. The tenants in turn must establish their own AMP for the leased space. For those units that City of Toronto maintain, the tenants are expected to operate under the City of Toronto AMP. Additionally this will permit City of Toronto staff to provide service personnel, maintenance personnel and contractors with detailed information as to the location of ACM in each rental unit.

Document Format

The information for each tenant unit shall consist of a single page entry on the floor plan including adjacent properties marked with coloured overlays showing the location of each of the ACM present. Key wording will describe the particular location of the material (i.e., a particular material may be found in the room space or concealed above solid plaster ceiling, etc.). Summary information in tabular form will compliment the drawing.

Document Location

Copies of this document shall be provided to each tenant and a master set maintained with the Asbestos Plan Manager. Additional copies may be distributed as required.

2.11 MASTER LOCATIONS DOCUMENT***Purpose***

The purpose of the master document is to consolidate all information on ACM for each individual building. This document will be available to the Asbestos Plan Manager, each Property Manager and Maintenance staff of the building.

Document Format

The document shall be arranged in two distinct sections, one to address the locations of ACM and the second to provide an assessment of the condition of the material with recommendations for appropriate corrective measures where required. The use of layout floor plans shall form an integral part of the report

Location Information Portion of Document

The document will include the following for the locations of ACM section of the document:

1. A survey methodology indicating limitations of the survey and whether destructive investigation was performed;
2. Bulk sampling and analysis methodologies used;
3. A site description with drawings showing the location and building additions; and
4. A summary of the location results, which shall include the following:
 - a) A room-by-room summary of ACM in the building. If applicable, the summary is also to be divided based upon building additions.
 - b) Separate floor plans showing the location of each ACM differentiating between friable and non-friable materials.

- c) A summary of analysis of bulk samples collected specifying the analytical method used and including floor plans showing the location where the bulk samples were collected.
- d) The type of asbestos and concentration within the material.

Once ACM has been removed, the Asbestos Plan Manager will update the locations document with the changes.

Assessment Information Portion of Document

The document will include the following for the assessment of the condition of the ACM section of the document:

1. A description of the assessment of ACM methodology.
2. A rationale for corrective action with a description of the options including:
 - Cleaning,
 - Repairing or sealing,
 - Enclosing, and
 - Removal.
3. A summary of assessment with recommendations for corrective action where required.
4. Individual recommendations for repair and any restrictions until repairs are completed will be listed with floor plans showing the location of each item.

Document Location

The master document for each facility shall remain with the Asbestos Plan Manager in the Administration office for City of Toronto and a site-specific document with each Property Manager or in the Maintenance Department office of each facility.

2.12 DISTRIBUTION OF ASSESSMENT RECORD AND REASSESSMENT

The Facility Manager is responsible for maintaining a copy of records, assessment reports and reassessment reports on site. In addition, the Facility Manager will ensure the following are provided with access (not additional copies) to these reports:

- JHSC representative.
- Tenant (in premises with ACM).
- Project Managers or Managers planning or performing work in a City Building.

SECTION 3.0
OPERATIONS AND MAINTENANCE
PROGRAM

3.0 OPERATIONS AND MAINTENANCE PROGRAM

3.1 INTRODUCTION

The identification, documentation and confirmatory analysis of ACM within a facility, is the first step in controlling building occupant exposure to asbestos fibres. Information generated from the building survey is then used by the Asbestos Plan Manager to control work that will be performed on or may likely disturb ACM. The purposefully managed and controlled work on ACM in buildings is known as the Operations and Maintenance Program.

The Operations and Maintenance Program is a set of specific procedures and practices applied to building cleaning, maintenance, renovation and general operation to reduce exposure to asbestos fibres to ambient levels (i.e. the outdoor environment). The Operations and Maintenance Program is initiated after the building survey is completed and draws heavily on information generated during that survey and any ongoing evaluations of the ACM. The Operations and Maintenance Program shall remain in effect until all ACM are removed from the facility.

The principal objective of an Operations and Maintenance Program is to minimize exposure to all building occupants from asbestos fibres. To accomplish this objective an Operation and Maintenance Program includes work practices to:

1. Maintain ACM in good condition,
2. Monitor the condition of ACM for deterioration,
3. Ensure a proper cleanup of asbestos fibres previously released, and
4. Prevent further uncontrolled releases of asbestos fibres.

The Operations and Maintenance Program is not a permanent abatement option. It should be implemented as part of an overall AMP that has a goal of eventual elimination of ACM within a building. The intent of the Operations and Maintenance Program is to manage the ACM on a daily basis including any repairs or minor removals. Large removal projects that require extensive planning and technical expertise are beyond the scope of the Operations and Maintenance Program.

The Operations and Maintenance Program includes the following elements:

1. The administration of the program, as discussed in Section 2.0, including assessing the impact of maintenance or renovation work on ACM and ensuring appropriate protective measures are implemented;
2. Conducting building inspections for renovations or demolition, periodic assessments (commonly referred to as Surveillance Programs) to evaluate the condition of the ACM to document any changes in the materials (i.e., deterioration) and to assess any spill episodes;
3. Providing building occupants (tenants and staff) with notification advising them on the locations of ACM in the building, as well as how and why uncontrolled disturbance of the material should be avoided;

4. Implementing control measures and procedures to limit building occupant exposure. Specialized work practices intended to avoid or minimize fibre release will include the following:
 - Cleaning procedures,
 - Work practices for maintenance activities,
 - Work practices for renovation, and
 - Emergency response procedures.
5. Record keeping documenting any operations and maintenance activities;
6. Training for the Asbestos Plan Manager, appointed designates, building managers, supervisory staff, custodial staff and maintenance personnel; and
7. Providing worker protection where staff is required to handle ACM and include:
 - A respiratory protection program, and
 - A medical surveillance program.

Additional work procedures may be included in the Program as determined by future needs. This will result in additions to the documented program.

3.2 PERIODIC BUILDING INSPECTION AND ASSESSMENT OF ACM

Periodic review of the Operations and Maintenance Program is essential to ensure that the program objectives are being met. A key feature of the review is re-inspection of all ACM in the building. Combined with ongoing reports of changes in the condition of the ACM made by service workers, the re-inspection will ensure that any damage or deterioration of the ACM will be detected and corrective action taken.

Inspection of the condition of the friable ACM will occur at three levels as required by legislation:

3.2.1 Routine Inspection

To be performed by maintenance staff and/or other qualified personnel, during their normal course of work. This is a casual inspection where deterioration or damage to an application or material shall be recorded and reported to the Building Manager who in turn will report the damage to the Asbestos Plan Manager. Necessary arrangements will then be made for remedial action where it is confirmed through documentation or additional bulk sampling and analysis that the material in question contains asbestos.

Upon discovery of damage the Damage Report (Figure 3.2) shall be filled in and arrangements can be made by the Asbestos Plan Manager, or designate, for repair if limited to a small disturbance. An outside firm specializing in asbestos inspection and abatement shall provide assistance where the disturbance is significant. All damage reports should be retained with the location report to assist in the formal inspection as described in the following.

3.2.2 *Formal Inspection*

An annual inspection (at least once in each 12-month period) will be made of the condition of all ACM in the building for all locations identified in the Asbestos Survey. The frequency of the inspection may be increased if the previous assessment indicates rapid deterioration or uncontrolled damage due to vandalism.

Formal inspections should be undertaken by a consulting firm, specialized in asbestos inspection and abatement. The auditor performing the inspection shall be qualified with a minimum of 5 years experience performing such inspections on projects of similar size and complexity.

Various assessment factors must be taken into account to evaluate each type of material. The assessment factors are:

- ACM condition (deterioration, physical damage, and water damage),
- Potential for disturbance (accessibility of the ACM, sources of vibration near the ACM, and potential for air and/or water erosion), and
- Location of the ACM in or near air plenums, airshafts, or elevator shafts.

For each time the formal inspection is performed the following should be recorded:

- Inspector's name,
- Date of inspection, and
- Notation of change (or lack of) in the condition of the ACM.

When an inspection reveals that remedial action is necessary due to deterioration, or that a situation exists that could result in deterioration, or that there is a risk of exposure to asbestos fibres, the Asbestos Plan Manager is to be informed. The need for corrective action is to be recorded in a similar format as per the initial assessment of the Building.

3.2.3 *Pre-Renovation or Construction Inspection*

An inspection of a building or section of a building is required prior to conducting any building renovation or construction to evaluate whether any ACM will be impacted. The inspection shall require intrusive methods to determine if concealed ACM is present. Additional sampling and analysis may also be required on any concealed materials or other materials not previously sampled. Confirmation of asbestos content can be determined by analytical results from visually similar material sampled in other locations.

3.3 REASSESSMENT OF ACM AND UPDATE OF SURVEY RECORD

The Facility Manager will arrange for a regular reassessment of all accessible areas identified by the survey to contain ACM. The reassessment will be performed at least annually if ACM is present. If a specific area is subject to any change of use, frequent maintenance which may disturb the material, or if any report of damaged or deteriorated ACM is brought to the attention of the Facility Manager, the reassessment of materials in the specific area shall be performed on a more frequent basis. Reassessment shall always be performed of specific materials when damage or deterioration is reported. The JHSC shall be notified of the reassessment and be invited to attend.

The reassessment of ACM will be documented in writing using the forms provided in Appendix H. The survey record should be updated based on these forms.

In Facilities which are entirely leased and in which neither City nor Facility Management Service Provider are responsible for maintenance, renovation or alteration of the initial survey and the reassessment are the responsibility of the landlord. Copies of the initial survey and reassessments shall be provided by the landlord to the Facility Manager and maintained on site.

3.4 DISTRIBUTION OF ASSESSMENT RECORD AND REASSESSMENT

The Facility Manager is responsible for maintaining a copy of records, assessment reports and Reassessment reports on site. In addition, the Facility Manager will ensure the following are provided with access (not additional copies) to these reports:

- JHSC representative.
- Tenant (in premises with ACM).
- Project Managers or Managers planning or performing work in a City Building.

3.5 PRE-CONSTRUCTION ASBESTOS SURVEY (SECTION 10 OF O. REG. 278/05)

Prior to the commencement of any renovation, construction or demolition project (including buildings built up to 1986/the present time), the building or specific areas of the building which are to be affected by the work, shall be assessed for friable and non-friable ACM. However, if the owner already knows that the materials within the building or specific areas which are to be affected by the work is not ACM, or if the owner already knows that the materials are ACM and knows the type of asbestos, or the building or specific areas have already been assessed, an asbestos survey is not required prior to the commencement of the renovation, construction or demolition. The survey must be performed by a specialized asbestos consultant and include destructive or intrusive testing of enclosed areas which will be affected by the work.

Upon completion of the pre-construction survey, if asbestos is present in the area, specifications for removal shall be prepared (Type 1, 2 or 3 as appropriate) and provided to the Constructor in the work specifications.

FIGURE 3.1 - PERIODIC INSPECTION OF ASBESTOS-CONTAINING MATERIALS

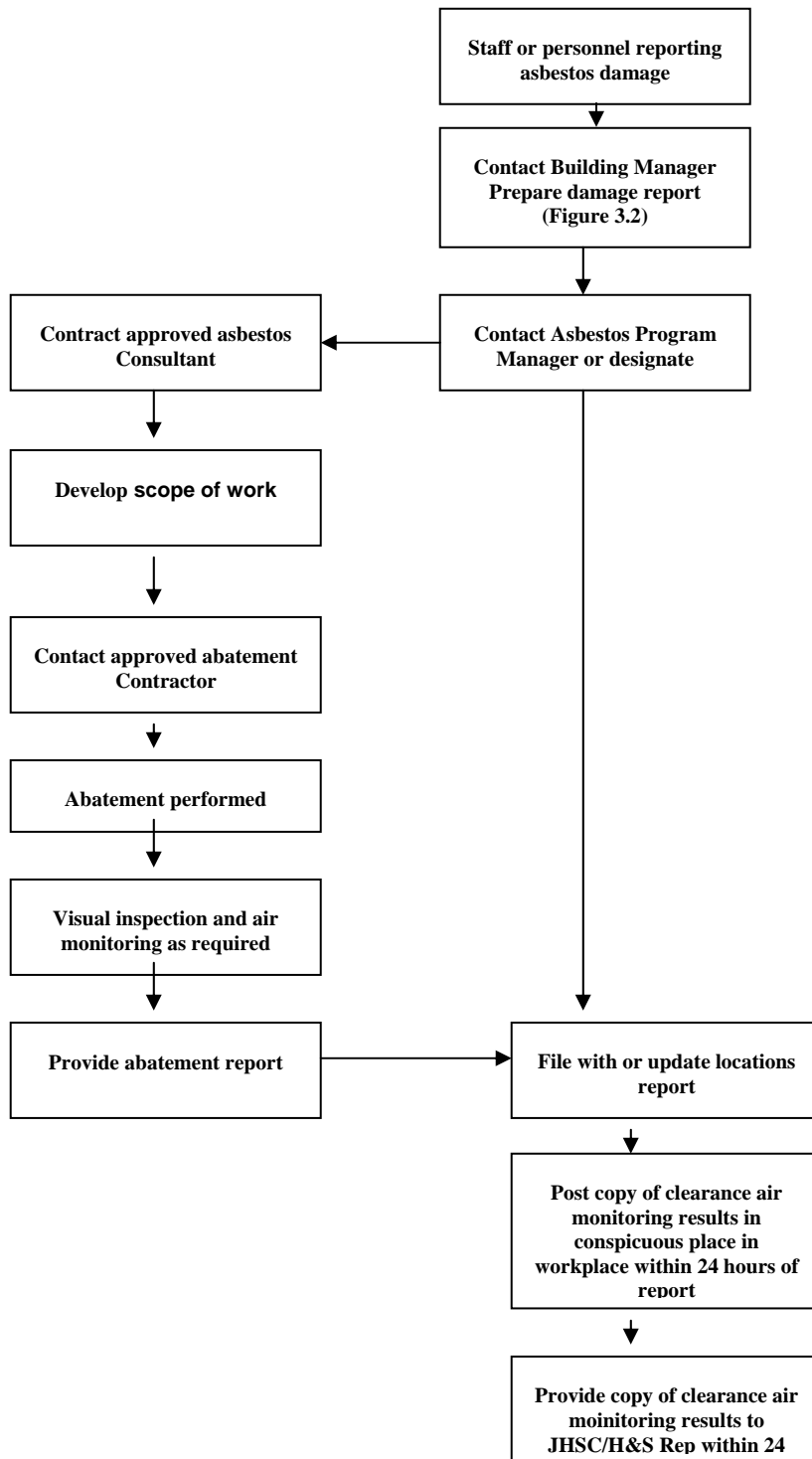


FIGURE 3.2 - ASBESTOS CONTROL PROGRAM DAMAGE REPORT

Reported By: _____ Date: _____

LOCATION DETAILS:

Building Name: _____

Building Section: _____

Room Name: _____ Room Number: _____

DAMAGE DETAILS:

Description of Damage:

Cause of Damage (If known):

Immediate Action Required:

YES _____ NO _____

Area Isolation Required:

YES _____ NO _____

SUBMISSION TO ASBESTOS PLAN MANAGER:

Name: _____ Position: _____ Date: _____

FOLLOW UP ACTION:

Asbestos Plan Manager: _____ Date: _____

Copies to: _____

This level of inspection is to be performed by a firm specializing in asbestos inspection and abatement. The auditor performing the inspection shall be qualified with a minimum of 5 years experience performing such inspections on projects of similar size and complexity. The locations document shall be updated following performance of the project.

Upon completion of the inspection, a report shall be generated and submitted to the Asbestos Plan Manager for submission to Contractors outlining the extent of asbestos that will be disturbed. The report shall use drawings to clearly delineate the extent of asbestos present in the construction/renovation area and the material requiring removal prior to conducting any other construction. NOTE: As per legislation, all ACM must be removed before renovations or construction can occur.

3.6 NOTIFICATION

Once the presence of ACM has been established in a building, a notification program is required by legislation. The purpose of the notification and warning program is to inform employees, tenants, service personnel, maintenance personnel, or others *with the potential* to come in contact with ACM, that ACM material is present.

The notification and warning program serves two purposes:

1. It alerts affected parties to a potential hazard in the building; and
2. It generates a broad involvement in the Operations and Maintenance Program.

Building occupants who are aware of the presence of ACM are less likely to disturb the material and cause fibre release. The notification to building occupants (i.e. staff and tenants) may include:

- Distribution of notices outlining the locations of ACM accompanied with a fact sheet on asbestos (Appendix A); and
- By holding awareness or informational seminars as outlined in the awareness training section of this manual.

All concerns relating to the condition of asbestos applications, reports or questions regarding the AMP are to be directed to the Asbestos Plan Manager. Notification will be initiated by the Asbestos Plan Manager and distributed in the following manner to targeted parties:

3.6.1 *City of Toronto Staff*

Individuals who have a potential to come into direct contact with ACM will receive formal training dealing with general asbestos awareness and recognition of potentially or hazardous situations and have full access to the master locations document for the building(s) under their responsibilities.

3.6.2 *Notification To Tenants*

Upon completion of the asbestos assessment, the Facility Manager will inform all Tenant Representatives of the presence of asbestos within their leased space and provide them with access to portions of the record regarding their premises and common areas. The letter of notification to Tenants regarding asbestos (Appendix C) shall be used for this purpose. This notice will be provided to all existing and new tenants as required.

3.6.3 *Service Personnel and Maintenance Personnel or Contractors*

All contractors and City employees who perform work at facilities where ACM is present must be notified of the presence of the ACM if their work may bring them into contact or close proximity to the ACM and they may disturb it. This notification may include janitorial, security, telephone, computer cabling suppliers, mechanical maintenance contractors, etc. This notification shall be performed by the Facility Manager or Project Manager.

All contractors and City employees who perform work at City facilities, where asbestos-containing sprayed fireproofing is present above ceilings, including telephone, computer cabling suppliers, electrical and mechanical contractors, etc., are to be notified that Type 2 Procedures are required for any entry to, or work within the ceiling space (visual inspection excepted, Type 1 Work). This notification shall be performed by the Facility Manager or Project Manager.

Upon completion of the asbestos assessment, the Facility Manager will inform Maintenance Personnel (including Physical Plant Personnel) of the presence of asbestos within the building and ensure they have access to the asbestos assessment report.

3.7 NOTIFICATION OF ASBESTOS ABATEMENT

Contractors are to:

- Notify orally and in writing, an inspector at the office of the Ontario Ministry of Labour nearest the project site (Notice of Project), as per Regulation 278/05, prior to commencing Type 3 abatement, Glove Bag abatement or any abatement project that exceeds \$50,000.00 in cost.
- Notify Sanitary Landfill site as per Ontario MOE Regulation 347 as amended.
- Inform all sub trades of the presence of ACM identified in the contract documents.
- Notify the Project Manager if suspect ACM not identified in the contract documents are discovered during the course of the work. The contractor is to notify the MOL and the JHSC if the friable material is asbestos containing, as required by Regulation 278/05.
- The Project Manager is to notify the JHSC of any testing or sampling that is

proceeding.

- The Project manager is to notify the Facility Manager, which in turn, is to notify tenants of any abatement work within their space or that will impact their operations. This is a procedural requirement, not a regulated requirement.

3.8 EMERGENCY PROCEDURES AND CONTACTS

3.8.1 *Fallen Debris Or Damaged Material*

City staff may encounter fallen material that is suspected to contain asbestos. This may occur in locations where asbestos has been documented or in areas not included in the Assessment due to limited accessibility, etc.

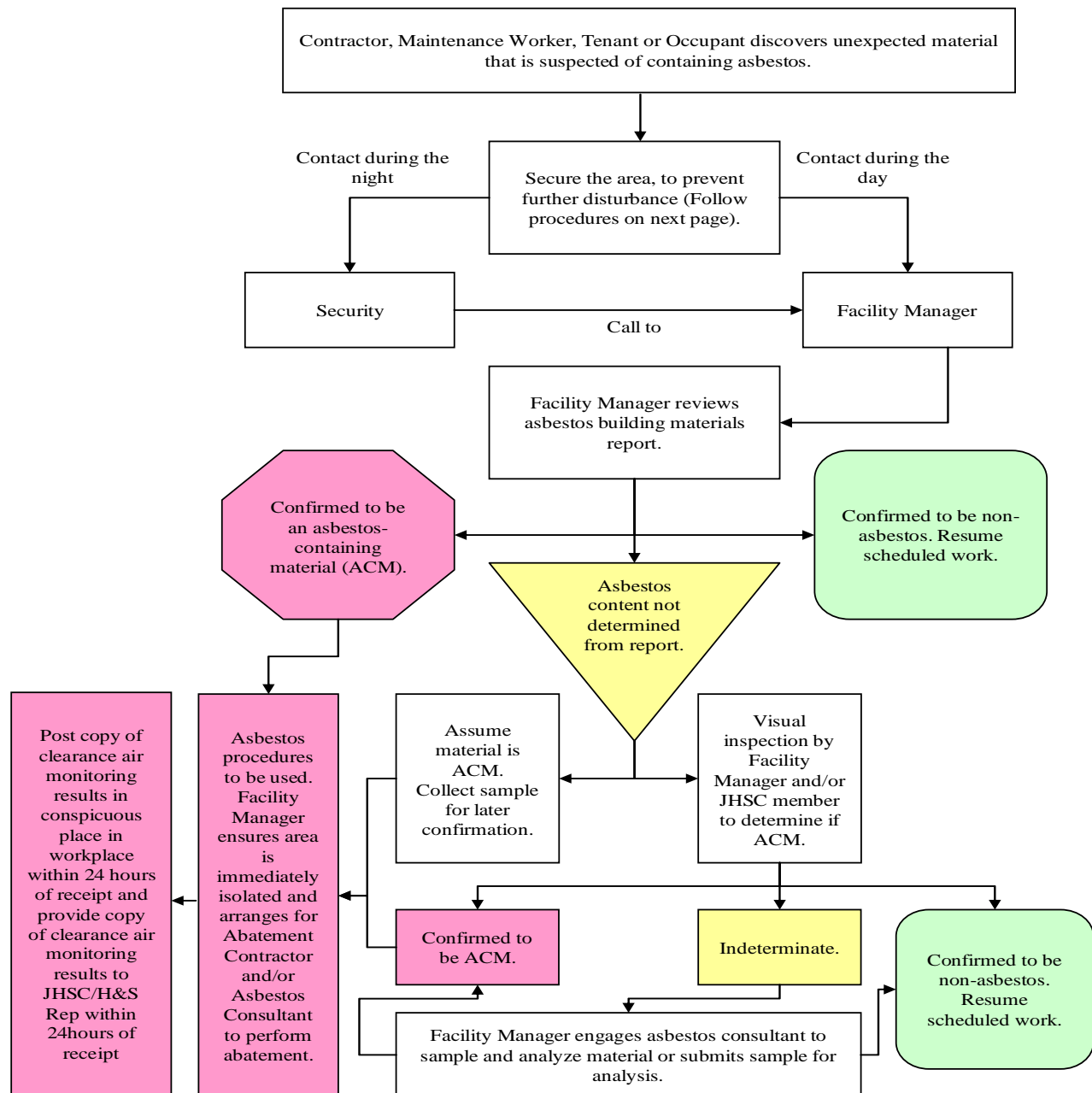
Facility Management shall follow the protocol “Emergency Reaction in the Event of a Suspected Asbestos Spill” (Appendix E).

In the event that Emergency Work must be undertaken, follow the procedures outlined in Appendix E – Work Practices for Emergency Work. All emergency situations shall be reported to the Facility Manager as soon as possible.

Emergency Contacts:

- Security: Emergency: 416 392 6666
- Security: Non- Emergency: 416 397 0000
- FRED: 416 338 3733
- Help Desk: 416 392 7995
- District Operations Manager: contact manager within the district
- Abatement Consultant:
 - ECOH Management: 905 195 2800
 - Fisher Environmental: 905 475 7755
- Abatement Contractor:
 - Furcon Environmental: 905 672 8314

FIGURE 3.3 - ASBESTOS EMERGENCY OR DAMAGE REPORTING



3.9 DISTURBANCE OF PREVIOUSLY UNIDENTIFIED FRIABLE MATERIAL

Previously unidentified friable materials may also be uncovered during demolition of finishes, walls etc. during construction. The Project Manager shall follow the protocol “Emergency Reaction in the Event of a Suspected Asbestos Spill” (Appendix E).

If the material contains asbestos, the Project Manager is to notify the local Ministry of Labour Office of the discovery. This is a regulated requirement.

3.9.1 Module 1: General Awareness Training

The "awareness seminar" is intended for all building occupants and other affected parties. It serves the purpose of occupant notification described in the previous notification section. The objective of the training is to provide a general awareness of the hazards of ACM. This module would also be suitable for building occupants other than employees who are concerned about the presence of asbestos in the building.

Session Content – Estimated duration of 2 hours

1. Health Effects of Asbestos Exposure;
 - Types and properties of asbestos,
 - Routes of entry,
 - Asbestosis, cancer, other health effects,
 - Effects of concentration and exposure duration.
2. Uses of Asbestos;
 - Products made from asbestos,
 - Risks of different types of materials (friable/non-friable),
 - Recognition of asbestos-containing building materials,
 - How asbestos in buildings can be a hazard.
3. Overview of Regulatory requirements;
 - Application to buildings,
 - AMP.
4. The AMP;

- Purpose of management program,
 - Elements of management program,
 - Person responsible for the program in a building.
5. Questions to Demonstrate Understanding.

3.9.2 *Module 2: Type 1 Work Training*

This session is designed for workers who are expected to be involved in Type 1 asbestos work only. The objective of the training is to enable the workers to identify work that requires Type 1 work procedures, understand the asbestos exposure hazard associated with the work, and to be able to carry out the work accordingly.

Session Content - Estimated duration of 7 hours

1. All of Module 1.
2. Overview of Regulatory requirements;
 - Requirements for testing insulation,
 - Classification of work,
 - Work procedures based on classification,
 - Medical surveillance.
3. Principles of Remedial Measures;
 - Enclosure, encapsulation, and removal,
 - Limitations of remedial measures.
4. Use and Interpretation of the Asbestos Record;
 - Should allow individual workers to identify where they may come into contact with friable asbestos material.
5. Limitations of Training;
 - Type of work that training allows worker to perform,
 - Who to contact in event of emergency.
6. Classification of Work;

- As prescribed by the regulation (Type 1 work procedures),
 - Work that employee may be required to perform.
7. Respirator Training;
- Theory of respirators,
 - Limitations of equipment,
 - Inspection, maintenance, and storage of equipment,
 - Selection, fitting and use of respirators,
 - Positive and negative pressure fit check,
 - Respirator cleaning and disinfection,
 - Record of worker training and fit testing,
8. Use, Care and Disposal of Protective Clothing,
9. Questions to Demonstrate Understanding.

3.9.3 *Module 3: Type 2 Work Training*

This session is designed for workers who are expected to be involved in both Type 1 and 2 asbestos work. The objective of the training is to enable these workers to distinguish between each work type. To understand the asbestos exposure hazards associated with the work, and to apply the appropriate procedures as prescribed by the Regulation.

Session Content – Estimated duration of 8 hours

Training should be related to actual jobs that each worker would be expected to perform. It is recommended that training for this module include hands-on experience in the use of respirators, protective clothing, portable enclosures, HEPA filter vacuums, etc.

1. Modules 1 and 2.
2. Asbestos Work Reports.
3. Type 2 Work Procedures;
 - As prescribed by the regulation,
 - Work that employee will be required to perform.
4. Biomedical Surveillance Program

5. Questions to Demonstrate Understanding.

3.9.4 *Module 4: Evaluating the Impact of Asbestos in a Facility*

This session is designed for building workers who are expected to inspect buildings for friable ACM or to evaluate whether the work will impact on ACM. The objective of the training is to enable these workers to survey buildings for and to assess the exposure potential of such materials.

Session Content – Estimated duration of 21 hours

1. Inspecting Buildings for Asbestos;
 - Reviewing building records,
 - Surveying building for ACM,
 - Where to look,
 - When to sample,
 - Precautions to be taken,
 - Sampling materials for analysis,
 - Preparing record of location of ACM.
2. Addressing the Risk of Asbestos Exposure;
 - Significance of the type of insulating material,
 - Significance of percentage of asbestos friability,
 - Effect of age and deterioration,
 - Evidence of physical or water damage,
 - Location and accessibility: potential for future disturbance,
 - Control options.
3. Workers carrying out inspections must also complete Module 3 training.
4. Questions to Demonstrate Understanding.

3.9.5 *Module 5: Outside In-depth Training*

Additional training may be required, on an as needed basis, for work beyond those described in the training packages presented in the AMP. The training may include attendance by City of Toronto personnel at seminars and courses presented by others pertaining to asbestos management or abatement. Course content may include detailed training for asbestos abatement or general information seminars. The Asbestos Plan Manager must authorize attendance in these programs. Asbestos workers must meet the requirements for Type 3 training as established by the Ministry of Training, Colleges and Universities and must also achieve a passing grade.

3.10 TRAINING

City employees will not undertake asbestos work other than for Type 1 and Type 2 work or in emergency situations in Type 3 projects. Therefore training shall be limited to the following:

Maintenance personnel and supervisors shall receive training in asbestos including identification of ACM, uses and hazards of asbestos, regulations applying to asbestos work and Type 1 and Type 2 work practices and safety procedures.

Facility and Project Managers shall receive training in asbestos management and removal and the AMP of sufficient content to allow them to implement the policies outlined in the AMP and to enable City to remain in compliance with O. Reg. 278/05.

Tenant Representatives and Building Occupants shall receive (upon request only) Asbestos Awareness Training. Such training may be provided in advance of a project incorporating Type 2 or 3 operations or if concern over asbestos is expressed by employees.

City requires all service providers, contractors, etc. to provide appropriate training to all workers who perform Type 1, 2 or 3 work in City Facilities.

In accordance with the Regulations, every employee working with ACM, or working in close proximity to ACM, and in a manner that may disturb the ACM, must partake in an information and training program. The program must be designed to instruct each employee in work procedures necessary to prevent exposure to asbestos fibres. Asbestos training is a continuous process with updates and reviews. The program will allow for re-training of current employees as well as ensuring that new hires are also given the proper training. Workers and supervisors conducting/overseeing Type 3 work must have proof of having attended training approved by the Ministry of Training, Colleges and Universities.

Training of building occupants and other affected parties is an integral aspect of an effective Operations and Maintenance Program. Training serves to establish the basis for proper awareness and work practices that will result in the effective implementation of the Operations and Maintenance Program. Training must be adequately developed and offered, on several levels, depending on the audience's particular participation in the program. Therefore, it is usually preferable to develop several training programs tailored to individual needs.

Asbestos training will be offered and provided on the needs of specific buildings as authorized by the Asbestos Plan Manager. At this time, City of Toronto staff are not permitted to conduct any Type 3 asbestos related work, and as such, a specialist Abatement Contractor will complete this work. The following training modules have been prepared as an outline to assist building owners in establishing

training requirements that will comply with the Regulations. The appropriate level of training will be selected based upon a person's role, function or responsibilities within the AMP. The Joint Health and Safety Committee/Health and Safety Representative must be advised of the time and place of any training provided.

3.11 PERSONAL PROTECTIVE EQUIPMENT PROGRAM

Any employee or building occupant with a significant potential for exposure to airborne asbestos should be involved in a personal protective equipment program. This is particularly relevant for custodial and maintenance workers who encounter ACM during the course of their duties. Additionally, outside maintenance personnel, service personnel and Contractors will be required to show proof of employee training in asbestos control procedures including a respiratory protection program.

City of Toronto have decided at this time that an experienced and qualified Abatement Contractor pre-selected by the Asbestos Plan Manager will perform all Type 3 work involving ACM for City of Toronto. No City of Toronto employee will be assigned Type 3 friable asbestos related work.

The information in this section is provided for reference only and not applicable at this time. Should this position change and selected employees will be required to conduct any type of work as specified in the Regulation 278/05, *Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations*, then training will be provided by a qualified Occupational Health and Safety Consultant. No work will be performed until specific training has been provided and the employee comprehension of the work has been evaluated by the Asbestos Plan Manager, and accepted as adequate. When initiating the Personal Protective Equipment Program, employee training shall include training with respirators and other personal protective equipment.

3.11.1 Respiratory Equipment

Respiratory requirements for work with asbestos are covered by Regulation 278/05, *Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations*. The requirements for use, selection, fit testing and storage of respirators are outlined in the following sections.

3.11.2 Requirement

1. Type 1 Operation - Respirator use is optional. If an employee requests a respirator while performing a Type 1 operation, the employee must wear the respirator. The specified respirator must be a half face or full face (for falling debris), air-purifying respirator with replaceable high-efficiency particulate filters.
2. Type 2 Operations - Respirator use is mandatory. This applies to all operations specified in this category. Depending on the nature of the work being performed, the following types of respirators may be required.

- Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter,
 - Air purifying full-face piece respirator with N-100, R-100 or P-100 particulate filter,
 - Or one of the following;
 - Powered air purifying respirator equipped with a tight-fitting face piece (half or full-face piece) and a high efficiency filter or N-100, P-100 or R-100 particulate filter,
 - Negative pressure (demand) supplied air respirator equipped with a full-face piece, or
 - Continuous flow supplied air respirator equipped with a tight fitting face piece (half or full-face piece).
 - NOTE: An Occupational Health & Safety Consultant must verify respirator requirements for specific asbestos removal work.
3. Type 3 Operations – Respirator use is mandatory. Different respirators are required depending on type of Asbestos and whether the ACM are removed wet or dry. Depending on the nature of the work being performed, the following types of respirators may be required.
- Pressure demand supplied air respirator equipped with a half mask.
 - Pressure demand supplied air respirator equipped with a full face piece.
 - Or one of the following;
 - Air purifying full-face piece respirator with N-100, R-100 or P-100 particulate filter,
 - Powered air purifying respirator equipped with a tight-fitting face piece (half or full-face piece) and a high efficiency filter or N-100, P-100 or R-100 particulate filter,
 - Negative pressure (demand) supplied air respirator equipped with a full-face piece, or
 - Continuous flow supplied air respirator equipped with a tight fitting face piece (half or full-face piece).
 - NOTE: An Occupational Health & Safety Consultant must verify respirator requirements for specific asbestos removal work.

In all cases the respirators provided must be approved by the US National Institute for Occupational Safety and Health (NIOSH).

Note: NIOSH publishes a certified equipment list. The approval number on the respirator and filter cartridge should be checked against the list to ensure that they are certified for use with asbestos. All respirators must properly fit the employee to afford adequate protection. The NIOSH certified equipment list link is <http://www.cdc.gov/niosh/94-104.html>.

3.11.3 Fit-Testing

The respirator must be fit-tested to ensure an effective seal on the face. The procedures, as outlined below, are to be followed when fit-testing a respirator.

1. Qualitative or Quantitative Fit Testing. Qualitative Fit Testing involves use of a challenge agent (either sweet or bitter).

This test is applicable to all respirator types and is performed at the following intervals:

- When a respirator is initially issued,
- Upon changing style, model or size of respirator, and
- Following any significant changes to the facial structure.
- Retraining is conducted at least every 2 years with a review conducted annually to confirm whether the respirator user remains qualified.

After the initial fit testing, the following are User Checks to be conducted by the respirator user before each use of the respirator:

1. Negative Pressure Test: This test is performed before each use of the respirator and is applicable to the negative pressure respirators only. Covering one or two filter inlets depending on type of respirator configuration with the palms of the hands and inhaling performs the negative pressure test. The face piece should collapse on the face with no air leakage around the mask.
2. Positive Pressure Test: This test is performed in conjunction with the negative pressure test before each use of the respirator and is applicable to the negative pressure respirators only. The positive test is conducted by covering the exhalation valve, usually located at the bottom centre of the respirator body, with the palm of the hand and exhaling gently. The face piece should puff slightly away from the face without allowing air to escape.

3.11.4 Maintenance

It is important to take proper care of a respirator in order to provide maximum protection. This requires regular maintenance and cleaning of the respirator and associated parts. Under no circumstances should a respirator with defective parts be used. Proper maintenance must include a visual inspection of the items listed in the following respirator checklist:

1. Examine the face piece for:
 - Excessive dirt,
 - Cracks, tears or holes,
 - Distortion and inflexibility, and
 - Cracks or breaks in filter holders, worn threads and missing gaskets.
2. Examine the head straps for:
 - Breaks or tears,
 - Broken or malfunctioning buckles and attachments, and
 - Excessively worn serrated edges on head harness, which might permit slippage (full-face pieces only).
3. Examine valves for:
 - Dust or other material on valves or valve seats,
 - Cracks, tears or distortion in the valve material, and
 - Missing or defective valve covers.
4. Examine filter cartridge for:
 - Proper filter for protection against asbestos (HEPA),
 - Incorrect installation, loose connections, missing or worn gaskets or cross threading, and
 - Cracks or dents in filter housing.

3.11.5 Cleaning

Respirators must be cleaned and disinfected after each use. Respirators shall be assigned to a person for their exclusive use, if practicable. The procedure listed below is to be followed when cleaning reusable full or half-face piece respirators:

- When removing mask from contaminated area of work, external surfaces must be cleaned by

damp wiping or with a High-efficiency filtered vacuum. Filter inlets should be sealed with either a protective cap, duct tape or disposed of,

- Remove the filter cartridges and damp wipe again placing them separately from the respirator body,
- Separate the parts of the respirator under water,
- Wash the face piece and components in warm water using a mild detergent,
- Rinse the face piece and components thoroughly in warm water,
- Place the respirator on a paper towel in a clean area to dry,
- Where disinfecting is required, for use by more than one person, a solution of 2 millilitres of laundry bleach to 1 litre of water will suffice or use manufacturers prepared disinfecting soap, and
- The respirator should then be place in a sealed container after it is dry.

3.11.6 *Storage*

Following cleaning of the respirator, it must be stored in a proper manner to ensure that it is kept clean and free of exposure to contamination from dirt, moisture and chemicals. After cleaning:

- Place the face piece and cartridges in a sealable plastic bag or container,
- Seal device, and
- Store the bag in a clean environment, away from any source of contamination, excessive heat or humidity and in an area where the respirator will not be crushed by any article or thing.

3.11.7 *Training*

Employees required to wear respirators during work involving asbestos will receive training in the use of respirators, covering:

- Theory of respirators,
- Limitations of equipment,
- Inspection, maintenance, and storage of equipment,
- Selection, fitting and use of respirators,

- Positive and negative pressure fit check,
- Respirator cleaning and disinfection, and
- Record of worker training and fit testing.

3.11.8 *Protective Clothing*

Each employee must be provided with and wear protective clothing when carrying out work involving ACM. This clothing shall consist of:

- Full body coveralls, and
- Suitable footwear.

The coveralls shall:

- Be made of a material which does not readily retain nor permit the penetration of asbestos fibres,
- Consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing, and
- Be repaired or replaced if torn.

The protective clothing must be put on in a suitable area away from the asbestos work area prior to beginning the work for Type 1 or 2 operations or in an attached change room adjacent to Type 3 work areas. The clothing is also to be decontaminated at the completion of the work prior to leaving the work area then disposed. Decontamination of clothing can be accomplished by either damp wiping or using a HEPA vacuum prior to removal.

3.12 MEDICAL SURVEILLANCE PROGRAM

The purpose of the medical surveillance program for Type 2 and 3 works is to establish an employee's fitness for duty (to wear a respirator, etc), and to detect any changes in the gastrointestinal and cardiopulmonary systems. Such changes may indicate the presence of an asbestos related disease.

City of Toronto has decided at this time that an experienced and qualified Abatement Contractor pre-selected by the Asbestos Plan Manager will perform all Type 3 work, with the exception of emergency Type 3 work, involving asbestos-containing building materials for City of Toronto. No City of Toronto employee will be assigned Type 3 friable asbestos related work, with the exception of emergency Type 3 work.

The information in this section is provided for reference only and is not applicable at this time. Should this position change and selected employees be required to conduct any type of work as specified in the

Regulation 278/05, *Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations*, then training will be provided by a qualified Occupational Health and Safety Consultant. No work will be performed until specific training has been provided and the employee comprehension of the work has been evaluated and accepted, by the Asbestos Plan Manager, as adequate. When authorized to proceed the employee and supervisory staff will comply with the requirements of this section of the Operations and Maintenance Program.

The main requirements of the medical surveillance program include:

- A physical examination, with emphasis on the cardiovascular and gastrointestinal systems, and
- A pulmonary function test, which includes the forced vital capacity (FVC) and the forced expiratory volume in one second (FEV).
- Chest X-ray

On the recommendation of the Ministry of Labour, Provincial Physician, a worker may volunteer to undergo the above tests initially and subsequently as recommended by his/her physician at least 2 years after the most recent exam. However, it is recommended that an initial chest x-ray be used in order to establish baseline conditions for the employee.

3.12.1 Employee Exposure Records

Regulation 278/05, *Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations* requires that an Asbestos Work Report form (see Figure 4.2) be maintained for each employee working on a Type 2 or Type 3 operation.

These work reports are to be submitted to the Provincial Physician; Ministry of Labour annually and when the employment of an employee is terminated. A copy of the form must also be given to the employees.

The procedure outlined below for recording the information and submission of reports is to be followed:

1. Employees;
 - Report the number of hours per day of working with ACM, as required, to his/her immediate supervisor.
2. Maintenance and Trades Supervisor;
 - Maintain a monthly log, as illustrated in Figure 4.3 for each employee involved in asbestos operations and include the following,
 - Number of hours daily,
 - Type of work performed (according to the classifications listed in the Asbestos Work Report),

- Employee information including Name, Address (home), Date of Birth and Social Insurance Number, and
 - Forward a copy of the individual employee log on a monthly basis to the Asbestos Plan Manager.
3. Asbestos Plan Manager;
- Maintain a file for each employee, containing the information forwarded by the employees supervisor,
 - Complete an Asbestos Work Report, containing all of the appropriate information for each employee and forward to the City's Employee Health and Rehabilitation section who will then forward to the Chief Physician, Occupational Health Branch, Ministry of Labour, on an annual basis. Medical surveillance would be coordinated through the City's EH&R section and
 - Forward a copy of the work report to each respective employee annually and on termination of employment.

FIGURE 3.4 – ASBESTOS WORK REPORT
Occupational Health and Safety Act/Loi sur la
santé et la sécurité au travail

For the Period/Pour la période
From/du **To/au**

This form is required under Section 21 of the Regulation for Asbestos on Construction Projects and in Buildings & Repair Operations.

Ce formulaire est requis en vertu de l'article 21 du règlement sur le travail avec l'amiante dans les projets de construction et de réparations d'édifices.

Asbestos Work Report/Rapport sur le travail avec l'amiante

Name of Employer/Nom de L'employeur			Employer's Address/Adresse de L'employeur		
Employee's Surname/Nom de l'employé	Given Name/Prénom	Init/Init.	Employee's Address/Adresse (Street No., Street, City, Postal Code/N° de rue, Rue, Ville, Code postal)		
S.I.N. /N° d'ass. Sociale	Date of Birth/Date de naiss. Y/A M/M D/J		Family Physician's Name and Address/Nom et adresse du médecin de famille		
Hours of Work/Heures de travail	Type 2		Type 3		
Return to: Provincial Physician Occupational Health & Safety Branch Ministry of Labour 655 Bay St 14 th Floor Toronto, ON M7A 1T7		Renvoyer au: Médecin provincial Direction de la sante et de la securite au Travail Ministère du Travail 655, rue Bay 14 th étage Toronto (ON) M7A 1T7		Signature of Employer/Signature de l'employeur	
				Date	
Distribution Part 1 Provincial Physician Part 2 Worker Part 3 Employer		Distribution Partie 1 médecin provincial Partie 2 travailleur Partie 3 Employeur			

FIGURE 3.5 - EMPLOYEE EXPOSURE RECORD

Employee: _____ Clock #: _____

Building & Department: _____

Period Starting: _____ Period Ending: _____

Employee Identification

Surname: _____

Given Names: _____

Address: _____

Date of Birth: _____

Social Insurance
Number: _____**Exposure Information**

Date of Exposure	Type of Work	Number of Hours
------------------	--------------	-----------------

3.13 WORK AUTHORIZATION

This section of the Operations and Maintenance Program deals with the authorization and issuing of work for the daily activities and occurrence in any specific building. All asbestos related work shall be authorized by the Asbestos Plan Manager in accordance with the following sections.

3.13.1 Maintenance/Renovation Permit System

An informal permit system will be initiated through the Asbestos Plan Manager or his designate for any maintenance or renovation work. All work that may potentially disturb ACM shall be funnelled through the Asbestos Plan Manager.

In the permit system, all requests for maintenance/renovation activities are given to the Asbestos Plan Manager prior to permitting the work to proceed. The Manager will check the building's asbestos records (files, computerized database, etc.) for information about the presence of ACM where work is to be performed. Additional testing for concealed or non-friable ACM in the actual area of work may also be necessary.

1. Where no asbestos is present, the work order is issued and the planned actions can proceed.
2. If ACM are present but will not be affected the work may proceed.
3. Where asbestos is present and the amount of material that will be disturbed is minimal, procedures appropriate to the work will be issued from Section 4 of this Manual, as applicable to the work, for service personnel, maintenance personnel or Contractor if adequately trained.
4. Where asbestos is present and impact will be extensive, an outside Consultant will be retained to prepare work procedures. In worst-case situations (e.g. large amounts of asbestos containing material, non-critical maintenance/renovation) work would be deferred until the ACM in the area can be dealt with in the proper manner.

3.13.2 Work Practices For Renovation and Remodelling

3.13.2.1 Renovation

Building renovation or building system replacement can cause major disturbance of ACM. Moving walls, adding wings, and replacing heating or air conditioning systems involve breaking, cutting, or otherwise disturbing ACM that may be present. Prior to renovation the removal of ACM is required. It is required by the Regulations to differentiate between Type 2 and 3 procedures for the quantity of material that will be disturbed. The following criteria should be used to guide the classification between the two work types. Type 2 work is the removal or disturbance of one square meter or less of friable ACM during the repair, alteration, maintenance or demolition of all or part of machinery or equipment or a building. Greater quantities than these values require the work to be considered a major removal

project and not part of the Operations and Maintenance Program.

3.13.2.2 Remodelling

Remodelling or redecorating implies less dramatic structural alteration. However, disturbance of ACM or materials contaminated with asbestos fibres is still possible. Where the remodelling involves direct contact with ACM all of the procedures and precautions specified would apply.

3.13.2.3 Specialized Cleaning Procedures

Four work criteria exist where specialized cleaning may be required. They consist of sections:

Appendix G – G-7: Cleaning, Stripping Wax from and Waxing Asbestos-Containing Floor Tiles - Type 1 Work in particular for tenants who may have extensive sections of vinyl tile;

Appendix G – G-8: Cleaning of Asbestos-Containing Debris – Type 2 Work;

Appendix G – G-9: Access and Cleaning above Suspended Ceilings – Type 2 Work where ACM may be found in a damaged condition; and

Appendix G – G-10: Cleaning Out Of HEPA Filtered Vacuum Cleaners, Asbestos Waste Storage and Disposal - Type 2 Work.

Studies have shown that cleaning, stripping or minor movement adjacent to ACM can, under some situations, release fibres and become hazardous. The following procedures are outlined to inhibit fibre release.

3.13.2.4 Special Work Practices for Maintenance Activities

Normal maintenance activities can disturb ACM and raise levels of airborne asbestos. Maintenance workers should be cautioned against conducting any maintenance work in a manner that may disturb ACM. Four work criteria are specified for handling various situations:

Appendix G – G-11: Work with Non-friable Materials and Manufactured Products – Type 1 Work generally involving removal of vinyl floor tile or removal of pipe gasket;

Appendix G – G-12: Repairing Thermal Insulation with non-powered tools – Type 2 Work where damaged thermal insulation applications are noted;

Appendix G – G-13: Asbestos Removal Using Glove Bags – Type 2 Work; and

Appendix G – G-14: Minor Asbestos Removal – Type 2 Work when the ACM must be removed.

3.13.2.5 Emergency Response Procedures

As long as ACM remains in the building, a fibre release episode could occur. Custodial and maintenance workers should report to the Building Manager, who in turn will report to the Asbestos Plan Manager, the presence of debris on the floor, water or physical damage to the ACM, or any other evidence of possible fibre release. Fibre release episodes can also occur during maintenance or renovation projects. The Asbestos Plan Manager should call an abatement contractor to clean up debris

and make repairs as soon as possible. If an outside contractor is to be used, the company should be retained for quick response action.

One procedure is provided for handling these episodes as follows:

Appendix G – G-15: Emergency Spill or Repair Response – Type 2 Work.

3.13.2.6 Minor Episodes

Minor episodes, such as a small section of insulation (less than 1 linear meter) falling from a pipe or a careless worker bumping into a beam and dislodging a small amount of fireproofing ACM (less than 1 square meter), can be treated with standard wet cleaning and HEPA-vacuum techniques.

3.13.2.7 Major Episodes

Major fibre release episodes are serious events. Large amounts of ACM falling from heights of several feet may contaminate an entire building with asbestos fibres. If 1 square meter or more of surfacing ACM or 1 linear meter or more of thermal system insulation delaminates or is dislodged from its substrate, the episode should be considered major. A large breach in a containment barrier for a maintenance or abatement project should also be considered a major episode.

3.14 WASTE DISPOSAL

City of Toronto has decided at this time that an experienced and qualified Abatement Contractor pre-selected by the Asbestos Plan Manager will perform all Type 3 work, with the exception of emergency work, involving asbestos-containing building materials for City of Toronto. No City of Toronto employee will be assigned Type 3 friable asbestos related work, with the exception of emergency Type 3 work.

The information in this section is provided for reference only and is not applicable at this time. Should this position change and selected employees be required to conduct any type of work as specified in the Regulation 278/05, *Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations*, then training will be provided by a qualified Occupational Health and Safety Consultant. Asbestos waste will not be stored in any building at this time except as part of a project.

Waste disposal requirements for work with asbestos are covered by the Revised Regulation of Ontario 1990, Regulation 347, as amended, under the *Environmental Protection Act General Waste Management*.

The abatement contractor will initiate shipment of the waste and will forward all records to the Asbestos Plan Manager. The Asbestos Plan Manager maintains all completed records of all shipments, as illustrated in Figure 3.6, of asbestos-containing waste and attachments. This record includes information on:

- date of shipment,
- number of drums / bags (estimated when in large quantities),
- destination,

- shipper, and
- shipment manifest/waybill number (include copy of the shipping manifest).

Reference must be made to the actual regulation in order to ensure that all of the requirements are being met.

FIGURE 3.6 - RECORD OF WASTE DISPOSAL

Building Name: _____

Address: _____

Date of Shipment: _____ Time of Departure: _____

Type of Waste: _____ Type of Container: _____

Number of Containers Shipped: _____

Waste Haulage Company: _____

Address: _____

Provisional Certificate of Authorization or
Certificate of Authorization Number of Hauler: _____

Waste Disposal Site: _____

Address: _____

Provisional Certificate of Authorization or Certificate
of Authorization Number of Disposal Site: _____

Date of Receipt: _____ Arrival Time: _____

Number of Containers Received: _____

Condition of Containers: _____

Copy of Shipping Documents and Bill of Lading on File: Yes _____ No _____

Signatures:

City of Toronto

Shipper: _____ Date: _____

Building Manager: _____ Date: _____

Asbestos Plan Manager: _____ Date: _____

3.15 AIR MONITORING

When a building is known to contain friable ACM, air monitoring may be carried out at the discretion of the Asbestos Plan Manager in order to reassure concerned staff or occupants, that the concentration of airborne-asbestos fibres does not exceed acceptable levels. In addition, air monitoring may also be performed during and at conclusion of abatement activities to verify that the work was performed in accordance with project specifications. Clearance air monitoring is required at the end of Type 3 abatement work.

In Canada, all existing legislation and environmental guidelines concerning permissible airborne asbestos fibre concentration are expressed in terms of fibres having lengths exceeding 5 micrometers. Table 3.1 lists the general permissible airborne asbestos fibre concentration criteria.

Table 3.1 – Asbestos Air Quality Criteria in Ontario

DESCRIPTION		FIBRE CONCENTRATION (fibres/cubic centimetre of air)
Time weighted average exposure of worker to airborne asbestos for an 8 hour day:		
All forms of airborne asbestos fibres ⁽¹⁾		0.1
Ambient Air Quality Criterion Over 24 Hours (average) ⁽²⁾		0.04
Clearance Value on Type 3 Work		0.01
Notes:	<p>(1) Ontario Regulation 278/05, as amended, – Designated Substance – Asbestos, made under the <i>Occupational Health and Safety Act</i>.</p> <p>(2) <i>Summary of Point of Impingement Standards, Point of Impingement Guidelines and Ambient Air Quality Criteria</i> (AAQCs), Standards Development Branch, Ontario Ministry of the Environment, December, 2005.</p>	

Air samples can be analysed by three methods: Phase Contrast Microscopy or Transmission Electron Microscopy by a laboratory specialized in the identification of asbestos in air samples following recognised methodologies. Although there are two methods, for Type 3 clearance testing, only the first two are outlined as methods to be used in the Regulation. Clearance air sampling at the completion of Type 3 abatement shall be conducted in compliance with Regulation 278/05 including the required number of samples and using forced air as per EPA Method 560/5-85-024. Clearance air sampling results must be posted in a conspicuous workplace location within 24 hours of receipt and a copy also provided to the JHSC/H&S Rep within 24 hours of receipt.

Acceptable Phase Contrast Light Microscope methodologies is:

1. Asbestos Fibres, NIOSH Method 7400 – Asbestos fibre counting rules (Latest Edition).

Acceptable Transmission Electron Microscope methodologies is:

1. Asbestos Fibres, NIOSH Method 7402 (Latest Edition)

3.15.1 *Air Sampling Program*

Air Monitoring will be performed by an outside Occupational Health & Safety Consulting firm specializing in this type of work with appropriate equipment and qualified personnel. Air monitoring requirements are broken down into two levels:

3.15.1.1 *Occupied Building*

Air quality checks in an occupied building where there may have been an asbestos disturbance or a need to establish fibre levels as established by the Asbestos Plan Manager.

Whenever feasible, City of Toronto will use the PCM method of air monitoring unless special circumstances indicate another method is preferable as determined by the Asbestos Plan Manager.

3.15.1.2 *Abatement Projects*

Abatement projects may require air sampling (is required in the case of Type 3 work), which will be authorized by the Asbestos Plan Manager.

3.16 EQUIPMENT

City of Toronto has determined that a qualified, experienced contractor will perform all asbestos abatement work and that no employee will be assigned Type 3 asbestos related work (see previous comment).

The information in this section is provided for reference only and is not applicable at this time.

3.16.1 *Asbestos Equipment Room*

The Asbestos Equipment Room is a room in the Maintenance Department of one or more buildings set-aside for the storage of the equipment and supplies required to perform any repair and/or minor removal of ACM. A copy of the Operations and Maintenance Program is also kept in the room for reference purposes.

In addition to equipment storage, the room may also be used for the temporary storage of sealed asbestos waste and emptying of the HEPA vacuum. Refer to the correct procedures listed in Section 3.16.5 for the emptying of the vacuum cleaner.

At the end of asbestos-related work all supplies are to be returned to the room and material used up during the work recorded on the equipment usage list. The Asbestos Plan Manager or designate will be responsible for maintaining adequate supplies of the equipment in the room.

3.16.2 List of Equipment

The supplies and protective equipment, presented in the list below, are required to perform the work outlined in Section 4.0, if and when, procedures are established. All required equipment shall be stored in the Asbestos Equipment Room.

A) PROTECTIVE EQUIPMENT:

1) Respirators;

- Half-face air purifying respirators (minimum for Type 1 and limited Type 2 work),
- HEPA Cartridge Filters,
- Qualitative or Quantitative Fit Testing Equipment
- Disinfectant.

2) Clothing;

- Disposable Coveralls with integral hood, boot covers and elasticized cuffs (Tyvek or equivalent).

B) REPAIR/REMOVAL EQUIPMENT:

1) Cleaning Equipment;

- HEPA Vacuum,
- Buckets and Sponges,
- Scrub Brush (Non-metal Bristles), and
- Mop (Long-Handled).

2) Asbestos Repair/Removal:

- Glove bags in the following configurations manufactured by Safe-T- Strip or equivalent;
 - 6",10" straight,
 - 6",10" vertical, and
 - 6",10" valve,
- Flexible Saw,
- Retractable Knife,

- Wire Cutters,
- Garden-style Airless Sprayer For Amended Water,
- Water containing one ounce/gallon of a 50/50 mixture of polyoxyethylene ester and polyoxyethylene ether (i.e. Aqua-Gro),
- Separate Garden-style Airless Sprayer For Encapsulant,
- Encapsulant (Approved) Ocean 666, or Decadex Fire Check,
- Lagging Adhesive (Approved) Bakelite 120-19 or 120-20,
- 6-ounce canvas cloth,
- Paint Brushes - 4",
- Warning Signs (Displaying Information Below),

CAUTION-ASBESTOS HAZARD

Breathing Asbestos Dust May Be

Hazardous to Your Health

ACCESS RESTRICTED TO PERSONS WEARING

PROTECTIVE CLOTHING AND EQUIPMENT

- Rope for Barricades,
- Duct Tape,
- Polyethylene Sheeting - 6 mil, Clear, and
- Polyethylene Sheeting - 6 mil, Dark.

3) Waste Disposal;

- Waste Disposal Bags - Yellow, Pre-labelled,
- Bag Ties, and
- Fibre Drums with sealable lids.

3.16.3 Special Equipment - HEPA Vacuum Cleaners

Vacuums equipped with a High-Efficiency Particulate Aerosol (HEPA) filters find wide use in asbestos-related work. A HEPA filter must be 99.97% efficient in collecting a 0.3 micrometer aerosol. Each filter is individually tested and certified. Important points to be considered in the

selection, use and care of HEPA vacuums include:

- HEPA vacuums are available in different sizes; some run on different voltages. Selection of the appropriate unit must be made after assessing all of the relevant factors.
- Manufacturers' instructions regarding filter life, use and care of the vacuum etc., should be followed. Because the HEPA filter is expensive to replace, every effort should be made to extend its service life by maintaining and replacing the less expensive and less sophisticated earlier stages of filtration (pre-filters).
- The changing of filters and emptying of waste from the vacuum require care and diligence to ensure that potential airborne fibre contamination is confined (refer to procedures, Appendix G).
- The outsides of HEPA vacuum cleaners must also be kept clean and free of dust and debris. Vacuum hoses are to be inspected regularly to ensure their cleanliness.

3.16.4 Requirement for Use

The Regulation respecting Asbestos requires that cleaning is performed in various stages of the operations involving asbestos. This cleaning must be performed either by:

- 1) Damp mopping / wiping; or
- 2) Vacuuming using a HEPA vacuum cleaner

3.16.5 Handling and Cleaning HEPA Vacuums

The changing of filters and emptying of waste is to be performed in the specially designated area (Asbestos Control Room) which is isolated from other occupied areas. The following procedure is to be used:

Work Procedure:

- 1) Identify the room with the proper warning signs and restrict access to those employees performing the work.
- 2) Wear a non-powered air-purifying respirator approved for use with asbestos and suitable protective clothing. Only persons wearing protective clothing and equipment shall be allowed to enter the work area.
- 3) Disable the ventilation system servicing the room if possible; seal ventilation ducts to and from the room.
- 4) Cover the floor with a large sheet of 8 mil. rip-proof polyethylene sheeting.
- 5) Place the HEPA vacuum in the centre of the polyethylene sheeting and slowly

remove the top lid.

- 6) Seal the waste bag in the vacuum cleaner and transfer to the waste disposal bag.
- 7) Seal the waste disposal bag and replace the lid on the vacuum cleaner.
- 8) Damp wipe the HEPA vacuum and the waste disposal bag.
- 9) HEPA vacuum the polyethylene sheeting on the floor and dispose of as asbestos waste. Clean the floor using the HEPA vacuum or by damp wiping.
- 10) Before leaving the work area, decontaminate protective clothing (including boots) and dispose of as asbestos waste; damp wipe the respirator and store in a proper place.
- 11) Wash hands and face at the completion of the job.
- 12) Ensure that the daily asbestos work report has been completed.

SECTION 4.0
ASBESTOS WORK PROCEDURES

4.0 ASBESTOS WORK PROCEDURES

The following sections briefly describe the standard operating procedures adopted for asbestos-related work. These meet or exceed the requirements of O. Reg. 278/05 and other regulatory requirements in effect on November 1, 2005.

These procedures are provided as a minimum standard for all asbestos work in City Facilities. No scheduled (non-emergency) Type 3 asbestos work will be undertaken by City employees.

4.1 CLASSIFICATION OF SCHEDULED WORK

The Ministry of Labour Regulation classifies asbestos work into Types 1, 2, and 3 procedures, depending on the type of disturbance, the material being disturbed, and the extent of work. The Ministry of Labour also allows the use of Glove Bags for removal of asbestos-containing pipe insulation as a Type 2 operation.

The following is the classification of work for materials known to exist in City Facilities.

Note: Refer to Appendix G for further details

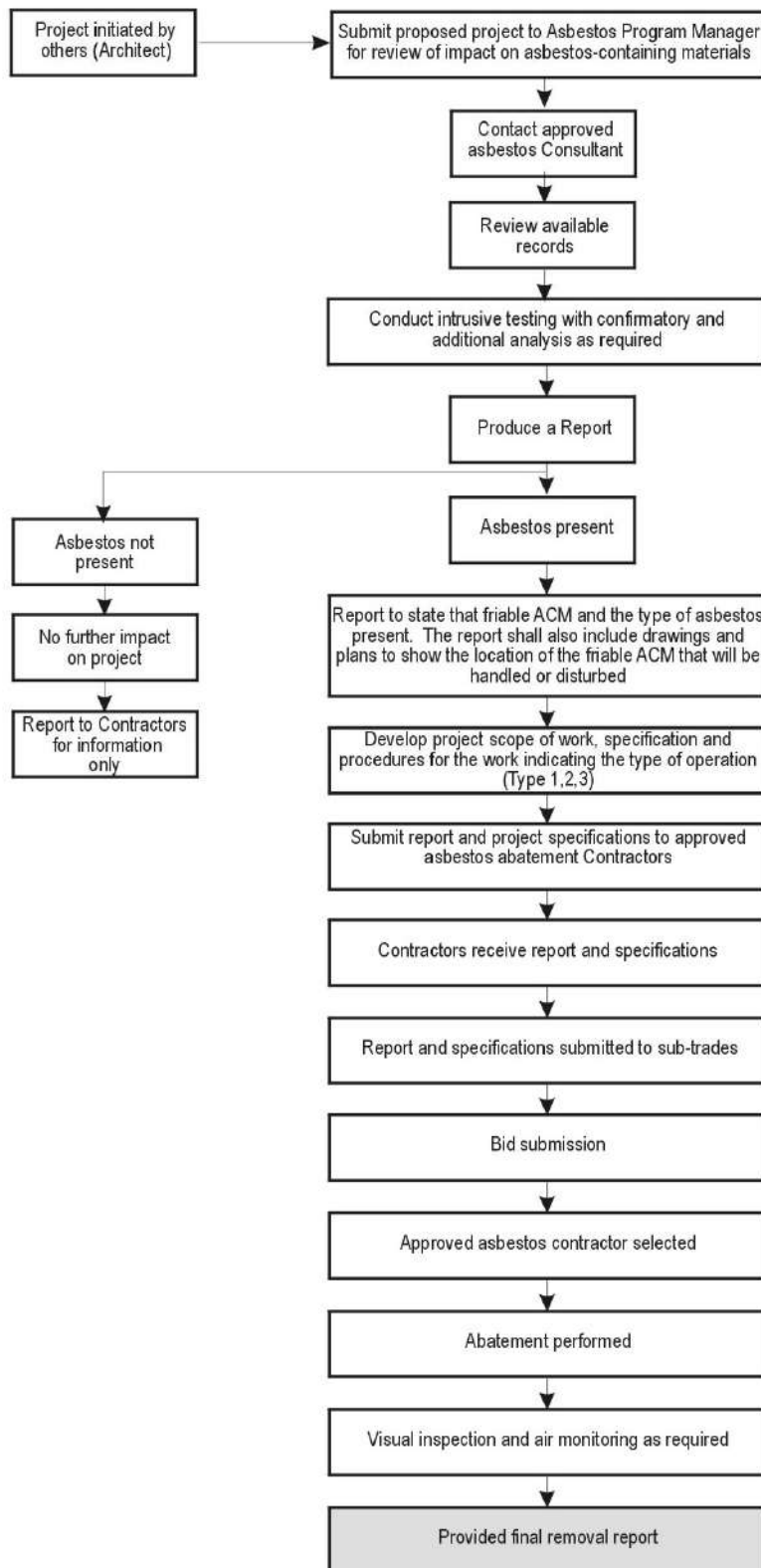
TABLE 4.1 – Classification of Asbestos Work Types

CLASSIFICATION	DESCRIPTION OF WORK
TYPE 1 OPERATIONS	Installing or removing ceiling tiles that are asbestos-containing material, if the tiles cover an area less than 7.5 square metres and are installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
	Installing or removing non-friable asbestos-containing material, other than ceiling tiles, if the material is installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
	Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if, <ul style="list-style-type: none"> i. the material is wetted to control the spread of dust or fibres, and ii. the work is done only by means of non-powered hand-held tools.
	Removing less than one square metre of drywall in which joint-filling compounds that are asbestos-containing material have been used.
TYPE 2 OPERATIONS	Removing all or part of a false ceiling to obtain access to a work area, if asbestos-containing material is likely to be lying on the surface of the false ceiling.
	The removal or disturbance of one square metre or less of friable asbestos-containing material during the repair, alteration, maintenance or demolition of all or part of machinery or equipment or a building, aircraft, locomotive, railway car, vehicle or ship.
	Enclosing friable asbestos-containing material.
	Applying tape or a sealant or other covering to pipe or boiler insulation that is asbestos-containing material.

CLASSIFICATION	DESCRIPTION OF WORK
	Installing or removing ceiling tiles that are asbestos-containing material, if the tiles cover an area of 7.5 square metres or more and are installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
	Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if, <ul style="list-style-type: none"> i. the material is not wetted to control the spread of dust or fibres, and ii. the work is done only by means of non-powered hand-held tools.
	Removing one square metre or more of drywall in which joint filling compounds that are asbestos-containing material have been used.
	Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the work is done by means of power tools that are attached to dust-collecting devices equipped with HEPA filters.
	Removing insulation that is asbestos-containing material from a pipe, duct or similar structure using a glove bag.
	Cleaning or removing filters used in air handling equipment in a building that has sprayed fireproofing that is asbestos-containing material.
	An operation that, <ul style="list-style-type: none"> i. is not mentioned in any of paragraphs 1 to 10, ii. may expose a worker to asbestos, and iii. is not classified as a Type 1 or Type 3 operation.
GLOVE BAG WORK	The use of glove bags to remove insulation from a pipe duct or similar structure is classed as Type 2 work but it requires notification of the MOL if more than 1 square metre of ACM is removed.
TYPE 3 OPERATIONS	The removal or disturbance of more than one square metre of friable asbestos-containing material during the repair, alteration, maintenance or demolition of all or part of a building, aircraft, ship, locomotive, railway car or vehicle or any machinery or equipment.
	The spray application of a sealant to friable asbestos-containing material.
	Cleaning or removing air handling equipment, including rigid ducting but not including filters, in a building that has sprayed fireproofing that is asbestos-containing material.
	Repairing, altering or demolishing all or part of a kiln, metallurgical furnace or similar structure that is made in part of refractory materials that are asbestos-containing materials.
	Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material, if the work is done by means of power tools that are not attached to dust-collecting devices equipped with HEPA filters.
	Repairing, altering or demolishing all or part of any building in which asbestos is or was used in the manufacture of products, unless the asbestos was cleaned up and removed before March 16, 1986.

CLASSIFICATION	DESCRIPTION OF WORK
NOTES TO CLASSIFICATION	Work on ceiling tiles, drywall or friable asbestos-containing material is classified according to the total area on which work is done consecutively in a room or enclosed area, even if the work is divided into smaller jobs.
	The following provisions apply if a dispute arises as to the classification of an operation under this section:
	<ol style="list-style-type: none">1. A party to the dispute may notify an inspector at the office of the Ministry of Labour nearest the workplace of the dispute.2. The party who notifies the inspector shall promptly inform the other parties that the inspector has been notified.3. Work on the operation shall cease until the inspector has given a decision under paragraph 4.4. The inspector shall, as soon as possible, investigate the matter and give the parties a decision in writing.
	Nothing in subsection (6) affects an inspector's power to issue an order for a contravention of this Regulation.

FIGURE 4.1 - MAJOR PROJECT PROTOCOLS FOR RENOVATION OR DEMOLITION

**Notes:**

1. All general contractors performing asbestos related work should be chosen from the Asbestos Plan Manager's approved list.
2. Where the general contractor for the work subcontracts part of the work, they shall supply a list of subcontractors who must be approved by the Asbestos Plan Manager.
3. If a major project results in the removal of all known ACM in the building, the AMP can be terminated.

NOTE: The term "Friable asbestos" must be interpreted to include non-friable materials.

Post copy of clearance air monitoring results in conspicuous place in workplace within 24 hours of receipt

Provide copy of clearance air monitoring results to JHSC/H&S Rep within 24hours of receipt

APPENDIX A
ASBESTOS FACT SHEET

ASBESTOS FACT SHEET

What Is Asbestos?

"Asbestos" is the name given to a group of naturally occurring minerals composed of tiny fibres, which become easily airborne. There are five major mineral forms in the asbestos group, only two of which, chrysotile and amosite, have been commonly used in Canada. These tiny fibres are flexible, fire-resistant and almost indestructible- qualities which have made asbestos very useful commercially.

Where Is It?

There have been more than 3,000 asbestos-containing products, some of which are currently in use. These are mostly in the form of hard materials. Soft materials of particular interest include thermal and acoustic insulation and fireproofing. Some of the more common products that may contain asbestos include:

Pipe insulation	Duct insulation
Cement products	Fireproofing
Plasters	Vinyl floor tiles
Floor felts in sheet floors	Floor mastics
Roofing shingles	Roofing tars
Roofing felts	Ceiling panels

In most commercial products, asbestos is combined with a binding material, so that it does not become readily released into the air. However, if the asbestos should become airborne, and if it is inhaled, it can remain in the lungs for a long period of time, possibly causing severe health problems that do not appear for many years.

Commencing in the mid-1970's, many ACM were banned from use, especially in the construction industry. Those products already in use were made subject to regulations governing their handling and disposal.

What Are The Problems?

Asbestos is rarely used alone, and it is generally safe when it is combined with other materials with strong bonding properties. Occasionally, asbestos fibres become loose and airborne, this is referred to as a "fibre-release." This happens most often when they are contained in soft, easily crumbled (friable) materials, such as sprayed-on fireproofing. Even in well-bonded materials such as floor tiles and painted surfaces, asbestos can become airborne when materials are cut, drilled, scraped, filed, sanded or otherwise abraded.

What Are The Health Effects?

If asbestos fibres are inhaled or swallowed, they can have serious effects on your health. These effects may not appear for 15 to 30 years after exposure. Asbestos can cause asbestosis, also known as "white lung", a scarring of the lungs that leads to severe breathing problems and heart failure. This disease is usually seen in workers who manufacture or use asbestos products, and is associated with high exposure levels.

Asbestos can also cause cancer of the lungs, as well as a very rare cancer of the chest and abdominal linings known as mesothelioma. It may also be linked with some cancers of the stomach, intestines,

kidneys and rectum.

There is much controversy in the scientific community over what constitutes a safe exposure level to asbestos fibres, and many factors determine whether an individual will develop an asbestos related disease. It is known that smokers exposed to asbestos are at a greater risk of developing lung cancer. Individual susceptibility is another factor. Also, different asbestos minerals have a different effect on the body, the fibres most often associated with mesothelioma are very rarely used.

Children and young adults are a special concern for asbestos exposure, since they carry asbestos fibres in their lungs for many years. It is for this reason that proper asbestos management is so important, particularly in schools.

Determining If There Is A Problem

To determine whether or not an asbestos problem exists, it must first be established if the material in question contains asbestos fibres. The only sure way to determine the presence of asbestos is to have a sample of the material analyzed at a testing laboratory using high-resolution microscopy techniques. A reputable company must always do the analysis.

What Are The Government Regulations?

There are three regulations that govern the control of asbestos and ACM in buildings in Ontario as follows:

Under the Occupational Health and Safety Act, Regulation 278/05, *Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations*.

Under the *Environmental Protection Act: General - Waste Management Regulation*: R.R.O. 1990, Regulation 347, as amended.

Under the *Dangerous Goods Transportation Act*: R.S.O. 1990. c.D.1

Under the *Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations* under the *Occupational Health and Safety Act*, the major requirements to building owners under this regulation include:

1. Provision of establishing an asbestos survey report outlining the locations, quantity, condition and content of asbestos in material in the building to all prospective contractors who are likely to handle or disturb the material.
2. The asbestos survey report shall contain the following information.
 - The location of material,
 - Where the material is friable or non-friable,
 - In the case of friable sprayed-on material, for each location, i) if the material is known to be ACM, the type of asbestos, if known, or ii) in any other case a statement that the material will be treated as though it contained a type of asbestos other than chrysotile.
3. Advising workers of the building owner who may work in close proximity to ACM and who may disturb

the material.

4. Periodic inspection of the material to determine its condition, including an annual update of the asbestos survey report.
5. Implementation of appropriate control measures, where required, following the precautions and procedures prescribed by the Regulation (Type 1, Type 2 or Type 3 operations). The classification of the work depends on the type of material, procedures used and the quantity of material to be disturbed. Refer to Table 4.1 Classification of Asbestos Work for further information.
6. Establishment of a training program for employees of the owner who are likely to handle ACM.
7. Annual submission of an asbestos work report form for each employee working in a Type 2 or Type 3 operation.
8. Removal of ACM, to the extent practicable, prior to demolition of a building, or part thereof.

What Is The City of Toronto Doing To Meet These Regulations?

1. Worker Training

The City of Toronto has a policy that no employees will actually be performing Type 3 asbestos related work but will receive asbestos awareness training courses for those who have the potential to come in contact with ACM during the performance of their duties so that they can recognize potential problems. All training meets the legislative requirements established by the Ontario Ministry of Labour. In addition managers of tenants whose rental units are tended to by City of Toronto will also be invited to the information sessions. The JHSC/H&S Rep will be advised of the time and place of the sessions.

2. Comprehensive Building Survey

The City of Toronto enlisted the services of a consulting firm specializing in asbestos surveys. The firm conducted a comprehensive inventory of the ACM present in the building, assessed the condition of these materials, and established the risk they pose to building occupants. The firm also recommended any required asbestos control measures.

3. AMP

The City of Toronto has in place a long-term plan to manage our ACM. It includes work procedures for trained service personnel, maintenance personnel and contractors who may be required to work in the facility so that their work actions will not increase the risk potential of asbestos exposure to building occupants.

4. Operations and Maintenance Program

The City of Toronto has implemented a program of procedures for the proper handling and maintenance of our ACM. It includes preventative measures to reduce the probability of damage to ACM as well as procedures for routine maintenance, cleaning, emergency responses to fibre releases, renovation and periodic re-inspection (surveillance) of these materials.

APPENDIX B
REFERENCE MATERIALS

1. Ontario Regulation 278/05: Designated Substance — Asbestos on Construction Projects and in Buildings and Repair Operations, made under the Occupational Health and Safety Act.

http://www.e-laws.gov.on.ca/DBLaws/Regs/English/050278_e.htm

2. Revised Regulations of Ontario 1990, Regulation 347, as amended: General — Waste Management, made under the Environmental Protection Act.

http://www.e-laws.gov.on.ca/DBLaws/Regs/English/900347_e.htm

3. Revised Statutes of Ontario 1990, Chapter D1: Dangerous Goods Transportation Act.

http://www.e-laws.gov.on.ca/DBLaws/Statutes/English/90d01_e.htm

4. Asbestos Information Sources and Governmental Sources (Canadian and US)

<http://www.chrysotile.com/>

<http://www.ccohs.ca/>

<http://www.cdc.gov/search.do?action=search&queryText=asbestos>

<http://www.ashrae.org/template/AdvancedSearchResult.jsessionid=aaa-u1J4MK-DY>

<http://www.labour.gov.on.ca/moved/index.html>

http://www.hc-sc.gc.ca/iyh-vsv/environ/asbestos-amiante_e.html

<http://www.osha.gov/SLTC/asbestos/index.html>

APPENDIX C

LETTER OF NOTIFICATION TO TENANTS REGARDING ASBESTOS IN PREMISES

LETTER OF NOTIFICATION TO TENANTS REGARDING ASBESTOS IN PREMISES

To Tenant Management Representative

This letter is being provided as notification of the presence of asbestos within the building at [address], Ontario. City has recently had an asbestos survey performed of the entire building and have established a program to manage all asbestos in a safe and prudent fashion. O.Reg. 278/05 requires notification of the building's tenants of the location of such material, as well as notification of workers who may work in close proximity to the material and who may disturb it.

Our consultant inspected all areas of the building and made recommendations, where necessary, for removal or repair of asbestos. All such work [has been completed/will be completed shortly] with appropriate inspection and supervision. All asbestos remaining is subject to the Asbestos Management Program as required by our own due diligence. A copy of the survey and Asbestos Management Program are available locally on site, or at Metro Hall, 55 John Street, Toronto, Ontario for review.

The continuing presence of the remaining asbestos does not pose a risk of exposure to your employees as long as it remains under this management program. Staff that may disturb these materials has been given appropriate training and are aware of its presence. If you are planning maintenance or renovation work please notify the Facility Manager who will determine if the planned work will affect the asbestos in any way and provide information regarding necessary work practices and obligations to maintain a safe and healthy environment for your staff and contractors.

Please ensure that your staff and sub-contractors are aware of the above information. If you have any concerns please contact the facility management office at _____.

APPENDIX D

**CONTRACTOR NOTIFICATION AND
ACKNOWLEDGEMENT FORM**

CONTRACTOR NOTIFICATION AND ACKNOWLEDGEMENT FORM

City has identified the presence of various friable and non-friable asbestos-containing materials in the Building. An asbestos inventory report showing the locations and amounts of these materials is available for viewing from the Facility Manager.

Ontario Regulation 278/05 (*Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations*) applies to workers that may disturb asbestos materials. The disturbance of asbestos building materials are only to be undertaken by Asbestos Abatement Contractors that maintain the appropriate insurance coverage and meet the requirements set out in the AMP. The following activities may disturb asbestos materials. The Facility Manager must be notified prior to performing the following:

- Removal or repair of asbestos mechanical insulation or sprayed asbestos.
- Ceiling entry which may disturb sprayed fireproofing or pipe insulation.
- Any other operation which may generate airborne asbestos from friable asbestos.
- Any removal, cutting or other disturbance of non-friable asbestos material.
- Disturbance of any material excluded from the survey.

Declaration by Contractor

The Contractor and their sub-contractors shall follow the work procedures as specified by City's Asbestos Management Program (AMP) and shall not disturb ACM without using proper procedures in accordance with Regulation 278/05 and this AMP..

We agree that our staff will not disturb asbestos-containing materials without prior notification to the Facility Manager. This firm and our staff will follow all procedures specified by the City Asbestos Management Program and/or O. Reg. 278/05. All asbestos waste will be packaged and disposed of in accordance with Ministry of the Environment requirements.

Notification of Asbestos Abatement

All contractors and City employees who perform work at facilities where ACM is present should be notified of the presence of the ACM if their work may bring them into contact or close proximity to the ACM and they may disturb it. This notification may include janitorial, security, telephone, computer cabling suppliers, mechanical maintenance contractors, etc. This notification shall be performed by the Facility Manager or Project Manager.

All contractors and City employees who perform work at City facilities, where asbestos-containing sprayed fireproofing is present above ceilings, including telephone, computer cabling suppliers, electrical and mechanical contractors, etc., are to be notified that Type

2 Procedures are required for any entry to, or work within the ceiling space (visual inspection excepted, Type 1 Work). This notification shall be performed by the Facility Manager or Project Manager.

Contractors are to:

- Notify orally and in writing, an inspector at the office of the Ontario Ministry of Labour nearest the project site (Notice of Project), as per Regulation 278/05, prior to commencing Type 3 abatement, Glove Bag abatement or any abatement project that exceeds \$50,000.00 in cost.
- Notify Sanitary Landfill site as per Ontario MOE Regulation 347 as amended.
- Inform all sub trades of the presence of ACM identified in the contract documents.
- Immediately notify the Project Manager and stop work if friable materials not identified in the contract documents are discovered during the course of the work. Ensure that the MOL and the Joint Health and Safety Committee are immediately notified if the friable material is asbestos containing, as required by Regulation 278/05.

Building (Address): _____

Project: _____

Contractor: _____

Name and Title: _____

Signature: _____

Date: _____

APPENDIX E

WORK PRACTICES – EMERGENCY WORK

WORK PRACTICES – TYPE 2 EMERGENCY CLEAN UP

Emergency asbestos procedures shall be implemented, when required, in order to protect those undertaking the work, as well as to protect all others from, or limit exposure to, airborne asbestos. Procedures indicated shall be followed as closely as possible, in the event of an emergency situation.

Procedures for asbestos work, required as an immediate response to floods through asbestos fireproofing, accidental disturbance of ACM, ceiling collapses of asbestos-containing ceiling tiles, or other emergencies that affect asbestos materials, are as follows:

- Clear area of all occupants. In critical situations clear area of only non-essential personnel, and provide essential personnel with proper respiratory protection.
- Shut down ventilation systems serving area including supply, return and exhaust.
- Isolate the area by locking doors, if this can be done without blocking emergency or fire routes.
- If it is not possible to safely isolate the area, the Facility Manager will notify personnel not to enter the area. If possible, post security to prevent unnecessary access.
- Close access doors to area or construct enclosure around area if time permits. Do not obstruct emergency exits under any circumstances.
- Only trained workers or Abatement Contractors will perform the emergency clean up.
- Entrance to the area will now be limited to those wearing applicable respiratory protection, safety glasses with side shields, disposable Tyvek coveralls, and impermeable gloves. Half face NIOSH approved respirators with P100 (HEPA) filters are adequate.
- No eating, smoking or chewing in the Asbestos Work Area.
- Remove all debris within the area of the accidental disturbance of ACM using HEPA vacuums.
- Place polyethylene drop sheets under area of repair.
- Repair ACM pipe insulation, replace ceiling tiles or stabilize ACM as required with minimum disturbance to ACM. Prior to repair work, area must be wetted to control the spread of dust and fibres.
- Remove dust using HEPA vacuums or wet wiping from all surfaces within area of disturbance.
- Dispose of items that cannot be cleaned as asbestos waste.

- Clean all non-disposable tools and items (before leaving work area).
- Dispose of all cleaning supplies and drop sheets as asbestos waste.
- Remove coveralls and dispose of as asbestos waste.
- Proceed to washroom and wash face and hands.
- At their option, the Facility Manager may decide to employ an Asbestos Consultant to perform air monitoring and consulting, after clean-up to ensure airborne fibre levels are within acceptable limits to re-occupy the space.
- The Facility Manager must notify the Joint Health and Safety Committee of the results of air monitoring or testing.

APPENDIX F

ASBESTOS PROJECT WORK RECORD

ASBESTOS PROJECT WORK RECORD

Building: _____
(Building Address or Name)

Date: _____
(Today's Date)

Project Number: _____
(City Project Number or Purchase Order Number)

Project Type: ☐ Emergency ☐ Type 1 ☐ Type 2
 ☐ Planned Project ☐ Glove Bag ☐ Type 3

Area of Work: _____
(Room Name, Number, Floor etc.)

Description: _____
(Brief description of abatement, material, system, etc)

Tenant: _____
(Tenant name if any, department or group)

Project Start Date: _____
(Mobilization date)

Project End Date: _____
(After dismantling/clean-up)

Contractor: _____
(Contracting firm or employee)

Telephone: _____
(Contractor or employee telephone)

Consultant: _____
(Name of consulting firm/contact if any)

Telephone: _____
(Consultant telephone)

Pre-Construction Survey for ACM performed and report provided to Contractor?

☐ Yes ☐ No (Explain) _____

Air Sampling during abatement?

☐ Yes ☐ No

Clearance Air Monitoring performed (Regulated requirement after Type 3 abatement)?

☐ Yes ☐ No

Air Monitoring results to Joint Health and Safety Committee?

☐ Yes ☐ No

Asbestos Survey Updated to Reflect Changes in ACM Inventory?

☐ Yes ☐ No. No changes to ACM inventory resulted.

☐ No. Forward copies to Consultant prior to next re-assessment.

Asbestos waste removed from site and disposed of?

☐ Yes. Dump tickets attached. ☐ No. ACM waste not generated.

☐ No. ACM waste remains on site for later disposal.

Append the following information relating to asbestos abatement to this work record, if applicable, and file Asbestos Work Record and attachments with AMP. Check where attached.

Submittals including Insurance ☐ Yes ☐ No

Dump tickets, waybills, etc for waste. ☐ Yes ☐ No

Specifications, Change Orders, Drawings. ☐ Yes ☐ No

Consultant Inspection Reports. ☐ Yes ☐ No

Air Monitoring Results. ☐ Yes ☐ No

Analytical Certificates. ☐ Yes ☐ No

Correspondence as required. ☐ Yes ☐ No

APPENDIX G
ASBESTOS WORK PROCEDURES

G-1 ASBESTOS WORK PROCEDURES

City of Toronto has decided that all asbestos abatement work will be performed by qualified, experienced outside service personnel, maintenance personnel or authorized asbestos abatement contractor and that no City of Toronto employee will be assigned any Type 3 asbestos related work.

The information provided in this section is intended to give background to the Asbestos Plan Manager so that they may select an appropriately qualified abatement contractor.

Various sections of this manual will be made available to Service/Maintenance personnel or a Contractor describing the work required to be performed and authorization to proceed will be based on receipt of proof that the individual is qualified to perform the work and demonstrates so.

G-2 MAJOR ASBESTOS ABATEMENT WORK

Any work of this type is to be performed by firms specializing in asbestos abatement under contract to the building. A qualified consultant will inspect all removal work. The consultant will be required to provide an on site inspector with experience working on projects of similar size and complexity.

Where additional work is required in separate locations, appropriate procedures can be incorporated with the main work. Type 3 work involves the handling or removal of significant amounts of ACM. This type of work is only performed within a polyethylene enclosure for indoor operations by qualified abatement contractors. The checklist presented below is intended to provide guidance in the administration of work performed by qualified outside consultants and contractors.

1. Arrange to have Specifications prepared for the project.
2. Schedule work with input from all affected parties including but not limited to:
 - Affected City Division/Tenant,
 - Facilities Management,
 - Project Architect,
 - City of Toronto Administration,
 - City of Toronto H&S Consultant
 - JHSC/H&S Rep

3. Arrange for inspection and air monitoring services.
4. Prepare Tender Documents.
5. Pre-qualify contractors.
6. Hold a pre-bid meeting with contractors to explain the scope of work.
7. Notify staff who work in the immediate area of the asbestos removal work.
8. Notify JHSC/H&S Rep for the building.
9. Conduct a walk-through inspection of the work area with the contractor prior to starting the work to identify and document the condition of the area and any existing damage.

In addition to the above, the following items should be considered for implementation into the removal project specifications, supplementary to the regulatory requirements:

1. Inspection
 - Provides on-site monitoring of the removal work to ensure that proper work practices, waste disposal and cleanup procedures are being followed.
2. Waste and equipment decontamination enclosure system
 - Minimizes the potential for contamination due to improperly cleaned waste containers and removal equipment, especially in occupied areas.
3. Application of sealant to work area surfaces
 - Prevents any residual fibres from becoming airborne and contaminating the work area after final cleanup.
4. Settling period
 - Allows airborne fibres to settle to the ground and be removed during the final cleanup process.

These items should be considered in addition to the regulatory requirements to ensure that contamination of the area adjacent to the asbestos removal does not occur, especially in occupied areas.

G-3 EMPLOYEE TYPE 1 WORK PROCEDURES

City of Toronto has decided at this time that an experienced and qualified Abatement Contractor pre-selected by the Asbestos Plan Manager will perform all work involving ACM.

This section has been intentionally left blank, until such time that employees will be required to

conduct this level of work as specified in Regulation 278/05, *Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations*. When it is decided that this type of work will be performed in-house, a qualified Occupational Health and Safety Consultant will provide training. No work will be performed until specific training has been provided and the employee's comprehension of the work has been evaluated and accepted as adequate.

G-4 EMPLOYEE TYPE 2 WORK PROCEDURES

City of Toronto has decided at this time that an experienced and qualified Abatement Contractor pre-selected by the Asbestos Plan Manager will perform all work involving ACM.

This section has been intentionally left blank, until such time that employees will be required to conduct this level of work as specified in Regulation 278/05, *Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations*. When it is decided that this type of work will be performed in house, a qualified Occupational Health and Safety Consultant will provide training. No work will be performed until specific training has been provided and the employee's comprehension of the work has been evaluated and accepted as adequate.

G-5 EMPLOYEE TYPE 3 WORK PROCEDURES

City of Toronto has decided at this time that an experienced and qualified Abatement Contractor pre-selected by the Asbestos Plan Manager will perform all work involving ACM.

This section has been intentionally left blank, until such time that employees will be required to conduct this level of work as specified in the Regulation 278/05, *Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations*. When it is decided that this type of work will be performed, a qualified Occupational Health and Safety Consultant will provide training and the training will be equivalent to training approved by the Ministry of Training, Colleges and Universities. No work will be performed until specific training has been provided and the employee's comprehension of the work has been evaluated and accepted as adequate.

G-6 CONTRACTOR WORK PROCEDURES – MINIMAL ASBESTOS DISTURBANCES

As indicated in the following Sections, the following work procedures are provided as background to the Asbestos Plan Manager, to allow for the selection of a qualified asbestos abatement contractor. Procedures for the following work are provided:

Procedures

- | | |
|-----|--|
| G7 | Cleaning, Stripping Wax From and Waxing Asbestos-containing Floor Tiles – Type 1 Work |
| G8 | Cleaning of Asbestos-containing Debris – Type 2 Work |
| G9 | Access and Cleaning above Suspended Ceilings – Type 2 Work |
| G10 | Cleaning out of HEPA Filtered Vacuum Cleaners, Asbestos Waste Storage and Disposal – Type 2 Work |

- G11 Work with Non-friable Materials and Manufactured Products – Type 1 Work
- G12 Repairing Thermal Insulation – Type 2 Work
- G13 Asbestos Removal Using Glove Bags – Type 2 Work
- G14 Minor Asbestos Removal – Type 2 Work
- G15 Emergency Spill or Repair Response – Type 2 Work

G-7 *Cleaning, Stripping Wax From and Waxing Asbestos-Containing Floor Tiles - Type 1 Work*

Many of the floor tile (vinyl asbestos tile - VAT) applications contain asbestos fibre. The asbestos is held in place within the vinyl binding-matrix and no fibres are released during regular traffic conditions. Studies have shown that dry stripping of these applications can under some situations release fibres and become a hazard.

Work Procedure:

- 1) Avoid Frequent Stripping of Wax from Floors. Stripping of floors should be done as infrequently as possible -- no more than once a year, if at all.
- 2) Strip Wax from Floors or Clean while Wet. The floors are to be kept wet with detergent or water during the stripping operation. **DO NOT PERFORM DRY STRIPPING.** Prior to machine operation, an emulsion of chemical stripper and water is to be applied to the floor with a mop, which strips the wax and also controls fibre release during the work. The floor should be thoroughly cleaned while wet after stripping and before application of new wax.
- 3) Run Machine at Low Speed. If a variable speed control is present, the machine is to run at the lowest setting.
- 4) Select the Least Abrasive Pad. White and red colour buffing pads should be used in preference to the green coloured type. Black coloured pads should not be used under any circumstances.
- 5) Do Not Over Buff Floor. Stop stripping when the old surface coat is removed. Over stripping can damage the floor and may cause release of asbestos fibres. Do not operate a floor machine with an abrasive pad on unfinished floors.

G-8 *Cleaning Of Asbestos-Containing Debris - Type 2 Work*

Use provisions of this section when cleaning is to be performed in areas where ACM has been previously disturbed and there is visible evidence of dust and debris. This situation differs from an emergency spill, as this disturbance has occurred in an area that can be isolated.

Work Procedure:

- 1) Prior to commencing the work, notify all affected staff of the asbestos work that will

be taking place.

- 2) Perform this work during off-hours if at all possible.
- 3) Assemble all supplies and equipment necessary for performing the work.
- 4) Wear a non-powered air-purifying respirator approved for use with asbestos.
- 5) Wear disposable full body type coveralls that will not permit penetration by asbestos fibres equipped with tight fitting cuffs including head hood and rubber boots or disposable shoe covers.
- 6) Do not use compressed air.
- 7) Do not eat, drink, chew or smoke in the work area.
- 8) Disable the mechanical ventilation system servicing the work area and seal with polyethylene sheeting sealed with tape.
- 9) Separate the work area from the rest of the workplace using rope barriers. The extent of the work area will depend on the amount of work to be performed, potential for fibre release and the height of the work above floor level.
- 10) Identify the work area with clearly visible warning signs
- 11) Spray any visible pieces of ACM with a mist of amended water using a garden-type sprayer.
- 12) Place any large pieces of ACM directly into waste disposal bags.
- 13) Use a squeegee or wetted broom to gather waste debris together into a dustpan and place directly into waste disposal bag.
- 14) Clean with HEPA filtered vacuum, remaining debris and then wet clean the immediate area of the "spilled material".
- 15) Where practical (in pipe chases or porous surfaces), HEPA vacuum and wet clean the entire designated work area and spray a coat of encapsulant on surfaces in the work area.
- 16) Before leaving the work area, decontaminate protective clothing, including boots, and equipment using a HEPA vacuum or by damp wiping.
- 17) Clean all non-disposable tools and items (before leaving the work area).
- 18) Wash hands and face at the completion of the work (before leaving the work area). Damp wipe the respirator and store in a proper place.
- 19) Dispose of protective clothing and spent respirator filter cartridges as asbestos waste.

- 20) Shower at the completion of the work if contamination is suspected, before leaving work.

G-9 Access And Cleaning Above Suspended Ceilings -Type 2 Work

This section applies to work above suspended ceilings in buildings where there is likely to be a significant quantity of friable material (fireproofing or thermal pipe and duct insulation) lying on the upper surface of the ceiling tile. Significant is any visible amount of material found on the ceiling tile that can be identified as originating from the overlying or adjacent parent material.

This procedure is to be used to access ceiling spaces where fireproofing or thermal insulation has been noted to be present or where in performing routine work material is discovered on the tiles.

Work Procedure:

- 1) Perform this work during off-hours if at all possible.
- 2) Clear the immediate area of all personnel not assigned to the work.
- 3) Collect all supplies and equipment necessary for performing the work.
- 4) Wear a non-powered air-purifying respirator approved for use with asbestos.
- 5) Wear disposable full body type coveralls that will not permit penetration by asbestos fibres equipped with tight fitting cuffs including head hood and rubber boots or disposable shoe covers, safety glasses with side shields and impermeable gloves.
- 6) Do not use compressed air.
- 7) Do not eat, drink, chew or smoke in the work area.
- 8) Separate the work area from the rest of the workplace using rope barriers. The extent of the work area will depend on the amount of work to be performed, potential for fibre release and the height of the work above floor level.
- 9) Disable the mechanical ventilation system that services the work area and seal with polyethylene sheeting and tape.
- 10) Relocate moveable objects (chairs, tables, desks, coat racks, etc.) out of the work area if practical.
- 11) Cover the floor and remaining furniture and equipment in the work area with dark 8-mil rip-proof polyethylene sheeting.
- 12) Construct an enclosure with polyethylene sheeting, duct tape and/or clips from ceiling to floor to contain any disturbed materials. Work area shall be large enough to cover 1 to 3 ceiling tiles with polyethylene sheeting sealed with tape at floor and at suspended ceiling tile metal frame. Allow an adequate lap (1 metre) in the polyethylene sheeting to provide an entrance yet maintain the isolation.

- 13) For operations involving the removal of false ceilings where ACM debris is likely above or when removing 1 square meter, or less, of friable ACM, the enclosure shall include one or more transparent windows areas to allow observation of the entire work area from outside the enclosures, if the work area is not enclosed by walls.
- 14) Identify the work area with clearly visible warning signs.
- 15) Work shall proceed in a careful manner to ensure thoroughness and to minimize potential airborne contamination.
- 16) Carefully remove the minimum number of tiles required to provide employee access (usually one tile is sufficient), lift the tile straight up and slide across onto the surface of the adjacent ceiling tiles. Note that there may be interference from overhead piping, conduits, duct work, hanger wires or construction debris.
- 17) Large bulk material shall be wetted and bagged if it cannot be handled with the HEPA vacuum. Then use a HEPA vacuum to clean any remaining fallen debris or loose material on the tiles in the immediate vicinity of the opening.
- 18) After immediate tiles have been cleaned, remove carefully, one at a time, to provide access to the next row.
- 19) Clean, with HEPA vacuum or by damp wiping, ceiling tile track system and all other above-ceiling components that may retain or hold asbestos debris.
- 20) Proceed with cleaning in this manner until a sufficient number of ceiling tiles have been cleaned to allow for the work to be performed in the ceiling space.
- 21) At the completion of the cleaning work, replace the tiles, clean the area under the suspended ceiling, including polyethylene drop sheets and equipment used in the cleaning operation (ladders, scaffolding, HEPA vacuum, etc.) by HEPA vacuuming or damp wiping.
- 22) After wetting the polyethylene sheeting, dismantle the enclosure, dispose of all polyethylene sheeting and tape as asbestos waste, vacuum surfaces in the immediate area including the floor.
- 23) Before leaving the work area, decontaminate protective clothing (including boots) and equipment, etc., using a HEPA vacuum or by damp wiping.
- 24) Clean all non-disposable tools and items (before leaving the work area).
- 25) Wash hands and face at the completion of the work (before leaving the work area). Damp wipe the respirator and store in a proper place.
- 26) Dispose of protective clothing and spent respirator filter cartridges as asbestos waste.
- 27) Shower at the completion of the work if contamination is suspected, before leaving work.

G-10 Cleaning Out Of HEPA Filtered Vacuum Cleaners, Asbestos Waste Storage and Disposal - Type 2 Work

This section applies to any work force on the property.

Work Procedure:

- 1) Cleaning or emptying of contents of HEPA filtered vacuums is not permitted for minor work anywhere on the property including within vehicles parked on the premises. The contents of the vacuum shall be cleaned or emptied at the Contractor's, Maintenance Personnel's or Service Personnel's facility.
- 2) Asbestos waste may only be stored on site during the performance of the work. The waste shall be removed at the end of the job or operation.
- 3) Waste shall be placed in 6-mil polyethylene bags and sealed.
- 4) Waste bags shall be pre-labelled advising of the contents.
- 5) While handling sealed waste bags, wear a non-powered air-purifying respirator approved for use with asbestos.
- 6) While handling sealed waste bags, wear disposable full body type coveralls that will not permit penetration by asbestos fibres and is equipped with tight fitting cuffs including head hood and rubber boots or disposable shoe covers.
- 7) Transport waste to an approved and authorized land fill-site.

G-11 Work With Non-Friable Materials and Manufactured Products - Type 1 Work

This work category covers the installation, removal, breaking, cutting, drilling, abrading, grinding, sanding or vibrating of non-friable asbestos-containing building materials, other than ceiling tiles, or manufactured products containing asbestos. Typical examples of these types of materials include vinyl floor tiles, gaskets, seals, packing, friction products or cement products.

Note: Power tools, including those equipped with dust collecting devices connected to a HEPA filtration system, are not permitted in this type of work.

Work Procedure:

- 1) Collect all supplies and equipment necessary for performing the work.
- 2) Wear a non-powered air-purifying respirator approved for use with asbestos.
- 3) Wear disposable full body type coveralls that will not permit penetration by asbestos fibres equipped with tight fitting cuffs including head hood and rubber boots or disposable shoe covers, safety glasses with side shields and impermeable gloves.
- 4) Do not use compressed air.

- 5) Do not eat, drink, chew or smoke in the work area.
- 6) Before beginning work, clean visible dust from all surfaces in the work area using a damp cloth or HEPA vacuum cleaner.
- 7) Where applicable, place a drop sheet of rip-proof polyethylene sheeting on the floor of the work area to catch any dust created by the work.
- 8) Spray the material being worked on continuously with a mist of amended water to reduce dust (unless wetting creates an electrical hazard), using a garden type sprayer.
- 9) Clean dust and debris during, and at the end of the work, using a HEPA vacuum or by damp wiping.
- 10) Clean polyethylene drop sheets using a HEPA vacuum or by damp wiping. Drop sheets shall not be reused. At completion of work, drop sheets are to be wetted and disposed of as asbestos waste.
- 11) Clean all non-disposable tools and items.
- 12) Ensure that hands and face are washed at the completion of the job.
- 13) Clean the respirator by damp wiping and store in a proper manner.

G-12 Repairing Thermal Insulation - Type 2 Work

This category of work covers the repair of damaged asbestos-containing thermal insulation on ducts and piping systems only using lagging (canvas cloth) and mastic (paint adhesive i.e. glue). This does not include any removal whatsoever. Repair of thermal insulation is usually selected as the control option where damage is limited and of a minor nature (such that repair activities are not likely to cause significant disturbance to the underlying friable material) and is not likely to re-occur due to its accessibility or for other reasons.

Work Procedure:

- 1) Perform this work during off-hours if at all possible.
- 2) Clear the immediate area of all personnel not assigned to the work.
- 3) Collect all supplies and equipment necessary for performing the work.
- 4) Wear a non-powered air-purifying respirator approved for use with asbestos.
- 5) Wear disposable full body type coveralls that will not permit penetration by asbestos fibres and is equipped with tight fitting cuffs including head hood and rubber boots or disposable shoe covers, safety glasses with side shields and impermeable gloves.
- 6) Do not use compressed air.
- 7) Do not eat, drink, chew or smoke in the work area.

- 8) Separate the work area from the rest of the workplace using rope barriers. The extent of the work area will depend on the amount of work to be performed, potential for fibre release and the height of the work above floor level.
- 9) Identify the work area with clearly visible warning signs.
- 10) Disable the mechanical ventilation system that services the work area and seal with polyethylene sheeting and tape.
- 11) Relocate moveable objects (chairs, tables, desks, coat racks, etc.) out of the work area if practical.
- 12) Place a drop sheet of rip-proof polyethylene sheeting on the floor of the work area to catch any dust or debris created by the work.
- 13) Pre-clean insulation to be repaired and any dust or debris in the immediate area using a HEPA vacuum.
- 14) Spray a fine mist of amended water (using a garden-type sprayer) on the damaged area of insulation.
- 15) Do not remove any existing jacket material.
- 16) Apply approved encapsulant to one side of a piece of 6-ounce canvas.
- 17) Apply the piece of canvas to the damaged area. Paint the outside area of the canvas with encapsulant. Ensure that the area of repair and six inches on all sides are coated with encapsulant.
- 18) Following completion of repair work, clean polyethylene drop-sheets and surrounding area, by damp wiping or HEPA vacuuming.
- 19) After wetting the polyethylene drop sheets, repeatedly fold on to itself, whereby trapping any debris that may be present in the folds. Dispose of all polyethylene sheeting and tape as asbestos waste. Using a HEPA vacuum, clean surfaces in the immediate area including the floor.
- 20) Before leaving the work area, decontaminate protective clothing (including boots) and equipment, etc., using a HEPA vacuum or by damp wiping.
- 21) Clean all non-disposable tools and items (before leaving the work area).
- 22) Wash hands and face at the completion of the work (before leaving the work area). Damp wipe the respirator and store in a proper place.
- 23) Dispose of protective clothing and spent respirator filter cartridges as asbestos waste.
- 24) Shower at the completion of the work if contamination is suspected, before leaving work.

G-13 Asbestos Removal Using Glove Bags - Type 2 Work

Glove Bag use is appropriate for asbestos removal in easily accessible areas when the full enclosure method is not justified and the Glove Bags can be used in accordance to the procedures specified.

Work Procedure:

- 1) Glove bag Removal Method on work where one square metre or more of friable asbestos-containing material will be removed, requires a Notice of Project (NOP) signed by the Ontario Ministry of Labour. A copy of the signed NOP must be available on site prior to beginning the work. All materials and work are to conform to requirements as detailed on the NOP.
- 2) Perform this work during off-hours if at all possible.
- 3) Clear the immediate area of all personnel not assigned to the work.
- 4) Collect all supplies and equipment necessary for performing the work.
- 5) Wear a non-powered air-purifying respirator approved for use with asbestos.
- 6) Wear disposable full body type coveralls that will not permit penetration by asbestos fibres and is equipped with tight fitting cuffs including head hood and rubber boots or disposable shoe covers, safety glasses with side shields and impermeable gloves.
- 7) Do not use compressed air.
- 8) Do not eat, drink, chew or smoke in the work area.
- 9) Separate the work area from the rest of the workplace using rope barriers. The extent of the work area will depend on the amount of work to be performed, potential for fibre release and the height of the work above floor level.
- 10) Identify the work area with clearly visible warning signs.
- 11) Relocate moveable objects (chairs, tables, desks, coat racks, etc.) out of the work area if practical.
- 12) Disable the mechanical ventilation system that services the work area and seal with polyethylene sheeting and tape.
- 13) Shut off all sources of heat for pipe systems.
- 14) Only new Glove Bags without modification or defects may be used.
- 15) The glove bag shall be made of material that is impervious to asbestos and sufficiently strong to support the weight of material the bag will hold.
- 16) Glove bag shall be equipped with:

- Sleeves and gloves that are permanently sealed to the body of the bag to allow the worker to access and deal with the insulation and maintain a sealed enclosure throughout the work period,
 - Valves or openings to allow insertion of a vacuum hose and the nozzle of a water sprayer while maintaining the seal to the pipe, duct or similar structure,
 - A tool pouch with a drain,
 - A seamless bottom and a means of sealing off the lower portion of the bag, and
 - A high strength double throw zipper and removable straps, if the bag is to be moved during the removal operation.
- 17) A glove bag shall not be used to remove insulation from a pipe, duct or similar structure if,
- It may not be possible to maintain a proper seal for any reason including, without limitation,
 - The condition of the insulation, or
 - The temperature of the pipe, duct or similar structure, or
 - The bag could become damaged for any reason including without limitation,
 - The type of jacketing, or
 - The temperature of the pipe, duct or similar structure.
- 18) Immediately before the glove bag is attached, the insulation jacketing or coating shall be inspected for damage or defects, and if any damage or defect is present, it shall be repaired.
- 19) The glove bag shall be inspected for damage or defects,
- Immediately before it is attached to the pipe, duct or other similar structure, and
 - At regular intervals during its use.
- 20) If damage or defects are observed when the glove bag is inspected, the glove bag shall be disposed of.
- 21) If damage or defects are observed when the glove bag is inspected, prior to beginning removal work, or at any other time,
- The use of the glove bag shall be discontinued,
 - The inner surface of the glove bag and the contents, if any, shall be thoroughly

wetted,

- The glove bag and the contents, if any, shall be removed and placed in the asbestos waste container, and
 - The work area shall be cleaned by vacuuming with a vacuum equipped with a HEPA filter before removal work is resumed.
- 22) Glove Bags cannot be used to remove pipe insulation that has a jacketing made of aluminium with a thickness exceeding 0.51 mm (24 gauge) or a jacketing made of steel.
 - 25) Relocate moveable objects (chairs, tables, desks, coat racks, etc.) out of the work area if practical.
 - 23) Place a drop sheet of rip-proof polyethylene sheeting on the floor of the work area to catch any dust or debris created by the work
 - 24) Vacuum surfaces of insulating material using a HEPA vacuum. Pre-clean any dust or debris in the work area by damp wiping or using a HEPA vacuum.
 - 25) Friable material that will be disturbed or removed during the work shall be thoroughly wetted before the glove bag is attached and at regular intervals during the work.
 - 26) Remove all obstructions from pipes to allow sufficient access.
 - 27) Insure that any knife to be used inside the Glove Bag has a retractable blade and that any saw used is of the flexible wire type. Any brush used inside the Glove Bag must not have metal bristles.
 - 28) Place any tools necessary to remove insulation in the bottom of the Glove Bag. Zip the bag onto the pipe or duct and seal all openings with the straps (do not use duct tape to secure Glove Bags to pipe). For valve Glove Bags, seal valve cover with tape or equivalent.
 - 29) Insert nozzle of spray pump (containing amended water) into Glove Bag through the valve. Place hands into the gloves and place the tools into the tool pouch.
 - 30) Cut or remove exterior insulation covering where applicable to expose asbestos pipe covering. Wet exposed pipe covering with water to suppress any dust. Remove insulation and place in the bottom of the Glove Bag. Wash exposed portion of pipe or duct and top section of bag. Saturate exposed insulation on the pipe and contents of the bag using the amended water sprayer. Any jagged or sharp edges that have been produced during the removal of the metal jacketing shall be handled in such a way so as to minimize the possibility of ripping or puncturing the Glove Bag.
 - 31) Ensure that the pipe and other surfaces are clean of visual residue, dirt or dust prior to removal or relocation of the Glove Bag.

- 32) After cleaning of the pipe, spray encapsulant on the exposed ends of the insulation on the pipe and the contents of the Glove Bag.
- 33) To remove Glove Bag after completion of stripping, wash top section and tools thoroughly and place all tools into the tool pouch.
- 34) Place a labelled waste disposal bag under and around the bottom of the Glove Bag. Tools may be removed from the Glove Bag by placing them in the glove, taping the glove in two locations, cutting it off between the tape and placing in a bucket of water.
- 35) Place the Glove Bag into the waste disposal bag and seal the disposal bag. Dispose of as asbestos waste.
- 36) After removal of the Glove Bag, ensure that the pipe is clean of all residues. If necessary, vacuum all surfaces of the pipe using a HEPA vacuum.
- 37) Cover exposed ends of pipe insulation with tape.
- 38) Clean all surfaces in the work area and equipment using a HEPA vacuum or by damp wiping.
- 39) After wetting the polyethylene drop sheets, repeatedly fold on to itself whereby trapping any debris that may be present in the folds. Dispose of all polyethylene sheeting and tape as asbestos waste, vacuum surfaces in the immediate area including the floor.
- 40) Before leaving the work area, decontaminate protective clothing (including boots) and equipment, etc., using a HEPA vacuum or by damp wiping.
- 41) Clean all non-disposable tools and items (before leaving the work area).
- 42) Wash hands and face at the completion of the work (before leaving the work area). Damp wipe the respirator and store in a proper place.
- 43) Dispose of protective clothing and spent respirator filter cartridges as asbestos waste.
- 44) Shower at the completion of the work if contamination is suspected.

G-14 Minor Asbestos Removal ($\leq 1 \text{ m}^2$) - Type 2 Work

Minor removal means planned removal of a small amount of ACM following established procedures. The removal of insulation from one pipe fitting (where the use of a glove bag is not possible) to gain access to a pipe or the removal of a small section of fireproofing to attach a fastening device are examples of minor removals.

This section of work requires the construction of an enclosure for minor removal work. Where an enclosure cannot be constructed to isolate the immediate work item it may be necessary to consider the whole room as the work area. If the room will serve as an enclosure then all openings will have to be sealed, the mechanical system servicing the room disabled and the ventilation ducts to and from

the work area will also have to be sealed. However, it may still be required to cover the floor, walls and ceiling with polyethylene sheeting.

Work Procedure:

- 1) Perform this work during off-hours if at all possible.
- 2) Clear the immediate area of all personnel not assigned to the work.
- 3) Collect all supplies and equipment necessary for performing the work.
- 4) Wear a respirator appropriate for the work being completed and that is approved for use with asbestos.
- 5) Wear disposable full body type coveralls that will not permit penetration by asbestos fibres and is equipped with tight fitting cuffs including head hood and rubber boots or disposable shoe covers, safety glasses with side shields and impermeable gloves.
- 6) Do not use compressed air.
- 7) Do not eat, drink, chew or smoke in the work area.
- 8) Separate the work area from the rest of the workplace using rope barriers. The extent of the work area will depend on the amount of work to be performed, potential for fibre release and the height of the work above floor level.
- 9) Identify the work area with clearly visible warning signs.
- 10) Disable the mechanical ventilation system that services the work area or if not possible, that would service the enclosure and seal with polyethylene sheeting and tape.
- 11) Relocate moveable objects (chairs, tables, desks, coat racks, etc.) out of the work area if practical.
- 12) Construct a frame for the enclosure from 2x4 wood studs or other suitable material (i.e. scaffolding).
- 13) If the potential exists for the disturbance of ACM during the construction of the enclosure, wear a respirator and suitable protective clothing. Ensure that the enclosure is of adequate size to permit the storage of equipment and waste.
- 14) Cover the walls, floor with 8-mil rip-proof polyethylene sheeting (if no debris is present on the floor surfaces) and ceiling of the enclosure with 6-mil clear polyethylene sheeting sealed with duct tape. Overlapping curtains of polyethylene sheeting must be fitted on each side of the entrance to the enclosure (curtain flaps may require weights at the bottoms to ensure proper closing).
- 15) Shut off or isolate electrical power within the enclosure.

- 16) Pre-clean any visible dust or debris in the enclosure using a HEPA vacuum or by damp wiping.
- 17) For thermal insulation applications, carefully cut the outer cover of thermal insulation on the section being worked on. Thoroughly wet the ACM with amended water using a garden sprayer.
- 18) For fireproofing applications, spray repeated fine mist applications of amended water using a garden sprayer. Limit wetting only to area to be removed.
- 19) Remove wetted asbestos material and covering jackets in small sections directly into a 6-mil labelled polyethylene bag.
- 20) Clean surfaces exposed by asbestos removal with a brush and wet sponge. Ensure that all surfaces of piping and other equipment are clean of all residues.
- 21) Immediately after removal of asbestos, clean all surfaces and equipment within the work area including, polyethylene sheeting, using a HEPA vacuum or by damp wiping.
- 22) Seal all surfaces of pipe or other equipment, and ends of exposed insulation which remains, with a suitable encapsulant.
- 23) After satisfactory completion of cleaning and before leaving the work area, decontaminate protective clothing (including boots) and equipment, etc., using a HEPA vacuum or by damp wiping.
- 24) Clean polyethylene drop-sheets and surrounding area, by damp wiping or HEPA vacuuming.
- 25) After wetting the polyethylene sheeting of the enclosure, repeatedly fold on to itself where by trapping any debris that may be present in the folds. Dispose of all brushes, sponges, polyethylene sheeting and tape as asbestos waste, vacuum surfaces in the immediate area including the floor.
- 26) Wash hands and face at the completion of the work (before leaving the work area). Damp wipe the respirator and store in a proper place.
- 27) Clean all non-disposable tools and items (before leaving the work area).
- 28) Dispose of protective clothing and spent respirator filter cartridges as asbestos waste.
- 29) Shower at the completion of the work if contamination is suspected, before leaving work.

G-15 *Emergency Spill or Repair Response - Type 2 Work*

Emergency Response refers to the cleanup of a limited, unintentional spill, of asbestos-containing insulation or spray application, which must be responded to immediately. An emergency would normally be the result of damage to a mechanical system with asbestos-containing thermal insulation or a water leak affecting a fireproofing or acoustic spray application where the friable material has dislodged. Typical examples include vandalism in a public area, or spillage due to water leaks (i.e. roof leak through fireproofing).

THIS PROCEDURE IS TO BE USED FOR EMERGENCY SITUATIONS ONLY AND NOT AS A RESULT OF POOR PLANNING.

Approval must be obtained from the Asbestos Plan Manager or an assigned designate prior to using the Emergency Repairs procedure.

Work Procedure:

- 1) Perform the work during off-hours if at all possible.
- 2) Clear the immediate area of all personnel not assigned to the work.
- 3) Insure that trained personnel are available to perform the work.
- 4) Building-staff are not to attempt a cleanup. Report to the Asbestos Plan Manager or an assigned designate after vacating the immediate area.
- 5) Assemble all supplies and equipment necessary for performing the work. Do not use Building Equipment for the clean up.
- 6) If possible, disable the mechanical ventilation system in the vicinity of the work area.
- 7) Separate the work area from the rest of the workplace using rope barriers. The extent of the work area will depend on the amount of work to be performed, potential for fibre release and the height of the work above floor level.
- 8) Identify the work area with clearly visible warning signs.
- 9) Wear a respirator appropriate for the work being completed and that is approved for use with asbestos.
- 10) Wear disposable full body type coveralls that will not permit penetration by asbestos fibres and is equipped with tight fitting cuffs including head hood and rubber boots or disposable shoe covers, safety glasses with side shields and impermeable gloves.
- 11) Do not use compressed air.
- 12) Do not eat, drink, chew or smoke in the work area.
- 13) Clean any loose or fallen material in the immediate vicinity of the spill by using a HEPA filtered vacuum cleaner or by damp wiping. Work from outside the spill area

to the centre. Do not walk through spill material.

- 14) Only perform work necessary to alleviate the immediate hazard.
- 15) If additional disturbance of ACM is possible during the cleanup then place a drop sheet of rip-proof polyethylene sheeting on the floor of the work area to catch any dust or debris.
- 16) For the limited removal of thermal insulation, carefully cut the outer layer of thermal insulation while spraying a mist of amended water on the section being worked on. Thoroughly wet ACM using garden sprayer equipment.
- 17) Remove wetted asbestos material and covering jackets in small sections directly into a 6-mil labelled polyethylene bag.
- 18) Maintain asbestos in wet condition at all times during removal and or handling operations. Dispose of material in waste bag and seal tightly.
- 19) Clean surfaces exposed by asbestos removal by brushing and wet wiping. Ensure that all surfaces of piping and other equipment are clean of all residues.
- 20) Immediately after removal of insulation, clean all surfaces and equipment within the work area, including polyethylene drop sheet, using HEPA vacuum or by damp wiping.
- 21) Seal all surfaces of pipe and exposed ends of the insulation or other remaining equipment with a suitable encapsulant.
- 22) Refer to other assigned procedures should more extensive work be required.
- 23) Remove polyethylene floor covering, fold inward, and place in 6-mil polyethylene waste bags. Seal bags tightly and dispose of as asbestos waste.
- 24) Before leaving the work area, decontaminate protective clothing (including boots) and dispose of as asbestos waste.
- 25) Clean all non-disposable tools and items (before leaving the work area).
- 26) Wash hands and face at the completion of the work (before leaving the work area). Damp wipe the respirator and store in a proper place.
- 27) Dispose of protective clothing and spent respirator filter cartridges as asbestos waste.
- 28) Shower at the completion of the work if contamination is suspected.

APPENDIX H
REASSESSMENT OF ACM

REASSESSMENT OF ACM

Upon completion of Reassessment, fill out the following form in its entirety and file in this facility's AMP and survey.

Building Name/Address: _____

Dates of Reassessment: _____

Organization completing Asbestos Reassessment:_____

Name of surveyor:_____

Name of surveyor: _____

Others present: _____

Signature of surveyor: _____

Signature of surveyor: _____

Summary of findings: (If no deterioration noted, indicate here – Specifically indicate only areas requiring action).

[illegible]

Room or Location	Material	Comments regarding condition – Disturbed/Undisturbed (if other, explain)	Action Required

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.
- .2 Read this Section in conjunction with the following Sections:
 - .1 Section 03 20 00: Concrete Reinforcing
 - .2 Section 03 30 00: Cast-In-Place Concrete
 - .3 Section 03 35 00: Concrete Floors and Finishing

1.2 **REFERENCES**

- .1 Conform to the latest edition of the following:
 - .1 CAN/CSA-S136 - North American Specification for the Design of Cold-Formed Steel Structural Members
 - .2 CSA-A23.1 - Concrete Materials and Methods of Concrete Construction
 - .3 CSA O121 - Douglas Fir Plywood
 - .4 CSA S269.1 - Falsework and formwork
 - .5 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **SUBMITTALS**

- .1 Shop Drawings: Submit Shop Drawings showing spacing of form ties for architectural concrete walls in accordance with Section 01 33 00. Show size of tie hole, plastic plug and plug recess.

1.4 **PRODUCT DELIVERY, STORAGE AND HANDLING**

- .1 Store materials on Site in a manner to prevent damage thereto. Protect from the weather. Comply with CSA-A23.1.
- .2 Protect Work of this section from damage. Protect other Work from damage resulting from this Work. Replace damaged Work which cannot be satisfactorily repaired.

1.5 **TOLERANCES**

- .1 Construct forms to produce plumb and level concrete, and true to linear building lines. Maximum variations (not accumulative) shall conform to CSA-A23.1.
- .2 A permitted variation in one part of the construction or in one section of the Specification shall not be construed as permitting violation of more stringent requirements for any other part of the construction, or in any other Specification section.

2 Products

2.1 **MATERIALS**

.1 Forms

- .1 Plywood: CSA O121, G1S; Douglas fir plywood, sheets as large as practical, exterior grade, waterproof glue, edges sealed with oil-based sealer.
- .2 Prefabricated steel forms: CAN/CSA S136-M; free of irregularities, dents, sags, rust, and materials that can discolour concrete finish.
- .3 Used formwork may be used for surfaces which will be concealed.
- .2 Form ties: Adjustable snap ties, formed to break 25 mm from surface of concrete after form removal, with a minimum working strength of 13 kN. Do not use wire ties.
- .3 Falsework materials: To CSA S269.1. Where patented accessories, fabricated forms, shoring or scaffolding units are to be used, follow manufacturer's instructions for load carrying capacity and bracing.
- .4 Plywood form liner: Medium density overlaid plywood marked "COFI Form Plus"; "Ultraform" by Richmond Plywood Corporation, or "Pourform 107" by Ainsworth Lumber Company Ltd.
- .5 Form tape: Pressure sensitive plastic film.
- .6 Form ties: Threaded internal disconnecting, spreader type, adjustable in length, minimum working strength of 13 kN when fully assembled. Ties to have maximum break-back of 38 mm from concrete surface. Ties shall incorporate removable tapered plastic spreader cones, with a setback of 38 mm. (Taper of spreader shall match taper of tie hole plugs).
- .7 Tie hole plugs: Plastic set back plugs, grey to match concrete, 38 mm setback, to fit tightly into tie holes. Include for tie hole plug quantity on the basis of 750 mm each way plug spacing pattern.
- .8 Bar type waterstops: Preformed bentonite and butyl rubber-based waterstop, "Waterstop RX 101" (others, see above) by DRE Industries Inc. or approved equivalent. Adhesive for concrete, steel, or PVC: water based "WB-Adhesive" by DRE Industries Inc. or approved equivalent.
- .9 Rubber waterstops: "Durajoint" by Sika, hot fused joints, type 4B, complete with factory welded corner and intersecting pieces.
- .10 Bar type waterstops: Preformed water-swelling elastic rubber, "Adeka Ultraseal MC-2010M" as distributed by Form and Build Supply Inc. Securement to substrate shall be either adhesive or concrete nail with packing depending on substrate, as recommended by waterstop manufacturer.
- .11 Tubular forms: Sonoco Products Ltd. "Sonotube" spirally wound fibre forms free of dents and other irregularities, treated internally with release material.
- .12 Tubular forms: Newark Paperboard Products "Poli-NewForm" fibre forms with seamless plastic liner.
- .13 Chamfer strips: 13 x 13 mm triangular fillets milled from clear, straight-grain pine, surfaced each side, or extruded vinyl type.

- .14 Formwork release agent: Imperial Oil "Filmo No 40", Goodco "Noxcrete", W.R. Meadows "Duogard", Euclid "Super Slip", CPD Chemical Form Release Agent or Dayton Superior "Clean-Strip (J-1)". (For formed concrete Work in contact with the soil, use a material that does not alter sulphate resistant qualities of the concrete).
- .15 Dovetail anchor slots: Minimum 0.6 mm thick Z275 galvanized steel with temporary insulation fill in slots; slots sized to receive dovetail anchors specified in Section 04 22 00.

3 Execution

3.1 **FORMWORK**

- .1 Construct formwork in accordance with CSA-A23.1, except where shown otherwise. Do not leave lumber in concrete.
- .2 Construct falsework in accordance with CSA S269.1.
- .3 Obtain Consultant's approval in writing for use of earth cuts as forms for vertical sides of footings and other Work not exposed to view. If approved, hand trim sides and bottoms and remove loose earth before placing concrete.
- .4 Assume full responsibility for the complete design and engineering of formwork including shoring and bracing to resist loads due to wet concrete, forms, wind, etc., and other forces arising from use of equipment to place concrete.
- .5 Do not set shoring and scaffolding on frozen subgrade. Continuously monitor safety of scaffolding.
- .6 Apply formwork release agent by spray in accordance with manufacturer's recommendations. Ensure surfaces of form receive a uniform coating.
- .7 Align form joints and make watertight. Keep form joints to a minimum.
- .8 Form for depressions, recesses, chases, reglets, anchorages and keys required in concrete.
- .9 Set floor screeds with true and straight top edge to proper elevation.
- .10 Form 13 mm x 13 mm minimum chamfered edges on exposed concrete corners unless shown otherwise. Set chamfer strips to achieve a smooth finish and consistent chamfer size throughout length of concrete.
- .11 Construct forms for concrete exposed in the finished Work to achieve the following:
 - .1 Grout-tight forms at corners, panel joints, recesses, arrises and at construction joints to prevent cement paste from leaking.
 - .2 Accurate alignment of concrete surfaces.
 - .3 Surfaces without indentations other than those shown.
 - .4 Sharp and straight corners.
- .12 Use full-size contact form sheeting panels wherever possible. Carefully install contact surfaces of formwork to produce neat and symmetrical joint patterns. Joints shall be either vertical or horizontal and, where possible, stagger so as to maintain structural continuity. Back vertical joints solidly and nail edges of abutting sheets to same stud. Likewise solidly

back horizontal joints. Take care to ensure adjacent form panels fit accurately, tight and flush. Use straight lumber.

- .13 Align forms to ensure no visible defects appear on finished Work.
- .14 Locate wall form ties in accordance with reviewed Shop Drawings; align on a particular member both vertically and horizontally. Arrange reuse of forms so tie holes are also reused. Tighten form ties, particularly at corners.
- .15 Form slab soffits using full size panels where possible. Keep number of smaller size panels to a minimum.
- .16 Take particular care in forming corners and openings. Ensure formwork is tight and braced so no movement occurs.
- .17 Cleaning and tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.2 **CONSTRUCTION JOINTS**

- .1 Form construction joints where required and where shown. Construction joints shall conform to CSA-A23.1.
- .2 Form 50 mm x 100 mm bevelled shear keys full length on construction joints, unless detailed otherwise.

3.3 **WALL CONTROL JOINTS**

- .1 Form "vee" groove control joints to details shown.

3.4 **INSTALLATION OF BAR TYPE BENTONITE WATERSTOPS**

- .1 Install continuous waterstops in all pour joints (i.e. wall-to-slab joint) of a concrete structure that is waterproofed by a bentonite clay waterproofing system or as shown.
- .2 Brush clean debris, dirt, and rocks from dry concrete surface. Verify surfaces are dry.
- .3 Ensure proper waterstop placement for sufficient concrete coverage. Install waterstop along interior side of the outer row of steel reinforcement to allow for minimum concrete cover.
- .4 Apply adhesive by roller or brush to 125 microns thick x width of waterstop to prepared concrete surfaces.
- .5 Allow adhesive to dry ten to fifteen minutes or until adhesive appears black in colour.
- .6 Remove release paper from waterstop and press firmly into dried adhesive. Apply pressure for minimum fifteen seconds to ensure adhesion.
- .7 Butt coil ends of waterstop together to form continuous installation. Do not overlap ends.

3.5 **INSTALLATION OF RUBBER WATERSTOPS**

- .1 Using a trowel, finish smooth that portion of concrete where waterstop is to be placed before concrete has set.

- .2 Install swelling type rubber waterstops in accordance with manufacturer's directions. Join edges minimum 50 mm.
- .3 Fix the waterstop close up against the substrate, without leaving any gap between the surface and the waterstop.

3.6 **STRIPPING FORMWORK**

- .1 Strip (regular) formwork in accordance with CSA-A23.1. Forms may be removed any time after three days from date of placing concrete or otherwise as directed by Consultant. (Remove plastic spreader cones from architectural form ties in preparation for installation of tie hole plugs or grouting application).
- .2 Strip formwork for soffits of beams, slabs and other spanning members which support weight of concrete only when concrete has reached 70% of its compressive strength, but under no circumstances shall formwork be stripped before seven days after pouring. Reshore concrete for fourteen additional days concurrently.
- .3 Strip formwork for beam and slab sides and other concrete not supporting weight of concrete only when no damage will result from stripping operations.
- .4 Strip fibre forms off architectural concrete two days after pouring, using power operated saw. To strip form, set power saw blade slightly less than thickness of the form, make two vertical cuts and remove form. Then, using a broad bladed tool, carefully pry form off with short strokes by pushing handle toward column. Exercise extreme care so not to mar concrete surface. After stripping, replace form halves on column and wire in place to protect column during construction. Leave around columns until after scaffolding and other formwork have been removed at end of construction to ensure column protection.
- .5 Be responsible for the safety of structure, both before and after removal of forms until concrete has reached its specified twenty-eight day compressive strength.
- .6 Take particular care when removing forms to ensure no damage occurs at corners, arris and the like.
- .7 To help avoid colour variations in architectural concrete, ensure length of time between concrete placing and form removal is approximately the same for each portion of Work.
- .8 In hot weather, wood forms remaining in place are not adequate for curing purposes. Instead, loosen forms as soon as practical without damage to the concrete, and run a water sprayer such as a soil soaker hose on the inside face of forms so as to keep concrete moist. In any case, loosen forms only following time frames specified for stripping.
- .9 In cold weather, defer removal of formwork or replace formwork with insulation blankets, to avoid thermal shock and consequent cracking of concrete surface.
- .10 Install tie hole plugs immediately following removal of spreader cones. Install to a snug fit, maximum setback from concrete surface as specified.
- .11 When concrete is dry, install temporary polyethylene rope in reglets to prevent contamination of same.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.
- .1 Read this Section in conjunction with the following Sections:
 - .1 Section 03 11 00: Concrete Forming
 - .2 Section 03 30 00: Cast-In-Place Concrete
 - .3 Section 03 35 00: Concrete Floors and Finishing

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 CSA-A23.1 - Concrete Materials and Methods of Concrete Construction
- .2 CAN/CSA G30.18-M - Billet-Steel Bars for Concrete Reinforcement
- .3 OPSS 905 - Ontario Provincial Standard Specification Construction Specification for Steel Reinforcement for Concrete
- .4 OPSS 1443 - Ontario Provincial Standard Specification Material Specification for Organic Coatings for Steel Reinforcement
- .5 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **SUBMITTALS**

.1 Shop Drawings

- .1 Submit Shop Drawings in the form of bar lists and placing drawings for review in accordance with Section 01 33 00.
- .2 Draw placing drawings to a scale not smaller than 1:50 and include plans, elevations, sections and details. Drawings shall be in accordance with the latest edition of Reinforcing Steel Institute of Canada's (RSIC) "Manual of Standard Practice".
- .3 Show openings in walls as to position and size. Cooperate with trades requiring openings to ascertain necessary information.
- .4 Show embedded items including conduits.

.2 Test Reports

- .1 Submit certification from reinforcing steel manufacturer confirming compliance of supplied Products to specified CSA standard.

1.4 **PRODUCT DELIVERY, STORAGE AND HANDLING**

- .1 Store materials on Site in a manner to prevent damage thereto. Protect from the weather. Comply with CSA-A23.1, clause 9.
- .2 Protect Work of this section from damage. Protect other Work from damage resulting from this Work. Replace damaged Work which cannot be satisfactorily repaired.

1.5 **TESTS OF REINFORCING**

- .1 Refer to "Quality Control" in Section 01 10 00 – General Requirements.

2 Products

2.1 **MATERIALS**

- .1 Reinforcing steel: Conforming to CAN/CSA G30.18-M, Grade 400 (350).
- .2 Mesh reinforcing: Conforming to CSA G30.5-M, flat sheets (rolls not acceptable).
- .3 Chairs and spacers: As manufactured by Drummond and Reeves Ltd., Acrow Richmond, Superior Concrete Accessories Ltd. or Max Frank GmbH & Co., of sufficient strength to rigidly support weight of reinforcement and construction loads.
 - .1 Use non-corrosive type over metal floor deck.
 - .2 Use chairs with flat plate base for reinforcing over rigid insulation.
- .4 Epoxy grout for dowels/rebars: conforming to ASTM C-881, 100% solids high modulus high strength epoxy gel adhesive; J-51 by Dayton Superior or Anchor Fix 3/Sikadur 35 by Sika Canada Inc.

2.2 **FABRICATION OF REINFORCING STEEL**

- .1 Fabricate reinforcing steel in accordance with reviewed Shop Drawings.
- .2 Bend steel cold; no heating will be permitted. Fabricate reinforcement conforming to CSA-A23.1, Clause 12.
- .3 Ship bundles of reinforcing steel, clearly identified in accordance with reviewed bar lists.

3 Execution

3.1 **EXAMINATION**

- .1 Inspect formwork to ensure it has been completed and adequately braced in place before commencing to place reinforcement.

3.2 **PLACING OF REINFORCING STEEL**

- .1 Place reinforcing in accordance with CSA-A23.1, Clause 12, and reviewed placing Drawings. Support with chairs or spacers in as close a spacing as possible to prevent displacement of reinforcement from intended bar position, before and during placing of concrete. Pieces of block, wood, etc. are not acceptable as chairs and spacers.
- .2 Before placing, remove all loose scale, dirt, concrete residue from previous pours, oil or other coatings, which would reduce bond.
- .3 Turn the ends of tie wire towards the interior of the concrete.

- .4 Do not eliminate or displace reinforcement to accommodate hardware to be embedded in concrete.
- .5 Replace kinked and bent bars not called for on Drawings.
- .6 Bars shall be in lengths as long as possible. Where bars are joined, lap at least the length required by CSA-A23.1 unless shown otherwise.
- .7 Lap wire mesh sections at least 150 mm and wire together securely.
- .8 Unless shown otherwise on Drawings, provide reinforcing to housekeeping pads as follows:
 - .1 100 mm thick pad: 10M at 300 mm o.c. each way middle layer.
 - .2 150 mm thick pad: 15M at 300 mm o.c. each way middle layer.

3.3 **ANCHORING OF DOWELS OR REINFORCING BARS**

- .1 Drill holes in accordance with grout manufacturer's printed directions.
- .2 Blow out dust and debris from holes with compressed air.
- .3 Dispense grout cartridges with a dispensing gun, filling anchoring holes.
- .4 Insert dowel or reinforcing bar, turning slowly during insertion. After insertion, holes should be full of epoxy.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

.1 Labour, Products, equipment and services necessary to complete the Work of this section.

.1 Read this Section in conjunction with the following Sections:

.1 Section 03 11 00 - Concrete Forming

.2 Section 03 20 00 - Concrete Reinforcing.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- | | | |
|-----|---------------------|--|
| .1 | ASTM A307 | - Carbon Steel Externally Threaded Standard Fasteners |
| .2 | ASTM A563M | - Carbon and Alloy Steel Nuts [Metric] |
| .3 | ASTM C260 | - Specification for Air-Entraining Admixtures for Concrete |
| .4 | ASTM C881 | - Specification for Epoxy-Resin-Base Bonding System for Concrete |
| .5 | ASTM C494 | - Specification for Chemical Admixtures for Concrete |
| .6 | ASTM C920 | - Standard Specification for Elastomeric Joint Sealants |
| .7 | ASTM C 1116 | - Standard Specification for Fiber-Reinforced Concrete |
| .8 | ASTM C 1550 | - Standard Test Method for Flexural Toughness of Fiber Reinforced Concrete (Using Centrally Loaded Round Panel) |
| .9 | ASTM C 1579 | - Standard Test Method for Evaluating Plastic Shrinkage Cracking of Restrained Fiber Reinforced Concrete (Using a Steel Form Insert) |
| .10 | ASTM C 1609 | - Standard Test Method for Flexural Performance of Fiber-Reinforced Concrete |
| .11 | CAN/CSA-A3001 | - Cementitious Materials for Use in Concrete |
| .12 | CSA-A23.1-14 | - Concrete Materials and Methods of Concrete Construction |
| .13 | CSA-A23.2 | - Methods of Test for Concrete |
| .14 | CSA-G40.20/G40.21-M | - General Requirements for Rolled or Welded Structural Quality Steel |

- .15 CISC/CPMA 2.75 - Canadian Institute of Steel Construction Standard 2.75 - A Quick Drying Primer for Use on Structural Steel
- .16 CAN/CSA G164-M - Hot-Dip Galvanizing of Irregularly Shaped Articles
- .17 SDI/ANSI C - 2011 - Standard for Composite Steel Floor Deck – Slabs
- .18 AODA - Accessibility for Ontarians with Disabilities Act

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 The flooring Contractor shall supply the concrete as per CSA A23.1-14.
- .2 Store materials on Site in a manner to prevent damage thereto. Protect from weather. Comply with CSA-A23.1-14, Clause 5.1.
- .3 Protect Work of this section from damage. Protect other Work from damage resulting from this Work. Repair damaged Work to the satisfaction of Consultant at no cost to Owner.

1.4 ENVIRONMENTAL CONDITIONS

- .1 Conform to CSA-A23.1-14, Clause 7.4.
- .2 During cold weather, Provide temporary heating and enclosures required. Mix, place and protect concrete in accordance with CSA-A23.1-14, Clause 7.4.
- .3 Designate areas for environmentally responsible disposal of excess concrete and truck washout.

1.5 TOLERANCES

- .1 Concrete in place shall be plumb, level and true to linear building lines. Maximum variations (not accumulative) shall conform to CSA-A23.1-14, Clause 6.4.
- .2 A permitted variation in one part of the construction or in one section of the Specification shall not be construed as permitting violation of the more stringent requirements for any other part of the construction, or in any other Specification section.

1.6 INSPECTION AND TESTS

- .1 Refer to “Quality Control” in Section 01 10 00 – General Requirements.
- .2 Materials and concrete Work will be inspected and tested for conformance to CSA-A23.1-14 and to Specifications by an independent inspection/testing company selected and paid for by the Owner.
- .3 Tests include the following:
 - .1 Obtaining certification of cement.
 - .2 Tests of aggregates.
 - .3 Test for setting mixes of concrete and design of mixes.
 - .4 Concrete cylinder test. Three cylinders from each day's placement for each 110 m³ of concrete or for each 30 m³ of concrete placed in small amounts on successive days.

- .5 Air content test and slump test which will be made on same batch of concrete from which test cylinders are made.
- .4 Tests will be made in accordance with CSA-A23.2.
- .5 Inspection/testing company's reports of tests will be forwarded to Consultant and Contractor with an opinion or reason for any abnormalities noted thereon.
- .6 Inspection/testing company will inspect and review placement of reinforcing steel bars and verify size of reinforcing in accordance with reviewed shop and placing Drawings prior to concrete placement. Any and all irregularities may deem installation to be unacceptable and must be rectified prior to concrete placement. Reports of inspection will be forwarded by the inspection/testing company to Consultant and Contractor.

1.7 **SUBMITTALS**

- .1 Product catalogues: Submit as Shop Drawings, up-to-date catalogue of Products proposed for use under this section in accordance with Section 01 33 00. Include the following in submittal:
 - .1 Specified admixtures
 - .2 Column anchor bolts
 - .3 Premoulded joint filler
 - .4 Joint sealant and primer
 - .5 Sealant
 - .6 Anchor bolt protection
 - .7 Bonding agent
- .2 Concrete mix design: Submit concrete Supplier's latest statistical analysis of all concrete mixes to be used on this Project.
- .3 Concrete producer's certification: Certification that plant, equipment and materials to be used in concrete comply with requirements of CSA-A23.1-14.
- .4 Contractor's quality control: Proposed quality control procedures for hot or cold weather conditions, for ensuring correlation of concrete mix with strength or exposure classification for area of placement, and for finishing and curing methods.
- .5 Anchor bolt setting diagrams: Submit detailed Drawings for anchor bolt setting.

1.8 **RECORDS**

- .1 Keep a written record of the following:
 - .1 Concrete placements, showing location of placement, date of placement and cubic yards or metres of concrete placed.
 - .2 Signed trip ticket for each truck.
 - .3 Ambient air temperature and unusual occurrences during each placement.
- .2 Permit inspection of records by Consultant at any time. At completion of Work, submit a summary of such data in six copies to Consultant.

2 Products

2.1 **MATERIALS**

- .1 Select one Product from that specified under each material listing. Source liquid admixtures for concrete from one manufacturer.
- .2 Portland cement: CAN/CSA-A3001 Normal, Type GU Portland Cement, Moderate Type MSb - Mild Exposure, or High Early Strength Type HE or Sulphate Resistant Type HS.
- .3 Portland cement: Conforming to CAN/CSA-A3001.
 - .1 Sulphate soil conditions: Sulphate resistant, type HS portland cement, or type GU portland cement blended to specified proportion with cementitious hydraulic slag to CAN/CSA-A3001-03, as specified for severe case, Table 3 of CSA-A23.1-14.
 - .2 Normal conditions: Normal, type GU portland cement.
- .4 Cementitious hydraulic slag: Conforming to CAN/CSA-A3001.
- .5 Coarse aggregate: Conforming to CSA-A23.1-14, Clause 4.2.3.4 and Table 11, Group I, 40-5 mm for slabs on grade, 20-5 mm for other slabs, and 9 mm maximum aggregate size for concrete fill on concrete filled steel stair treads and landings. Coarse aggregate to be 100% crushed, in cubular size.
- .6 Fine aggregate: Conforming to CSA-A23.1-14, Clause 4.2.3.3 and Table 10.
- .7 Water: Conforming to CSA-A23.1-14, Clause 4.2.2.
- .8 Formwork: Furnish formwork in accordance with Section 03 11 00.
- .9 Waterproofing admixture: Euclid, "Eucon Vandex AM 10", Everdure "Caltite", Sika "Sika 1 +/ViscoCrete 2100", Xypex "C-500 2%" or Kryton International Inc. "Krystol Internal Membrane (KIM) system", Master Builders Solutions (Formerly BASF Corporation) "MasterLife 300D".
- .10 Air entraining admixture: Conforming to ASTM C260:
 - .1 Master Builders Solutions (Formerly BASF Corporation) "MasterAir" Series
 - .2 Euclid "Airextra"
 - .3 Grace "Darex AEA EH" or "Darex AEA ED"
 - .4 Axim "Catexol AE260"/"Catexol AE360" (for low slump concrete)
- .11 Wet curing: Water conforming to CSA-A23.1, clause 4.2.2, clear and entirely free from any elements which might cause staining of concrete, and geosynthetic cloth minimum 0.1 mm thick polyethylene film) complying with maximum allowable moisture loss requirements of ASTM C156.
- .12 Water reducing admixture: Conforming to ASTM C494 Type A:
 - .1 Master Builders Solutions (Formerly BASF Corporation) "MasterPozzoloth" Series or "MasterPolyheed" Series
 - .2 Euclid "WR 75"

- .3 Grace "WRDA" series or "Zyla" series
- .4 Axim "Catexol 1000N"
- .13 Retarding admixture: Conforming to ASTM C494, Type B or Type D:
 - .1 Master Builders Solutions (Formerly BASF Corporation) "MasterSet R" Series or "MasterSet DELVO" Series
 - .2 Approved equal
- .14 Accelerating admixture: Conforming to ASTM C494, Type C or Type E:
 - .1 Master Builders Solutions (Formerly BASF Corporation) "MasterSet AC 534" or "MasterSet FP 20"
 - .2 Approved equal
- .15 High-range water-reducing admixture: Conforming to ASTM C494, Type F:
 - .1 Master Builders Solutions (Formerly BASF Corporation) "MasterGlenium" Series or "MasterRheobuild 1000"
 - .2 Approved equal
- .16 Workability-retaining admixture: Conforming to ASTM C494, Type S:
 - .1 Master Builders Solutions (Formerly BASF Corporation) "MasterSure Z 60"
 - .2 Approved equal
- .17 Corrosion inhibiting admixture: Conforming to ASTM C494, Type C, 30% plus or minus 2% calcium nitrite:
 - .1 Euclid "Eucon CIA" at the rate of 10 litres/m³ (15 litres/m³) of concrete
 - .2 Grace "DCI" or "DCI-S" at the rate of 10 litres/m³ (15 litres/m³) of concrete
 - .3 Axim "Catexol 1000 CNCI" at the rate of 10 litres/m³ (15 litres/m³) of concrete
 - .4 Master Builders Solutions (Formerly BASF Corporation) "MasterLife CI 30" at the rate of 10 litres/m³ (15 litres/m³) of concrete.
- .18 Shrinkage-reducing admixtures: Conforming to ASTM C 494, Type S:
 - .1 Master Builders Solutions (Formerly BASF Corporation) "MasterLife SRA" Series or "MasterLife CRA 007"
 - .2 Approved equal.
- .19 Alkali-silica reaction-inhibiting admixtures: Conforming to ASTM C 494, Type S. Shall contain a nominal lithium nitrate content of 30 percent.
 - .1 Master Builders Solutions (Formerly BASF Corporation) "MasterLife ASR 30".
 - .2 Approved equal.
- .20 Viscosity-modifying admixture: Conforming to ASTM C 494:
 - .1 Master Builders Solutions (Formerly BASF Corporation) "MasterMatrix" Series

- .2 Approved equal
- .21 Synthetic fibers: Shall conform to ASTM C 1116/C 1116M, Type III.
 - .1 Macrosynthetic fibers: Shall have an equivalent flexural strength ratio ($R_{e,3}$) of [] percent when tested in accordance with ASTM C 1609/C 1609M.
 - .1 Dosage shall be as recommended by the manufacturer or as shown on a plan.
 - .1 Master Builders Solutions (Formerly BASF Corporation) "MasterFiber MAC" Series.
 - .2 Euclid Chemical Company "TUF-STRAND SF"
 - .3 Approved equal
- .22 Anchor bolts: To meet specified requirements of ASTM A307, Section 1.3. Provide suitable nuts and washers to meet specified requirements of ASTM A563M, Table 11 (hot-dip galvanized to CAN/CSA G164-M).
- .23 Anchor bolt protection: Clean, non-soluble, rust inhibitive grease and 0.254 mm thickness polyethylene wrapping.
- .24 Flowable construction grade grout: Pre-mixed, without aggregate fillers, non shrink, flowable type; complete with forms for flowing in place:
 - .1 Euclid "Euco NS"
 - .2 W.R. Meadows "CG-86"
 - .3 Sika "M-Bed Standard" or "Sika Grout 212"
 - .4 Master Builders Solutions (Formerly BASF Corporation) "MasterFlow 100" (formerly) "Construction Grout"
 - .5 CPD "Non-Shrink Construction Grout"
 - .6 Dayton Superior "1107 Advantage Grout"
 - .7 Five Star Products "FSP Construction Grout"
- .25 Epoxy grout: Premixed, non-shrink, consisting of thermosetting resin base, with inert fillers, with minimum seven-day compressive strength of 10,000 psi, suitable for use on dry or damp surfaces:
 - .1 Dayton Superior "J-54 Sure-Grip Epoxy Grout"
 - .2 Euclid Chemical Company "E3-G"
 - .3 Sika Chemical Company "Sikadur 42 Grout Pak"
 - .4 W.R. Meadows, Inc. "EG-96 Plus"
 - .5 Five Star Products "DP Epoxy Grout"
- .26 Bonding agent: Conforming to ASTM C881:
 - .1 Sika Chemical "Sika-Dur Hi-Mod"

- .2 Euclid "452LV or MV"
- .3 W.R. Meadows "Resi-Weld 1000"
- .4 Master Builders Solutions (Formerly BASF Corporation) "MasterEmaco ADH 326" (formerly "Concresive Liquid LPL")
- .5 CPD "Epoxcrete (Hi-Mod)"
- .6 Dayton Superior "Resi-Bond (J-58)"
- .7 Five Star Products "Bonding Adhesive"
- .27 Sealant for exposed V-joints: Grey in colour:
 - .1 Sika "RC-1"
 - .2 Euclid "Eucolastic I"
 - .3 Tremco "Vulkem 116"
 - .4 Master Builders Solutions (Formerly BASF Corporation) "MasterSeal NP1" (formerly Sonolastic "NP-1")
- .28 Sealant - exterior immersion conditions:
 - .1 Vulkem 171 primer and two-part chemical curing, pour grade Vulkem 245 polyurethane sealant.
 - .2 Master Builders Solutions (Formerly BASF Corporation) MasterSeal P 173 primer and MasterSeal SL2 sealant.
- .29 Asphalt coating (for portion of steel columns embedded in, or located below, concrete): Henry "110-14" or approved equivalent, including primers recommended by coating manufacturer.
- .30 Bond breaker coating: Dayton Superior "Sure-Lift WB (J5)" or Cresset "Crete-Lease 20-VOC" by Form and Build, two-coat application, brush applied.
- .31 High density insulation: Dow Styrofoam "HI-40" or Owens-Corning "Foamular 400" unless shown or noted otherwise.
- .32 Steel angles: New material conforming to CSA-G40.20-M/G40.21-M, Grade 300W cleaned and primed with primer conforming to CISC/CPMA 2.75 (hot-dip galvanized in accordance with CAN/CSA G164-M requirements).
- .33 Epoxy capsule type anchors: Hilti "HVA Adhesive Anchor", two-part, threaded steel stud and epoxy adhesive filled capsule anchoring system. Install per manufacturer's recommendations.
- .34 Premoulded joint filler: Rigid grade, closed cell polyethylene or PVC foam, 6 mm thick, unless shown or noted otherwise, conforming to ASTM D1752, Type 1:
 - .1 W.R. Meadows "Deck-O-Foam" pre-scored, conforming to ASTM 1622 and ASTM 3575.
 - .2 CPD "Closed Cell Foam Joint Filler", conforming to ASTM D1056 and ASTM D1667.

- .35 Premoulded joint filler adhesive: For securing joint filler to abutting adjacent structures, as recommended or supplied by manufacturer of joint filler used.
- .36 Backer rod type "A": "Spal-Pro Rod" by Metzger-McGuire Co. or "CRL Retainer Spline" by C.R. Laurence, Mississauga, Ontario. Use with epoxy sawcut joint sealant for floor slab on grade only. Backer rod size to be slightly greater than joint width to ensure a snug, secure fit.
- .37 Backer rod type "B": Extruded closed cell, circular polyethylene foam, sized 25% larger than sawcut joint. Use with standard joint sealant for sawcuts in concrete on metal deck.
- .38 Standard joint sealant: Two-component chemically reactive polyurethane-modified conforming to ASTM C920, Type M, Grade NS, Class 25, grey. Use one of the following:
 - .1 Euclid "Eucolastic II"
 - .2 Sika "Sikaflex 2C NS/SL"
 - .3 Tremco "Vulkem 245"
 - .4 Sonneborn "Sonolastic SL2"
- .39 Stair nosings for concrete stairs: American Safety Tread Co./Safety Stair Products "FA-311D", IKG Industries "Mebac C-3E" or Wooster Products equivalent.
- .40 Stair nosings for concrete filled steel pan stairs: American Safety Tread Co./Safety Stair Products, "FAL311", IKG Industries Mebac "A-3E" or Wooster Products equivalent.
- .41 Concrete topping to create slopes: Stabilized concrete aggregate, lightweight insulating concrete conforming to ASTM C332, Group I, as manufactured by Specialty Vermiculite Canada Corp. or approved equivalent. Slip sheet: 6 mil polyethylene sheet.

2.2 FLOOR FINISHES SCHEDULE

- .1 Type 1
 - .1 Hand screed
 - .2 Power steel trowel finish
 - .3 Water cure

2.3 CONCRETE MIX PROPORTIONS

- .1 Ready-mixed concrete and concrete proportions to be in accordance with CSA-A23.1-14, Clause 4.3.1, as per Table 5, Alternative (1) Performance and as follows:
 - .1 Minimum allowable compressive strengths at twenty-eight days are as follows unless otherwise noted or shown.
 - .1 15 MPa: for lean concrete fill
 - .2 15 MPa: for mud slab
 - .3 30 MPa: for footings
 - .4 30 MPa: for piers, grade beams, curb and walls
 - .5 32 MPa: for slab on grade (interior)

- .6 25 MPa: for slab on grade (exterior)
- .7 35 MPa: for exterior aprons
- .2 Minimum cement content as per code requirement: If blended normal Portland cement/cementitious hydraulic slag is used, slag content to be not more than 25% of total volume of cement.
- .3 Slump at point of deposit: 80 mm with a maximum tolerance of plus or minus 20 mm. Not exceeding 225 mm when high-range water-reducing admixtures are used.
- .4 Keep water-cement ratio to a minimum to increase strength and durability of concrete.
- .2 Note:
 - .1 If supplementary cementing materials are used as part of the percentage of recycled content, Supplier must fill the Consultant's material information sheet template.
 - .2 Exposure classification: as defined in Table 2 of CSA-A23.1-14 and as follows:
 - .1 C-1 for exterior reinforced concrete
 - .2 N-CF for interior slabs on grades
 - .3 N for interior footing
 - .4 F-1 for exterior non-reinforced concrete.
 - .3 Air content for exterior concrete: conforming to CSA-A23.1-14, Clause 4.3.3, Table 4.
 - .4 Add corrosion inhibitor (to concrete mix) (to concrete mix for foundation walls only) at specified rate.
- .3 Concrete proportions for concrete to be in accordance with CSA-A23.1-14, Clause 4.3.1, and as follows:
 - .1 Minimum allowable compressive strength at 28 days: see 2.2.1.1 unless otherwise noted or shown on the drawings.
 - .2 Minimum cement content: If blended normal Portland cement/cementitious hydraulic slag is used, slag content to be not more than 25% of total volume of cement. If blended type 10 Portland cement/cementitious hydraulic slag is used, slag content to be not more than 35% of total volume of cement.

2.4 **ADMIXTURES**

- .1 Admixtures
 - .1 Add admixtures to concrete mix in accordance with manufacturer's recommendations. Have admixture manufacturer make available, at no cost, upon seventy-two hours notice, the services of a qualified, full-time field representative to assure proper use of admixtures.
 - .2 Except where specified otherwise herein, comply with CSA-A23.1-14.

- .3 The use of calcium chloride or additional admixtures, other than that specified, is not acceptable.
 - .2 MVRA Admixture
 - .1 Add MVRA in accordance with manufacturer's instructions. Mix designs below 0.42 and above 0.52 to meet CSA standards may require adjustment. Consult with MVRA manufacturer.
 - .2 Freshening on site with held back mix water is acceptable so long as it complies with ACI guidelines and does not exceed the original water-to-cementitious material ratio or the instructions of the Consultant.
 - .3 Other admixtures are acceptable, but each must be added separately.
 - .4 The following admixtures are not acceptable:
 - .1 Shrink Reducing Admixture (SRA)
 - .2 Crystalline Growth admixture
- 3 Execution
- 3.1 **EXAMINATION**
 - .1 Confirm surfaces on which concrete is to be placed are free of frost, water, and debris before placing concrete.
 - .2 Confirm that reinforcement, inserts and other built-in Work are in place and secured before placing concrete.
 - .3 Prior to placement of concrete, confirm that reinforcement is secured in correct location.
 - .4 Replace incorrectly fabricated reinforcement, relocate misplaced reinforcement and install omitted reinforcement before concrete is placed, as directed by Consultant. Incorrectly fabricated, misplaced or omitted reinforcement will be considered defective Work performed by this section. Establish elevations of compacted underfloor base prior to commencing Work.
 - .5 Establish elevations of compacted underfloor base prior to commencing Work.
- 3.2 **SETTING AND BUILDING-IN**
 - .1 Set and build into formwork anchorage devices and other embedded items required for other Work that is attached to or supported by cast-in-place concrete. Use setting Drawings, diagrams, instructions, and directions provided by Suppliers of items to be attached. Refer to CSA-A23.1-14 "Fabrication and Placement of Hardware and Other Embedded Items" for acceptable tolerances.
 - .2 Advise trades well in advance of scheduled concrete placements to allow adequate time for supply of items to be built in. Have respective trades verify location of items supplied by them.
 - .3 Set column anchor bolts to comply with the following tolerances:
 - .1 Tolerance of anchor bolt location: Conform to CSA-A23.1-14, Clause 6.7.
 - .2 Allowable anchor bolt height tolerance: To within plus or minus 12 mm maximum.

.3 Tolerance for placing embedded items: Conform to CSA-A23.1-14, Clause 6.7.

.4 Set bumper posts in concrete footings and fill with ram packed 20 MPa concrete. Form top of fill to a crown, smooth finish.

3.3 **PLACING OF CONCRETE**

.1 Place concrete in accordance with CSA-A23.1-14, Clause 6.8.5.4.

.2 Install sluices to limit height of free fall of concrete to 1200 mm maximum. Place concrete to prevent layering and segregation and vibrate sufficiently to ensure thorough compaction, maximum density and according to CSA-A23.1-14, Clause 6.8.5.4. Hand spade concrete adjacent to forms.

.3 Before placing fresh concrete against set or partially set concrete, clean surfaces to remove dirt, scum, shavings, debris, laitance, etc. On set surfaces, brush generously with a bonding compound.

.4 Check work frequently with accurate instruments during placing of concrete.

.5 If rubber waterstops are used, systematically and thoroughly vibrate concrete around waterstops to avoid honeycombing and voids, to ensure complete contact between waterstop and concrete.

.6 Work concrete into complete contact with forms and embedded items. Consolidate concrete adjacent to side forms along the entire length of forms and ensure smooth surface finish after stripping of formwork.

.7 Install sluices to limit height of free fall of concrete to 1.2 m maximum. Place concrete to prevent layering and segregation and vibrate sufficiently to ensure thorough compaction, maximum density and in accordance with CSA-A23.1, Clause 6.8.5.4. Hand spade concrete adjacent to forms with metal spatulas.

.8 Before placing fresh concrete against set concrete at construction joints, clean surfaces to remove dirt, scum, shavings, debris, laitance, etc.; grease dowels generously at construction joints. Provide bond break between pours.

.9 Where floor drains occur, level floor around walls and provide minimum uniform slope of 1.6 mm per 300 mm to drains if not specify otherwise on the design drawings.

.10 Install premoulded joint filler for full depth of slabs.

.1 Except in areas to receive subsequent architectural floor finish, knife score joint filler through 75% of its thickness 6 mm from top of material to be set at finish floor elevation.

.2 Set premoulded joint filler in adhesive.

.3 Set scored face of filler against existing structure and ensure no adhesive is applied to top 6 mm portion which will be stripped just prior to installation of sealant.

3.4 **PLACING OF REINFORCING STEEL**

.1 Place reinforcing steel in accordance with reviewed Shop Drawings and Section 03 20 00.

3.5 TREATMENT OF FORMED CONCRETE

- .1 Treat and finish exposed formed surfaces in accordance with CSA-A23.1-14, Clause 7.7.
- .2 Where top of grade beams or foundation walls will be exposed to view in the finished Work, steel trowel same to a level, smooth finish.
- .3 Treat and prepare surfaces to be waterproofed or dampproofed to a smooth and even finish free from projecting mortar, concrete fins, honeycombing and other irregularities and with juncture of wall and footing covered with masonry mortar. Patch as required in accordance with CSA-A23.1-14, Clause 7.7.2.

3.6 ARCHITECTURAL CONCRETE

- .1 All concrete surfaces exposed to public view shall be "Architectural Concrete" quality in accordance with CSA-A23.1-14/A23.2, Clause 8.3 - Architectural Concrete. Finish such exposed concrete to a "light sandblast" finish in accordance with ACI 303R.

3.7 ANCHOR BOLT PROTECTION

- .1 Adequately protect unburied portion of anchor bolts set in concrete, including nuts and washers from rusting, corrosion and damage by a heavy coating of specified coating material; wrap in a manner to exclude moisture.
- .2 Clean surfaces to be protected to bare steel followed by the specified protection system.

3.8 GROUTING

- .1 Grout column base plates prior to installation of siding, precast panels or decking. Shims or double nuts alone are not structurally stable to carry the foregoing loads.
- .2 Place grout in accordance with the grout manufacturer's printed directions. Form around bases, place grout in a manner which will ensure positive bearing of the full area of the steel plate on top of the supporting surface. Thoroughly compact, leaving no voids.

3.9 SEALANT APPLICATION

- .1 Sealant at V-joints: Prime, prepare substrate and apply sealant full joint depth in accordance with manufacturer's printed directions. Tool to a smooth semi-concave finish. Exclude joints in surfaces to receive waterproofing treatment.

3.10 CONSTRUCTION JOINTS

- .1 Form construction joints. Dowels occur on construction joints unless detailed otherwise. Grease dowels generously just prior to new pour. Place bond break to adjacent slabs. Place galvanized circular steel forms as column isolation joints as shown..

3.11 SAWCUTTING CONTROL AND CONSTRUCTION JOINTS – SOFT CUT JOINTS

- .1 Sawcut control joints and construction joints in slab in straight lines, 3 mm wide x 35 mm deep for slab on grade, and 3 mm wide x 30 mm deep for slab on metal deck.
- .2 Perform "dry method" using "Soff-Cut saw" as soon as the slab will support the weight of the saw and operator without disturbing the final finish. Perform sawcutting from zero to two hours after final floor finishing or within a concrete cutability window of 1.1 MPa/10.5 kg/cm² to a maximum of 5.6 MPa/56.3 kg/cm². Replace manufacturer's patented anti-ravel skid plate with each new blade to avoid spalling and ravelling.

- .3 Take sawcut joints to face of columns.
- .4 After sawcutting, vacuum clean joints to remove dust and debris.
- .5 When cleaned joints are dry and prior to traffic being allowed over area, install temporary polyethylene backer rod in joints to prevent contamination of same.

3.12 **SAWCUTTING CONTROL AND CONSTRUCTION JOINTS – REGULAR SAWCUT JOINTS**

- .1 Sawcut control joints and construction joints in slab straight lines, 3 mm wide x 35 mm deep for slab on grade, and 3 mm wide x 30 mm deep for slab on metal deck.
- .2 Perform sawcutting twelve to twenty-four hours after concrete (or deferred monolithic traprock topping) has been placed, depending on when saw can be run over concrete surface without leaving tread marks, when concrete can be sawn without dislodging aggregate and before uncontrolled shrinkage has occurred. Do not postpone sawing operations beyond these time limitations. Concrete not utilizing retarding admixtures placed with temperature exceeding 26°C (79°F) shall be sawn not later than twelve hours after placing.
- .3 In strip poured slabs, sawcut joints at locations shown in accordance with the following sequence:
 - .1 Initially, sawcut mid-transverse section of completed strip pour with a fine saw blade.
 - .2 Vacuum out debris and re-run saw over finely cut joint using a blade of size to produce 5 mm wide x 35mm deep sawcuts.
 - .3 Repeat .1 and .2 at one-quarter points (one each side of the mid-sawcut on poured strip).
 - .4 Cut other sawcuts in the strip to 3 mm wide x 35mm deep (i.e. no fine sawcutting required).
- .4 Continuously spray water on saw blade during sawing. Grind edges of sawcuts to eliminate burrs; do not grind to bevel or chamfer joint edges. In sawcutting floor slabs on metal deck, run a wet vacuum cleaner immediately behind sawcutting equipment.
- .5 Take sawcut joints to face of columns.

3.13 **CURING/SEALING OF SLABS**

- .1 At premoulded joints to be subsequently caulked, and after curing/sealing operations are complete, remove scored strip from top of isolation joints in floor slab. Clean joints above premoulded joint filler and place temporary polyethylene rope to prevent contamination of joint until sealant is applied.

3.14 **JOINT FILLER**

- .1 Do not apply filler in areas of concrete slab which are to receive quarry tile, ceramic tile, carpet, resilient flooring or epoxy topping system.
- .2 Do not fill isolation joints, construction joints, and control joints sooner than 120 days after concrete pours. Execute joint sealing during cool, dry ambient conditions when slab is in contracted state to minimize future joint separation at sealant-filled joints. Provide filler maintenance if filler must be applied sooner than specified as approved by Consultant.

- .3 Clean sawcut joints with a high power industrial vacuum cleaner to remove dust and debris. Do a second pass of vacuum cleaner as required to render joints clean.
- .4 Fill sawcuts in concrete floor slab on grade using heavy duty sawcut joint filler (epoxy or polyurea), as follows:
 - .1 Using epoxy: Provide type "A" backer rod in sawcut joints, push to the bottom of sawcut. Fill joint with filler, finish top flush with the surface of the slab.
 - .2 Using polyurea: Fill joint full depth with filler, finish top flush with the surface of the slab.
- .5 Prime walls of joint as recommended by filler manufacturer. Mix filler as directed by manufacturer. Coat surfaces of metal in contact with filler primer as recommended by filler manufacturer.
- .6 At sawcuts in concrete slabs on metal deck, provide type "B" backer rod, set to allow a sealant depth of 13 mm. Fill remainder of joint with standard joint sealant. Top of sealant to be slightly concaved from the surface of the slab.
- .7 Comply with sealant manufacturer's primer, application and temperature requirements. Mask floor to edge of joints and fill joint with joint filler. After initial set prime sealant surface and refill joints with sealant as required to produce slightly convex joint surface.
- .8 Remove 6 mm scored strip from top of premoulded joint filler. Caulk over premoulded joint filler with standard joint sealant.
- .9 Fill exterior sawn construction and control joints and over premoulded isolation joint filler with specified standard joint sealant (hydrocarbon resistant joint sealant).

3.15 **SITE CLEAN UP**

- .1 Remove excess materials including waste hardened concrete and other debris resulting from Work of this section from Site and leave premises in a condition acceptable to Consultant.
- End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- | | | | |
|-----|-----------------|---|--|
| .1 | CAN/ULC-S102 | - | Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies |
| .2 | CSA A82.1-M | - | Burned Clay Brick |
| .3 | CSA A165 Series | - | CSA Standards on Concrete Masonry Units |
| .4 | CSA A179 | - | Mortar and Grout for Unit Masonry |
| .5 | CSA A370 | - | Connectors for Masonry |
| .6 | CSA S304.1 | - | Design of Masonry Structures |
| .7 | CSA A371 | - | Masonry Construction for Buildings |
| .8 | CSA W47.1 | - | Certification of Companies for Fusion Welding of Steel Structures |
| .9 | CSA W48.1-M | - | Carbon Steel Covered Electrodes for Shielded Metal Arc Welding |
| .10 | CSA W59-M | - | Welded Steel Construction (Metal Arc Welding) |
| .11 | CSA W117.2 | - | Safety in Welding, Cutting, and Allied Processes |
| .12 | AODA | - | Accessibility for Ontarians with Disabilities Act |

1.3 **SUBMITTALS**

.1 Submit the following in accordance with Section 01 33 00:

.2 Product data: Submit as Shop Drawings, manufacturer's specifications and other data for masonry.

.3 Scaled masonry wall elevations with the following information:

- | | |
|----|---|
| .1 | Block arrangement, wall thickness |
| .2 | Core fills |
| .3 | Rebar, rebar designation, laps, dowels, and anchors |
| .4 | Openings and lintels |
| .5 | Bond beam and horizontal reinforcement |
| .6 | Control joint location and extent |

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Check materials for damage and carefully unload. Remove unsatisfactory materials from the Site and replace with new materials to satisfaction of Consultant at no increase in Contract Price.
- .2 Store materials on Site in a manner to prevent damage thereto. Stockpile for easy heating if required. Protect from the weather. Do not concentrate storage on any part of the structure so as not to set up any strain beyond the designed load of any portion thereof.
- .3 Take particular care so as not to overload unsupported portions of the structure which have not attained their full strength.
- .4 Comply with CSA A371.
- .5 Protect the following:
 - .1 Masonry materials during storage and construction from wetting by rain, snow or ground water, or inter-mixture with earth or other materials.
 - .2 Metal reinforcing or ties against corrosion or contamination, including ice, which will reduce or destroy bond.
 - .3 Other Work from damage resulting from this Work.
 - .4 Sills, ledges and projections from droppings of mortar.
- .6 Cover tops of masonry walls not enclosed or sheltered during rain, at the end of each day's construction and at times when Work is not in progress, with waterproof covers temporarily secured against displacement, until flashings are completed. Drape cover over wall and extend 600 mm down both sides. Anchor securely in position. Protect exposed corners against droppings or damage from other trades, by boarding or other means.
- .7 Prevent grout or mortar from staining the face of masonry to be left exposed or painted. Immediately remove grout or mortar in contact with such masonry.
- .8 Cold weather protection: Do not lay masonry at air temperatures below 5°C (41°F) without prior review by Consultant of proposed protective measures. Comply with CSA A371.
- .9 Repair or replace damaged Work to satisfaction of Consultant at no increase in Contract Price.

1.5 SCAFFOLDING

- .1 Erect, maintain and remove on completion, scaffolding adequate for the proper execution of the Work.
- .2 Conform to "Occupational Health and Safety Act". Lay masonry from scaffolds erected on same side as face Work. Do not support scaffolding from finished building surfaces.

1.6 WELDING

- .1 Retain a firm certified in accordance with CSA W47.1 Division 1 or 2.1 to perform welding of anchor clips.

- .2 Employ welding operators licensed per CSA W47.1 for types of welding required by the Work.

1.7 **TEMPORARY BRACING**

- .1 Temporarily brace masonry Work during erection to prevent damage due to winds or other lateral loads until permanent structure provides adequate bracing.

2 Products

2.1 **MATERIALS**

- .1 Source (each type of) masonry unit from one manufacturer. Units to be of uniform texture and colour for each kind required.
- .2 Brick Veneer: Metric modular, hard burned clay brick masonry units, conforming o CSA A82.
 - .1 Finish exposed ends of brick at external corners, headers, control joints, expansion joints and openings same as the face.
 - .2 To match existing brick in all respects, modular size, with special shapes and sizes as detailed.
 - .3 Where brick veneer masonry type is not specified, provide Type X, exterior grade.
 - .4 Manufacturer:
 - .1 Brampton Brick
 - .2 Shaw Brick
 - .3 Forterra Brick
 - .5 Sills: in accordance with Contract Drawings. Colours to match existing or as selected by Consultant.
- .3 Concrete blocks: Normal weight, metric modular, moisture-controlled units conforming to CSA A165.1, Type H/15/A/M (and Type S/15/A/M).
 - .1 Exposed surfaces: Free of cracks, chips or other blemishes, and broken corners. Use sash blocks at control joints, solid block around openings for rolling steel doors or shutters and where noted, and concrete block lintels over openings in concrete block walls unless steel lintels are shown.
 - .2 Units on external corners of exposed interior block and block at door jambs: Bullnosed type.
 - .3 Special shapes: Manufacture to shape shown; do not field cut stretcher units to make special shapes.
- .4 Mortar: Conforming to CSA A179-M, Type "S".
- .5 Mortar (exterior wythe blocks in cavity wall): Conforming to CSA A179-M, Type "N", 1:1:6 ready mixed, as supplied by Maxi Mix or Daubois Inc. Use pre-mixed/pre-bagged/pre-gauged cement-lime requiring water to be added in the mixer per mortar manufacturer's directions. No loose sand allowed on site. Mix colour pigment manufactured by Harcros

Pigment Canada or Solomon Colours, Inc. to produce coloured mortar colour; colour as selected by the Consultant.

- .6 Mortar (rendering, patching or leveling): Quick-setting, polymer-modified, fiber-reinforced cementitious rendering mortar for interior and exterior concrete wall and floors. Minimum 3 mm thickness and requiring water to be added in the mixer per mortar manufacturer's directions. "Planitop 330 Fast" by Mapei or approved equal.
- .7 Grout: Conforming to CSA A179-M, coarse.
- .8 Horizontal masonry reinforcement (for single wythe masonry block walls): Welded wire, galvanized units in heavy duty truss or ladder two-side rod design by Dur-O-Wal, Blok-Lok, or Hohmann and Barnard, prefabricated in straight lengths of not less than 3 m with matching corner "L" and intersection "T" units. Overall width shall be such that side rods are positioned at the centreline of both face shells of the concrete block. Reinforcing gauge and finish to meet requirements of the Ontario Building Code and referenced CSA Standards.
- .9 Ties from outer wythe to inner wythe: Hot-dip galvanized of types as specified below complete with insulation support and V-tie by Fero Corporation as distributed by Stuart & Associates:
 - .1 For tying brick, concrete block and masonry unit veneers to concrete block: use Fero Block Shear Tie in combination with two-wire ladder horizontal reinforcing 3.66 mm diameter wire side and cross rods.
 - .1 Block shear length: to suit concrete block (inner wythe) width and thickness of insulation.
 - .2 V-tie length: as required to provide placement of V-tie legs at centreline of veneer (outer wythe). Provide block shear ties at 800 mm horizontal x 600 mm vertical spacing and 300 mm maximum spacing around wall openings, top, base and corners or as noted on Drawings.
 - .2 For tying brick, concrete block and masonry unit veneers to cast in place concrete and structural steel: Use Fero RAP ties fastened to backup with U-CAN fasteners.
 - .1 RAP plate length: To suit thickness of insulation.
 - .2 V-ties: Of length to provide placement of V-tie legs at the centreline of veneer (outer wythe). Provide ties at 600 mm x 600 mm spacing and 300 mm maximum spacing around wall openings, top, base and corners or as noted on Drawings.
 - .3 For tying brick, concrete block and masonry units to structural columns and beams: Use Fero CAT tie attached with UCAN fasteners.
 - .1 V-ties: Of length to provide placement at the centreline of veneer (outer wythe). Provide CAT ties.
 - .4 For tying brick, concrete block and masonry unit veneers to metal studs: Use Fero side mounting RAP ties attached to side of stud with U-CAN fasteners.
 - .1 Side mounting RAP plate length: To suit width of metal stud and thickness of sheathing/insulation.

- .2 V-ties: Of length to provide placement of V-tie legs at the centreline of veneer. Provide side mounting RAP ties at 400 mm x 600 mm vertical spacing and 300 mm maximum spacing around wall openings, top, base and corners or as noted on Drawings.
- .5 For tying brick, concrete block and masonry unit veneers to wood studs: Use Fero Adjustable BVTs attached to stud with UCAN fasteners as supplied by Stuart & Associates. The Fero Adjustable BVTs length to suit width of insulation/sheathing.
- .6 The Fero V-ties shall be of length to provide placement of V-tie legs at the centreline of veneer (outer wythe). Provide adjustable BVTs at 400 mm horizontal x 600 mm vertical spacing and 300 mm maximum spacing around wall openings, top, base and corners or as noted on Drawing.
- .10 Masonry anchors: 6 mm thick steel plate anchors and clips to laterally support masonry walls from other walls or structural elements. For interior or dry locations, clean to SSPC-SP3 and prime with CISC/CPMA solvent reducible primer. For exterior or humid conditions, hot-dip galvanize to CSA G164. For non-structural anchorage, Blok-Lok "Flex-O-Lok" may be used.
- .11 Masonry-to-precast concrete (concrete) anchors: 1.5 mm (16 gauge) galvanized steel dovetail anchors. Supply filled 0.9 mm (20 gauge) galvanized steel dovetail slots for building-in in concrete (precast concrete).
- .12 Vertical reinforcement: Conforming to CAN/CSA G30.18-M, Grade 400.
- .13 Insulation adhesive: Synthetic rubber based compatible with insulation as recommended by insulation manufacturer.
- .14 Concrete block cell insulation: "Zonolite" granular vermiculite by W.R. Grace.
- .15 Compressible filler atop non-fire rated masonry walls: Where ceiling is used as a return air plenum use:
 - .1 "Zero Draft Z2-600" by Can-Am Building Envelope Systems, a foamed-in-place material with a flame spread rating of 25 or less in accordance with CAN/ULC-S102, or
 - .2 Fibreglass or mineral wool sealed with a firestop spray meeting the maximum flame spread and smoke ratings as above, as manufactured by 3M, Tremco or Johns Manville.
- .16 Compressible filler atop non-fire-rated masonry walls: Where ceiling space is not used as a return air plenum, use soft grade closed cell foam joint filler strips by CPD.
- .17 Premoulded control joint gasket: Dur-O-Wal "Rapid Control Joint" in "Wide-Flange" design of type to suit wall thickness. (Use "Regular" design for control joints at pilasters or columns.) For fire-rated control joint gaskets, use fire-rated closed cell neoprene conforming to ASTM D1056 or ASTM D2056.
- .18 Brick Control Joints Material:
 - .1 Neoprene Sponge by Blok-Lok Limited.
 - .2 NS - Closed Cell Neoprene Sponge by Hohmann & Barnard Company

- .19 Expansion joint flashings: Insulated Lexsuco "Lexpand" wall expansion joint with rigid polyvinyl nailing strips, of type to suit joint width shown. Adhesive to be as supplied by flashing manufacturer, and 0.6 mm thick x 25 mm (24 gauge x 1") wide metal batten strips with oval head galvanized "Confas" masonry anchors for securement of expansion joint flashing nailing strips to masonry substrate.
- .20 Dampproof course and through-wall flashings: "Blueskin SA" by Monsey Bakor, or "Soprseal Stick" by Soprema, self-adhesive grade.
- .21 Cavity wall ventilation inserts: Dur-O-Wal "Cell Vent Weep-Hole Ventilator". Colour as selected by the Consultant.
- .22 Cavity wall drainage net: High density polyethylene or nylon woven mesh type mortar dropping control devices with trapezoidal zigzag-shaped top edge, design to allow moisture/water to flow/drain downward in cavity to weep holes, 25 mm thick x 250 mm high x manufacturer's standard lengths "Mortar Net" with insect barrier or "Mortar Trap" by Hohmann and Barnard Inc.
- .23 Precast concrete sills and wall caps: Of sizes and profiles shown complete with slopes and drips, 35 MPa concrete poured in rigid forms, high frequency vibrated, colour pigments added to match finish of the wall face in which they occur. Pigments as manufactured by Harcros Pigment Canada. Use same mortar specified for brick veneer, for setting sills and caps.
- .24 Brick and block vents: Titus "Model OXL-77" complete with duct extension and birdscreen; exposed surfaces clear anodize finished.
- .25 Anchor bolts: Minimum 9 mm diameter steel, in length shown on Drawings, hot-dip galvanized to CAN/CSA G164-M.
- .26 Foamed-in-place air seals: Class 1, single component polyurethane foam conforming to CAN/ULC-S710.1, with flame spread rating of 20 or less and smoke developed of 25 or less. Density of 20.8 to 28.8 kg/m³, "Zerodraft Foam Sealant" by Canam Building Envelope Specialists Inc., or "Great Stuff Pro" by Dow Chemical Company, or "LEF" by Tremco.
- .27 Parging: "Gem Foundation Coating" by Gemite Products Inc.

3 Execution

3.1 MORTAR MIXING

- .1 Mix mortar with the maximum amount of water consistent with workability to provide maximum tensile bond strength within the capacity of the mortar. Use a mechanical mixer. No hand mixing permitted.
- .2 Do not use mortar which has begun to set or if more than 2½ hours has elapsed since initial mixing. Retemper mortar during the 2½ hour period only as required to restore workability.

3.2 GENERAL MASONRY CONSTRUCTION

- .1 Carefully and neatly lay masonry, truly vertical and horizontal, with joints of uniform size as required to suit requirements for design coursing and bonding.
- .2 Tooth intersections of walls with alternating units, except as otherwise shown or where control joints and expansion joints occur.

- .3 Lay blocks in running bond except where shown otherwise. Lay in full mortar beds with face shell vertical joints filled. Align block webs vertically and with thicker ends of face shells up.
- .4 When thumbprint hard, tool exposed joints shallow concave with non-staining round jointer. Tool joints flush where shown and where gypsum wallboard, ceramic tile and resilient base are to be applied as finish.
- .5 Lay prefaced block in running bond, in full mortar beds and with vertical joints filled with mortar. Neatly tool joints shallow concave with non-staining tools.
- .6 Lay ledge blocks in running bond in full mortar beds and with vertical joints filled with mortar. Tool joints flush.
- .7 Keep masonry walls 25 mm clear of underside of steel building frame, roof or floor and deck over. For non-fire rated masonry walls used as air plenum, pack the clear space with the specified material of either fibrous filler and spray seal combination, or foam-in-place. For non-fire rated masonry walls that are not used as air plenum, fill the clear space with specified foam strips. Compress to 50% of original thickness.
- .8 Lay brick in such a way that vertical joints in alternate brick courses are plumb from the top course to the bottom course.
- .9 Cut masonry units using a motor-driven table saw designed to cut masonry with clean, sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full-size units without cutting wherever possible.
- .10 Match coursing, bonding (colour and texture) of new masonry work with existing Work where indicated.
- .11 Build control joints in masonry walls at 9000 mm unless shown otherwise. Provide joints using sash block units. Fill chase and joint with premoulded gasket full height of control joints. Leave a depth of 12 mm for caulking. Locate control joints in modular dimensions.
- .12 Coordinate building-in of anchors as required for the proper installation of the Work of other trades.
- .13 Provide solid block or Provide metal lath under block and fill block cells solid for lintel bearing and as required to secure built-in anchor bolts and/or anchors.
- .14 Build-in door frames, borrowed light and glazed screen frames, anchors, inserts, loose lintels, shelf angles, conduits and other items required to be built into masonry. Set anchors between frames and masonry and fill voids between metal frames and masonry walls with mortar.
- .15 Build recesses to receive items recessed in masonry.
- .16 Build-in anchor bolts for wood copings on tops of masonry walls and other locations. Install anchor bolts in a staggered arrangement to prevent wood blocking from "cupping".

3.3 **REINFORCING, TIES AND ANCHORS**

- .1 Build-in continuous masonry reinforcement in horizontal courses terminating at vertical terminations such as control and expansion joints, full height of walls and partitions, at every second block course. Install reinforcing in first and second courses over door and window openings.

- AND/OR -

- .2 Build-in continuous masonry reinforcement in horizontal inner wythe courses of cavity wall, terminating at vertical terminations such as control and expansion joints, full height of walls, at specified spacing. Install reinforcing in first and second courses over door and window openings.
- .3 Maintain continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut, bend and lap reinforcing units as per printed directions of manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.
- .4 Where a new masonry wall is superimposed on an existing masonry wall, tie same to the existing masonry wall in accordance with the code.
- .5 Build-in dovetail anchors.
- .6 Weld masonry anchor clips to structural steel in accordance with the following standards:
 - .1 CSA W48.1-M: For electrodes. If rods are used, only coated rods are allowed.
 - .2 CSA W59-M: For design of connections and workmanship.
 - .3 CSA-W117.2: For safety.
- .7 Thoroughly clean welded joints and expose steel for a sufficient space to perform welding operations. Touch-up disturbed primer paint with matching primer.
- .8 Where shown, install vertical steel reinforcing and fill block cells with grout. At lintels, install reinforcing per schedule and fill with grout. Allow 200 mm minimum bearing on each lintel end up to 1200 mm span; 400 mm minimum bearing on each end for spans exceeding 1200 mm. Temporarily support lintels until concrete has cured.

3.4 **CAVITY WALL CONSTRUCTION**

- .1 Lay block as specified under "General Masonry Construction".
- .2 Tie exterior wythe to interior wythe using shear connectors spaced 600 mm vertically and 800 mm horizontally.
- .3 Lay damp course and through-wall flashings. Lap joints 50 mm minimum. Roll with steel hand roller to ensure proper contact at laps. Carry through-wall-flashings continuous past exterior steel columns.
- .4 Extend flashing membrane one block course up the back wall and return into mortar joint a minimum 25 mm.
- .5 Install cavity wall ventilator inserts in vertical brick or block joints immediately over dampproof courses and through-wall flashings, at 600 mm o.c. Set 3 mm from the face of masonry unit. Ensure inserts are not plugged with mortar or debris. Slope flashings towards the exterior in order that any water that penetrates the exterior wythe and drains to the bottom, is directed back to the exterior through the inserts.
- .6 Install through-wall flashings at any interruption of the air space behind the face veneer such as:
 - .1 Bottom of cavity walls
 - .2 Over shelf angles and lintels in exterior walls

.3 At other locations shown

- .7 Flashing above windows and doors that is discontinuous shall be turned up at ends to form a dam.
- .8 Place continuous run of drainage net on top of through-wall flashing.
- .9 Keep exterior wall cavities free from mortar droppings. Strike mortar joints facing cavity flush.
- .10 Coordinate masonry Work with the application of sheet membrane air/vapour barrier on cavity side of inner masonry wythe.

3.5 **CAVITY WALL INSULATION**

- .1 Place insulation in horizontal parallel courses in full bed of adhesive, tightly fitted between masonry reinforcement and in firm contact with adhesive. Apply adhesive in accordance with manufacturer's directions.
- .2 Cut and fit insulation to provide complete unbroken installation with minimum joints. Fit insulation tightly around ties. Butter insulation joints with adhesive.
- .3 Progressively install insulation, retaining wedges at maximum spacing of 400 mm horizontally at each masonry reinforcing course. Ensure that wedge presses insulation in tight and firm contact with adhesive. Wherever possible have wedge occur at junction of vertical and horizontal joint.

3.6 **COMPOSITE WALL CONSTRUCTION**

- .1 Lay face brick on exposed face in running bond (with full headers every sixth course as shown) (with split headers every sixth course).
- .2 Wet bricks before using in dry weather; keep dry and cover in freezing weather. Wet tops of walls where Work is left off before Work is resumed.
- .3 Parge back of face brick wythe and face of masonry block back-up with setting mortar to ensure void is filled. Lay face brick with shove joint in full mortar bed and with vertical joints filled solid.
- .4 Provide brick joints 10 mm wide horizontally and vertically, finished to a shallow concave finish.
- .5 Lay block and brick as specified under "General Masonry Construction".
- .6 Block cell insulation: As block masonry is being built, pour vermiculite insulation in block cells. Do not lay more than six block courses between pours. Rod insulation into cells to ensure that no voids or air pockets are left unfilled.
- .7 Wall expansion joint flashings: Secure flashing flaps to substrate with a full coat of adhesive and mechanically fasten every 300 mm through metal strips. Extend flashing as required to provide proper connection with roof expansion joint.

3.7 **PARGING**

- .1 Parge predampened masonry walls with type S mortar applied in two uniform coats to a total thickness of 19 mm. Scarify first parging coat to ensure full bond to subsequent coat.

- .2 Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 3 mm per m.
- .3 Damp cure parging for at least twenty-four hours and protect until cured.

3.8 **FIELD QUALITY CONTROL**

- .1 The Owner may engage an inspection and testing company to observe workmanship and to conduct block, mortar and grout strength tests in accordance with CSA A165.1, CSA A179, and CSA S304, and will pay all costs thereto.

3.9 **REPAIR, POINTING AND CLEANING**

- .1 Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout; point to eliminate evidence of replacement.
- .2 Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar.
- .3 Point-up joints including corners, openings and adjacent Work to provide a neat, uniform appearance, properly prepared for application of sealant compounds.
- .4 Rake out to 12 mm depth, joints between sills and between ends of sills and masonry. Point to full 12 mm depth with pointing material specified. Tool pointing to a slightly concave smooth condition.

3.10 **FINAL CLEANING**

- .1 After mortar is thoroughly set and cured, clean one-half of sample wall panel. Obtain Consultant's acceptance of sample wall panel cleaning before proceeding to clean building masonry Work.
 - .1 Dry clean to remove large particles of mortar using wood paddles and scrapers. Use chisel or wire brush if required.
 - .2 Scrub down wall with stiff fibre brush.
- .2 Acid cleaning of masonry is not permitted.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- | | | |
|-----|---------------------|---|
| .1 | ASTM A53 | - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless |
| .2 | ASTM F1554 | - Standard Specifications for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength |
| .3 | ASTM A325M | - High-Strength Bolts for Structural Steel Joints [Metric] |
| .4 | ASTM A500 | - Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes |
| .5 | ASTM A653/A653M | - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process |
| .6 | ASTM B209M | - Specification for Aluminum and Aluminum-Alloy Sheet and Plate |
| .7 | ASTM B210M | - Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes |
| .8 | ASTM B221M | - Specification for Aluminum-Alloy Extruded Bars, Rods, Profiles and Tubes |
| .9 | ASTM B241/B241M | - Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube |
| .10 | ASTM B308/B308M | - Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles |
| .11 | ASTM D635 | - Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position |
| .12 | ASTM E84 | - Test Method for Surface Burning Characteristics of Building Materials |
| .13 | ASTM F436 | - Hardened Steel Washers (for Use with High Strength Bolts) |
| .14 | CAN3-S157-M | - Strength Design in Aluminum |
| .15 | CSA-G40.20/G40.21-M | - General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel |

- .16 CAN/CSA-S16.1 - Limit States Design of Steel Structures
- .17 CAN/CGSB-1.181 - Ready Mixed Organic Zinc Rich Coating
- .18 CGSB 85-GP-16M - Painting Galvanized Steel
- .19 CAN/CSA G164-M - Hot-Dip Galvanizing of Irregularly Shaped Articles
- .20 CSA W47.1 - Certification of Companies for Fusion Welding of Steel Structures
- .21 CSA W47.2 - Certification of Companies for Fusion Welding of Aluminum
- .22 CSA W48 Series - Electrodes
- .23 CSA W59-M - Welded Steel Construction (Metal Arc Welding)
- .24 CSA-W117.2 - Safety in Welding, Cutting and Allied Processes
- .25 CISC/CPMA 2.75 - Canadian Institute of Steel Construction/Canadian Paint Manufacturers Association "A Quick-Drying Primer for Use on Structural Steel"
- .26 CISC - Canadian Institute of Steel Construction, "Code of Standard Practice"
- .27 OPSS - Ontario Provincial Standard Specifications
- .28 SSPC - Steel Structures Painting Council, "Steel Structures Painting Manual, Vol. 2"

1.3 **SUBMITTALS**

- .1 Shop Drawings
 - .1 Submit Shop Drawings for fabrication and erection of miscellaneous metals in accordance with Section 01 33 00.
 - .2 Clearly show and describe all items; sections, dimensions, erection details, anchors and fastenings, connection and jointing details.
 - .3 Shop Drawings for stairs and handrails and support members shall bear the seal and signature of a licenced Ontario Professional Structural Engineer responsible for their design.

1.4 **QUALITY ASSURANCE**

- .1 Retain a firm certified in accordance with CSA W47.1 Division 1 or 2.1 to perform welding. (For aluminum Work, retain a firm certified in accordance with CSA W47.2-M to perform welding.
- .2 Employ welding operators licensed per CSA W47.1 for types of welding required by the Work.

1.5 **PRODUCT DELIVERY, STORAGE AND HANDLING**

- .1 Coordinate deliveries to comply with construction schedule and arrange ahead for strategic off-the-ground, covered storage locations. Do not load areas beyond the designed limits.
- .2 Handle and store metal materials at job Site in a manner to prevent damage to other materials, (to existing buildings) or property.
- .3 Handle components with care, and Provide protection for surfaces against marring or other damage. Ship and store members with cardboard or other resilient spacers between surfaces. Use lifting chokers of material which will not damage surface of steel members.
- .4 Use strippable coatings or wrappings to protect exposed surfaces of prefinished metal Work which does not receive Site finishing. Use materials recommended by finishers or manufacturers of metals, to ensure that method is sufficiently protective, easily removed, and harmless to the finish.
- .5 Prevent the formation of wet storage stain on galvanized articles by complying with the following measures:
 - .1 Stack articles or bundle to allow air between the galvanized surfaces during transport from Supplier. Load materials in such a manner that continuous drainage could occur.
 - .2 Raise articles from the ground and separate with strip spacers to provide free access of air to most parts of the surface. Incline in a manner which will allow continuous drainage. Do not lay galvanized steel on cinders, clinkers, wet soil or decaying vegetation.
 - .3 Handle galvanized articles in such a manner as to avoid any mechanical damage and to prevent distortion.
- .6 Tag metal fabrications, including associated anchor bolts, sleeves, and bases, or otherwise mark for ease of identification at Project site.

1.6 **COORDINATION**

- .1 Supply to concrete, masonry and/or other sections, materials requiring setting and/or building-in in concrete, masonry or other trades. This includes inserts, anchors, frames, sleeves, etc. Verify locations of said materials.

1.7 **PROJECT CONDITIONS**

- .1 Field measurements: Take measurements at the building to assure proper fitting, fabrication, and erection of the Work. Check dimensions in the field, whether or not shown, upon which the accurate fitting together and building-in of the metal fabrication Work may depend or which affects the proper installation of the Work of others.

2 **Products**

2.1 **MATERIALS**

- .1 General: Metals shall be free from defects which impair strength or durability, or which are visible. Metals shall be new, of best quality and free from rust, waves or buckles, and

- clean, straight throughout entire length, sharply defined profiles and true in web and flange.
- .2 Structural shapes, plates, etc.: New material conforming to CSA-G40.20/G40.21-M, Grade 350W for W and H shapes, and Grade 300W for other shapes, and plates.
 - .3 Hollow structural sections: New material conforming to CSA-G40.20/G40.21-M Grade 350W, Class H.
 - .4 Welding materials: Conforming to CSA W48.1-M and CSA W59-M.
 - .5 High strength bolts, nuts and washers: Conforming to ASTM A325M, with each type and size of bolt and nut of same manufacture and of same lot.
 - .1 Bolts: Heavy, hexagon head high strength structural bolts, of standard size, of lengths required for thickness of members joined and for type of connection.
 - .2 Nuts: Heavy hexagon semi-finished nuts per ASTM A563M.
 - .3 Washers: Flat and smooth hardened washers, quenched and tempered.
 - .6 Machine bolts and anchor rods: As specified below, complete with hexagon heads and nuts:
 - .1 Common bolts: Conforming to ASTM A307, Grade A, of lengths required to suit thickness of material being joined, but not projecting more than 6 mm beyond nut, without the use of washers.
 - .2 Anchor rods: Conforming to ASTM F1554, Grade 36, of lengths noted, but projecting not less than 13 mm beyond nut unless otherwise noted.
 - .3 Nuts: per ASTM A563M.
 - .7 Primer paint: Solvent reducible alkyd, light grey, in fast drying, lead and zinc-chromate free formulation conforming to CISC/CPMA 2.75. Use one brand of primer paint throughout the Work, in any of the following, tinted to the specified colour:
 - .1 "97-680" by PPG Canada Inc.
 - .2 Selectone "MR-05-3" by Selectone Paints Ltd.
 - .3 "Kem Bond HS-B50WZ4" by Sherwin-Williams
 - .8 Primer paint: Solvent reducible alkyd, white, in fast drying, lead and zinc-chromate free formulation conforming to CISC/CPMA 2.75. Use one brand of primer paint throughout the Work, in any of the following:
 - .1 "97-680" by PPG Canada Inc.
 - .2 Selectone "MR-05-5" by Selectone Paints Ltd.
 - .3 "Kem Bond HS-B50WZ4" by Sherwin-Williams
 - .9 Primer paint: Solvent reducible alkyd, red oxide, in fast drying, lead and zinc-chromate free formulation conforming to CISC/CPMA 2.75. Use one brand of primer throughout the Work, in any of the following:
 - .1 PPG "97-900"

- .2 Selectone "J-82"
- .3 ICI Devoe "27454"
- .4 Sherwin-Williams "Kem Bond HS B50NZ3"
- .10 Galvanizing: Hot-dip galvanizing with minimum zinc coating of 600 g/m² to CAN/CSA G164-M.
- .11 Galvanized primer: Zinc rich conforming to CAN/CGSB-1.181 for new galvanized metal in compliance with CGSB 85-GP-16M. For galvanized fabrications touchup to remain unpainted in finished Work, use W.R. Meadows of Canada Ltd. "Galvafroid" or Kerry Industries "Z.R.C." or Niagara Paint Inc. "PL052898" zinc rich coating.
- .12 Steel pipe handrails: Conforming to ASTM A53, Type "S", Grade B steel pipe, powder coat finish. Colour to be selected by Consultant from manufacturer's standard colour range.
- .13 Steel pipe bumpers: Conforming to ASTM A500, cold rolled, bare, seamless steel pipe of sizes shown.
- .14 Handrail brackets: Julius Blum cast steel model 378 (377), powder coat finish, and with flanges tapped for bolting. Colour to match steel pipe handrails.
- .15 Stainless steel pipe: To ASTM A312, Type 304, 180-grit finish.
- .16 Galvanized sheet steel: 0.0897 mm (13 ga) core thickness commercial quality to ASTM A653/A653M, Grade A, with Z275 zinc coating designation.
- .17 Checkered plate: To ASTM A36/A36M, 6 mm thick, with raised diamond floor surface pattern.
- .18 Aluminum and steel bar grating: As manufactured by Fisher & Ludlow, Armco Irving, Borden Metal Products or Ohio Gratings Inc.
- .19 Grating treads and landings: As manufactured by Borden Metal Products, Armco Irving, Fisher & Ludlow or Ohio Gratings Inc. Furnish treads with 32 mm x 5 mm bearing bars incorporating 32 mm crosshatch abrasive nosing.
- .20 Fiber reinforced plastic (FRP) grating: Manufactured from premium grade (isophthalic) (vinylester) resin, conforming to ASTM E-84, Class 1 and flame rating and self-extinguishing requirements of ASTM D635. Patterns shall be (rectangular) (square), covered with baked on safety non-skid epoxy grit. Colour; (grey) (yellow) (custom). Fabricate grating to carry uniform distributed load as manufactured by Fisher & Ludlow, Seasafe Inc., or MAK Enterprises Inc.
- .21 Ladder rungs (on steel rails): "Algrip" by Safe Walk Inc., "Mebac" by IKG Industries, "Slipnot" by W.S. Molnar Co. or Safety-Tread by Amico.
- .22 Ladder rungs (cast in concrete): 20 mm rectangular solid aluminum, alloy 6051T4 with non-slip surface, No. 2916 by Stepcon Industries Inc. or approved alternative.
- .23 Highway type beam guardrails: Single rail (double rail) manufactured by Armtec Limited, Canadian Metal Rolling Mills, or Canada Culvert and Metal Products, OPSS Type DD-909-A complete with standard terminal sections, splicers, galvanized steel nuts and bolts and 125 mm diameter concrete filled standard pipe posts.

- .24 Plastic handrail: Extruded high quality virgin PVC in colour to Consultant's selection: Rehau "Art. 70039RAU - PVC9505", Micro Plastics Canada Ltd., or VPI Rail "103A", verify models to handrail and railing steel plate size. Furnish covers with protective strippable covering to protect PVC from scratches and marring during construction process.

- .25 Drilled inserts: Ramset "Mega" or Hilti "HSL" heavy-duty anchors installed in accordance with manufacturer's directions, to sizes shown. Load capacity when embedded in 25 MPa concrete shall not be less than:

Diameter	Pullout kN	Shear kN
8 mm	30.0	36.0
10 mm	43.6	57.2
12 mm	53.6	82.8
16 mm	83.6	149.6
20 mm	119.6	205.6

- .26 Epoxy capsule type anchors: Hilti "HVA Adhesive Anchor", two-part, threaded steel stud and epoxy adhesive filled capsule anchoring system. Install per manufacturer's recommendations.

.27 Bollards

.1 Interior Steel Pipe Bollards

- .1 Surface mounted, bolted down bollards with base plate, conforming to ASTM A500, Schedule 40 standard weight steel pipe cleaned to SSPC SP3 and shop primed with primer conforming to CISC/CPMA 2.75 (hot dip galvanized to CAN/CSA G164 M).
- .2 Dimensions of bollard as indicated on Drawings.
- .3 Base plate: 200 mm x 200 mm x 12.5 mm thick and 4 corner holes.
- .4 For Plastic Bollard Covers:
- .1 Cover with reflective stripe, plastic cover, safety yellow, 6 mm thick.
- .2 Finish: Schedule 40, safety yellow powder coat finish.

.2 Exterior Pipe Bollards

- .1 Concrete filled, hot dipped galvanized steel bollards. Fabricated in HSS in accordance with CSA G40.20/G40.21, Grade 350W, Class H or Schedule 40 steel pipe, grade B, in accordance with ASTM A53/53M
- .2 Sizes of bollard as indicated on Drawings.
- .3 Pipe Finish: ICI Devoe 201 or approved equivalent two-part polyamide epoxy tie coat, and exterior alkyd enamel topcoat conforming to CAN/CGSB-1.59-M.

2.2 **BASIC MATERIALS - ALUMINUM**

- .1 Aluminum rolled or extruded shapes: Structural quality to ASTM B308/B308M, Alloy 6061-T6.

- .2 Aluminum bar, rod, wire: To ASTM B221M.
- .3 Aluminum sheet or plate: To ASTM B209M.
- .4 Aluminum checkered plate: To ASTM B209M, Alloy 5086.
- .5 Aluminum drawn tubes: To ASTM B210M.
- .6 Aluminum pipe: To ASTM B241/B241M, Schedule 40, 6061 alloy.
- .7 Stainless steel bolts: Expansion bolts using high strength stainless steel conforming to ASTM A193, Grade B8, Type 316.
- .8 Aluminum finish: (plain mill finish) (clear anodic finish, designation AA-M12C22A41)
- .9 Accessories
 - .1 Steel bolts: To (ASTM F1554 grade 36) (ASTM A325M), hot-dip galvanized to CAN/CSA-G164-M, minimum zinc coating of 600 g/m².
 - .2 Bituminous paint: Henry "410-02" Bituminous paint.

2.3 **BASIC MATERIALS - STAINLESS STEEL**

- .1 Stainless steel sheet: To ASTM A167, type 304 to AISI No. 4 (2B) finish.
- .2 Stainless steel plate: To ASTM A167, type 304 to AISI No. 4 (2B) finish.
- .3 Stainless steel shapes: To ASTM A276, type 304 to AISI No. 4 (2B) finish.
- .4 Stainless steel fasteners: Type 304, (316).
- .5 Stainless steel pipe: To ASTM 312, type 316, 180 grit finish.
- .6 Stainless steel bolts: Expansion bolts using high strength stainless steel conforming to ASTM A193, Grade B8, Type 316.

2.4 **SHOP FABRICATION**

- .1 Fabricate items that are to be built into masonry or concrete and deliver to Project site for setting; furnish items complete with bolts, anchors, clips, etc., ready to set. Furnish, completely install and connect other items. Erect items to proper lines and levels, plumb and true, and in correct relation to adjoining Work. Secure parts in a rigid and substantial manner using concealed connections where practicable.
- .2 Where necessary to secure Work to the structure by means of expansion bolts, cinch anchors, and similar connections, lay out the Work and install such connections, install the Work and bolt up, unless otherwise noted.
- .3 Provide bolts, shims, blocks, nuts, washers, wedging pieces, etc., required for complete installation, unless otherwise noted.
- .4 Drill field holes for bolts or rivets. Do not burn holes.
- .5 Furnish fitting-up bolts, drift pins, other tools and equipment and do necessary reaming of unfair holes found in field connections. New holes or enlargement of unfair holes by use of cutting torch is cause for rejection of the entire member. Replacement shall be made at Contractor's expense.

- .6 Mill joints to a tight, hairline fit; cope or miter corners. Form joints exposed to weather to exclude water.
- .7 Remove burrs from all exposed cut edges.
- .8 Execute shop welding conforming with welding requirements specified under "Quality Assurance" and "Welding" herein. (Fabricate structural aluminum in accordance with CAN3-S157 and in accordance with reviewed Shop Drawings).
- .9 Accurately cut, machine and fit joints so that finished Work presents a neat appearance.
- .10 Assemble members without twists or open joints.
- .11 Drill properly sized holes for connecting the Work of other trades where such can be determined prior to fabrication. Where possible, show such holes on Shop Drawings. Place holes so not to cause an appreciable reduction in strength of member.
- .12 Certain miscellaneous metal elements are listed with a corresponding description below. Such listing is intended to provide clarity or to specify requirements for the given elements, and not to represent the scope of metal fabrications work.
- .13 Stairs – General
 - .1 Fabricate stairs with necessary components and in sizes and manner to enable installation directly to structure. Provide cast-in anchor assemblies supporting pickets, balustrades and other stair railing members. Provide bracing and hangers including necessary adjustment capability. Where possible, fit and shop assemble various sections of Work and deliver to Site in largest practicable sections.
 - .2 Forming and bending of exposed materials for treads shall be crisp, smooth, and of smallest possible radii.
 - .3 Fabricate items that are to be built into masonry or concrete and deliver to Project site for setting; furnish items complete with bolts, anchors, clips, etc., ready to set. Furnish, completely install and connect other items. Erect items to proper lines and levels, plumb and true, and in correct relation to adjoining Work. Parts shall be secured in a rigid and substantial manner using concealed connections where practicable.
 - .4 Where necessary to secure Work to the structure by means of expansion bolts, cinch anchors, and similar connections, do the Work of laying out and installing such connections, installing the Work and bolting up, unless otherwise noted. Drill or core holes in concrete and masonry Work.
- .14 Metal Pan Stairs
 - .1 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 and ground smooth.
 - .2 Sub-treads, risers and landing permanent metal forms: Steel sheet formed as shown; treads to be concrete filled, with bare metal riser incorporating 19 mm dust cove.
 - .3 Supports: As detailed on Drawings.

- .15 Bar Grating
 - .1 Of pressure resistance welded construction. No notching of bearing or cross bars permissible.
 - .2 Band openings cut in grating and grating edges, using welded connections.
- .16 FRP Grating
 - .1 Fabricate FRP gratings so that a regular pattern is presented in the finished Work with all members lined up or evenly spaced, and pattern is unbroken.
- .17 Steel Ladders and Cages
 - .1 Assembly: Welded construction, complete with steel stiffeners, rungs, safety cage, angle rails, bent plate straps or angle brackets.
 - .2 Cage bars: Of 50 mm x 3 mm thick steel bent to form rings, located at maximum 1200 mm centres, with first hoop located 2.1 m from floor level.
- .18 Steel Pipe Handrails
 - .1 Close open ends of steel pipe handrail with 1.9 mm (14 gauge) closure neatly welded and ground smooth.
 - .2 Pipe railing to consist of top rail and intermediate rail, and with matching vertical standards.
 - .3 Form changes in direction of railing members by mitering or inserting prefabricated flush elbow fittings.
 - .1 Form curves by bending in jigs to produce uniform curvature without buckling, flattening, twisting, cracking, or otherwise deforming exposed surfaces.
 - .4 Perform all welding and joining in shop prior to finishing.
 - .5 Assemble end-to-end connections and splice joints by using internal sleeves, bonded by epoxy adhesive or by field welding. Do not field weld.
- .19 Pipe Railings
 - .1 Fabricate the same as steel pipe handrails.
 - .2 Where railings are permanently inserted into concrete floors, Provide steel pipe sleeve of adequate size to be cast into concrete with a 3 mm thick steel plate welded to bottom and required anchor rods to ensure a securely set sleeve.
 - .3 Fabricate removable railings in sections to permit for easy removal. Provide steel sleeves into which railing uprights will be inserted. Fabricate sleeves to sliding fit over uprights and to provide adequate support.
- .20 Stainless Steel Pipe
 - .1 Thoroughly clean welds and surrounding substrate area of weld spatter, flux or scale by wire brushing, grinding and polishing.
 - .2 Remove excess weld by grinding to provide for continuous weld line. Grind, polish, and buff welds exposed to view to match finish of parent material.

- .21 Flat Bar Handrails, Pickets
 - .1 Handrails: Continuous top and bottom flat bars supporting both ends of pickets.
 - .2 Pickets: Welded to top and bottom flat bar handrails.
 - .3 Connection to stairs: Weld both sides of bottom rail continuously to top flange of stringer.
 - .4 Wall brackets: Provide for railings supported from walls.
 - .5 Handrail cap: Cover top flat bar full length with extruded plastic handrail cover. Weld all joints in vinyl.
- .22 Channel Door Frames
 - .1 Structural channel sections, selected for trueness of web and flange, with joints welded and ground smooth. Furnish (bar stop) and bent bar anchors for anchorage to masonry or concrete as required.
 - .2 Fit frames with temporary spreaders to prevent frame from springing out of shape.
- .23 Steel Frames for Miscellaneous Openings
 - .1 Connections: Connect built-up members of frames by means of plug welding. Miter or cope and join members with continuous welding beads.
 - .2 Top of frames embedded in concrete: Fabricate frames so top of frames are flush with finish floor elevation.
- .24 Pipe Bumpers and Sleeves, Pipe Guardrails
 - .1 (Removable), constructed of steel pipe sizes shown, complete with lifting hole where bumper is to be removable, and 6 mm thick plate closure welded to bottom of guard post sleeves.
 - .2 Provide properly sized steel pipe sleeves to allow easy removal of pipe bumper.
- .25 Lintels
 - .1 Weld pairs of members back to back together and in no case shall lintels be more than 25 mm less in width than wall they support.
 - .2 Extend lengths to allow 150 mm minimum end bearing on masonry. Unless otherwise shown, lintels in block walls shall be of steel furnished under this section.
- .26 Toilet Partition Support Framing
 - .1 Fabricate for ceiling-hung toilet partitions in washrooms with suspended ceilings. Align steel framing member with, and directly above the ceiling, over the pilasters of partitions to provide a fastening point for the pilaster. Hang the framing member from building framing above and brace the assembly against movement. Provide supplementary, concealed steel framing as required to secure the hangers and bracing in place.

.27 Lateral Supports For Masonry Walls

- .1 Minimum size 100 x 100 x 150 x 6 mm thick, steel angles along top of concrete block walls as shown. Fasten angles to structure above and space at not over 1800 mm o.c. on both sides of the walls, staggering the angles, that when combined, angles are not over 900 mm o.c.

.28 Checkered plate covers: Diamond shaped raised pattern, of nominal thickness shown exclusive of raised pattern.

.29 Floor plate: Shearing, cutting, or punching shall leave clean, true lines and surfaces. Drill countersunk holes in plate where it will be bolted in place.

.30 Kickplates: Continuous, 150 mm high x 6 mm thick.

2.5 **WELDING**

- .1 Execute welding to avoid damage or distortion to the Work. Should there be, in the opinion of Consultant or inspection and testing company, doubt as to adequacy of welds, such welds shall be tested for efficiency and any Work not meeting specified standards shall be removed and replaced with new Work satisfactory to Consultant. Execute welding in accordance with the following standards:

- .1 CSA W48-M: For electrodes. If rods are used, only coated rods are allowed.
.2 CSA W59-M: For design of connections and workmanship.
.3 CAN/CSA-W117.2-M: For safety.

- .2 Thoroughly clean welded joints and expose steel for a sufficient space to perform welding operations. Neatly finish welds. Where exposed to view and finish painted, apply weld continuously and grind to a uniformly smooth finish.

2.6 **CLEANING, SHOP PRIMING**

- .1 Omit prime painting of miscellaneous metals that will be painted with epoxy as specified in Division 9.
.2 Clean steel to SSPC SP3 (SP6) and remove loose mill scale, weld flux and splatter.
.3 Shop prime with one coat of primer paint to dry film thickness of 0.025 mm. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7°C (45°F). Paint items under cover and leave under cover until primer is dry. Follow paint manufacturer's recommendations regarding application methods, equipment, temperature, and humidity conditions.
.4 Clean but do not paint surfaces being welded in field.
.5 Do not paint surfaces embedded in concrete.
.6 Do not paint surfaces in friction connections.
.7 Treat surface of aluminum in contact with or embedded in dissimilar materials in accordance with CAN3-S157-M. Treat as if material is installed in the presence of moisture.

2.7 **HOT-DIP GALVANIZING**

- .1 Galvanize members exposed to exterior elements when in final location; members embedded on the exterior side of exterior walls; members embedded in concrete; members specified in this section or noted on Drawings.
- .2 Perform hot-dip galvanizing after fabrication. Plug relief vents air tight. After galvanizing, remove plugs, ream holes to proper size and re-tap threads. Straighten shapes and assemblies true to line and plane after galvanizing. Repair damaged galvanized surfaces with galvanize primer in accordance with manufacturer's printed directions.
- .3 Wet storage stain: Remove wet storage stain that may have developed in the coating before installation so that premature failure of the coating does not occur. Remove wet storage stain in accordance with galvanizer's recommendations.
- .4 Repair of galvanized items: Repair coatings damaged by welding, cutting, or during handling, transport or erection using cold galvanizing compound specified, and as follows:
 - .1 Ensure surface is clean, dry, and free of oil, grease and corrosion.
 - .2 Power clean surface to near white metal condition, extending into undamaged galvanized coating.
 - .3 Apply touch up material to a dry film thickness of 0.203 mm (8 mils) minimum. If touched up Work is to remain exposed in the finished Work, apply a finish coat of aluminum paint to provide a colour blend with the surrounding galvanizing.
 - .4 Coating shall be continuous, adherent, smooth and evenly distributed.

3 Execution

3.1 **ERECTION**

- .1 Fit joints and intersecting members accurately. Make Work in true planes with adequate fastenings. Build and erect Work plumb, true, square, straight, level and accurate to sizes detailed, free from distortion or defects detrimental to appearance or performance.
- .2 Stairs, Rails and Handrails
 - .1 Erect rigid and free from whip.
 - .2 Continuously weld connections for railings attached directly to steel stringers. Where rails return to wall Provide end returns and wall brackets.
 - .3 Provide temporary supports and bracing required to position stairs and landings.
 - .4 Adjust railings prior to securing in place to ensure proper matching at butting joints and correct alignment throughout their length.
 - .5 Continuously weld connections between handrails and balusters and in lengths of handrails.
 - .6 Secure wall brackets to walls with through bolts and plate where these can be concealed, otherwise use bolts and expansion shields to achieve maximum rigidity of rail. Wood plugs for fixing to walls will not be permitted. Use metal anchoring devices.

- .3 Fit door frames and jambs with temporary steel spreaders to prevent springing frames and jambs out of shape.
- .4 Weld as specified herein.
- .5 Take adequate care to prevent damage to any material such as weld burns, etc.
- .6 Include all cutting and patching of masonry walls where necessary. Obtain Contractor's approval of cutouts in advance.
- .7 Insulate where necessary to prevent electrolysis due to dissimilar metal to metal contact, or metal to masonry and concrete. Use bituminous paint, butyl tape, building paper or other approved means.
- .8 Install materials in a good and workmanlike manner, cleaning and grinding all welding laitance and touching up primer where necessary.
- .9 Erect fibre reinforced plastic (FRP) grating plumb, true, square, straight, level and accurate to size detailed, in accordance with manufacturer's printed instructions.

3.2 **CONNECTIONS**

- .1 Weld or high strength bolt main member connections. Use CISC double angle header connections wherever possible. High strength bolted connections shall be bearing type using 19 mm diameter bolts conforming to ASTM A325M. Secondary members may be bolted with machine bolts.
- .2 Perform high tensile bolted connections in accordance with CSA-S16.1. Accurately space holes of size 1.6 mm larger than the nominal diameter of the bolt. Install bearing type high tensile bolted connections unless shown otherwise on Drawings. Provide compressor or electrical equipment capable of supplying and maintaining required pressure at the wrench. Make connections without the use of erection bolts; some high tensile bolts will serve that purpose. Prevent nuts on bolts, except high tensile bolts, from becoming loose by burring bolt thread, by welding or by lock washers or lock nuts.
- .3 Execute welding as specified under shop welding in Part 2 and as follows:
 - .1 Provide continuous welds on exterior Work to provide proper weathering.
 - .2 Take necessary safety precautions in accordance with CSA standards when welding is carried out in cold weather.

3.3 **FIELD TOUCH-UP**

- .1 Paint bolt heads, washers, nuts, field welds and previously unprimed items. Touch up shop primer (and galvanizing) damaged during transit and installation with material to match shop primer or galvanize coating.
 - .2 Clean off dirt on installed miscellaneous metal surfaces.
 - .3 Touch up all damaged surfaces of aluminum Work with one coat of zinc chromate primer.
- End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section, including but not limited to, the following:
 - .1 Stainless steel cladding on the exterior of elevator shafts
 - .2 Prepainted metal cladding within elevator shafts
 - .3 Hollow metal frames within cladding system
 - .4 Stainless steel railing and guardrails
 - .5 Miscellaneous steel framing for stainless steel cladding system
 - .6 Stainless steel handrail, with tempered glazing
 - .7 Porcelain enamel for yellow and black handrail markers
 - .8 Ornamental metal handrails, rails and balustrades of polished stainless steel plates, bars, angle and tubing with fittings and accessories
 - .9 Tubing handrail and railings complete with vertical posts, floor and wall flanges, tees, elbows and end caps

1.2 **REFERENCES**

- .1 Conform to the latest edition of the following:
 - .1 ASTM A123 - Zinc (Hot Galvanizing) Coatings on Iron and Steel Products
 - .2 ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - .3 ASTM A240 - Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels
 - .4 ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
 - .5 ASTM A276 - Specification for Stainless Steel Bars and Shapes
 - .6 ASTM A653/A653M - Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .7 CSA-G40.20/G40.21-M - General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels
 - .8 CAN/CSA G164-M - Hot-Dip Galvanizing of Irregularly Shaped Articles
 - .9 CSA W47.1 - Certification of Companies for Fusion Welding of Steel Structures

- .10 CSA W59-M - Welded Steel Construction (Metal Arc Welding)
- .11 CAN/CSA-W117.2 - Safety in Welding, Cutting and Allied Processes
- .12 AODA - Accessibility for Ontarians with Disabilities Act
- .13 ANSI/AWS D1.6/D1.6M - Structural Welding Code - Stainless Steel.

1.3 **DESIGN CRITERIA**

- .1 Design and fabricate handrails, railings and balustrades to conform to requirements of the Ontario Building Code, 1997.
- .2 Design handrails, railings and balustrades and connections to withstand 1.5 KN/m applied horizontally or vertically to the top rail.

1.4 **SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00.
- .2 Show fabrication and installation of cladding and supports, railings and guardrails.
- .3 Submit representative samples of stainless steel cladding and prefinished metal cladding on plywood backing.

1.5 **QUALITY ASSURANCE**

- .1 Work of this section requires specialized high quality metal Work and shall be done by a company with a record of minimum five years of continuous and successful experience in the fabrication and installation of commercial ornamental metal Work, and thoroughly conversant with governing laws, by-laws and regulations. Submit proof of this requirement to the Engineer on request.
- .2 Have a full time, senior, qualified representative at the Site to direct the Work.

1.6 **PROJECT CONDITIONS**

- .1 Protection: Provide strippable protective film to stainless steel surfaces.

2 **Products**

2.1 **MATERIALS - GENERAL**

- .1 Specialty metals: Of best commercial quality, with various forms straight and true without scratches, scars, creases, buckles, ripples, or chatter marks. Finished surfaces must be suitable for polishing.
- .2 Select materials for surface flatness, smoothness, and freedom from surface blemishes when exposed to view in finished unit. Exposed-to-view surfaces which exhibit pitting, seam marks, roller marks, "oil-canning", stains, discolourations, dents or other imperfections on finished units will not be acceptable.
- .3 Stainless steel sheet, plate and strip: ASTM A240, Type 304 in Excelsior "XL-Blend-S" on exposed surfaces.
- .4 Metal clad panels: 1.519 mm (16 ga) stainless steel sheet bonded to visible faces and edges of 13 mm exterior grade plywood, with 0.759 mm (22 ga) galvanized steel sheet bonded to concealed faces and edges. Return the facing sheet over the edges and ends

of panels. Where back faces are also exposed, continue face sheet around to the back face of the panel. Weld mitred joints in facing material. Grind smooth. Finish shall match adjoining surfaces. Seal edges. Fastenings shall be stainless steel. Exposed fastenings not acceptable.

- .5 Stainless steel shapes: Conforming to ASTM A276, type 304 with X-L Blend S finish.
- .6 Stainless steel pipe: Conforming to ASTM A312, type 304, (316) 180-grit finish.
- .7 Stainless steel fasteners: Sizes and type shown, stainless steel type 304, unless otherwise specified.
- .8 Stainless steel bars: Conforming to ASTM A276.
- .9 Structural shapes and plates: New material conforming to CSA-G40.20-M and CSA-G40.21-M, Grade 300W.
- .10 Galvanizing of ferrous metal: Hot-dip with minimum zinc coating of 600 g/m² to CAN/CSA G164-M.
- .11 Galvanized touch up: W.R. Meadows of Canada Ltd. "Galvafruid" zinc rich coating.
- .12 Hollow metal frames: Furnish in accordance with Section 08 11 13.
- .13 Welding materials: In accordance with ANSI/AWS D1.6/D1.6M for stainless steel welding
- .14 Prepainted metal facing: 0.912 mm (20 ga), Z275 galvanized sheet steel laminated to gypsum board walls at interior of elevator shafts. Refer to Section 09 29 00 for gypsum board material.
- .15 Fastenings: Furnish stainless steel fasteners and adhesives as required by various substrates and details; supply drilled inserts where required in accordance with Section 05 50 00.

2.2 **FABRICATION**

- .1 Design components to allow for expansion and contraction without causing buckling, excessive opening of joints or overstressing of welds and fasteners.
- .2 Form metalwork to required shapes and sizes with true curves, lines and angles. Provide necessary rebates, lugs and brackets for assembly of units.
- .3 Shop fabricate items so far as practicable. Flush rivet joints to conceal reinforcement, or weld where thickness of section permits. Where cutting, welding, and grinding are required for proper shop fitting and jointing of Work, restore finish to eliminate any evidence of such corrective Work.
- .4 Grind contact surfaces of connected members true. Assemble parts so that joints are tight and practically unnoticeable, without use of filling compound.
- .5 Fabricate balustrades into largest sections possible of a length that will permit entry into building. Use material of the longest lengths to minimize joints. Weld all joints fabricated in shop. Field joints in rail to occur at natural transition points at hairline joint and concealed fasteners.
- .6 Balustrades where attached to steel fabrications shall be fixed by countersunk screws with finishing rosettes.

- .7 Stainless steel shall be refinished as required after fabrication to a polished finish specified, to eliminate markings, scratches or other surface imperfections.
- .8 Furnish assemblies with matching fascia and floor flanges factory welded to posts and rails, of sizes shown. Provide countersunk holes in flanges for flush fasteners.
- .9 Protect tubing and plate with strippable sheet protection, remaining in place through installation.

2.3 **METAL FRAMES FOR CLADDING SYSTEM**

- .1 Fabricate frames from 1.519 mm (16 ga) galvanized steel and 1.519 mm (16 ga) stainless steel where shown on Drawings. All glazing stops shall be 1.519 mm (16 ga) stainless steel.
- .2 Furnish frames of welded construction.
- .3 Prepare frames by grinding, sanding and filling same as specified for door frames in Section 08 11 13.

2.4 **WELDING**

- .1 Welding shall conform to CSA W59-M and done by a firm fully certified in accordance with CSA W47.1. All welders employed in the field shall be qualified as Class "O" as defined in CSA W47.1.
- .2 Conform to safety requirements of CSA W117.2 for all welding operations.

2.5 **STAINLESS STEEL WELDING**

- .1 Weld stainless steel by inert gas shield tungsten-arc welding GTAW (TIG) or inert gas shielded metal-arc welding SMAW process, in accordance with CSA W59-M for design of connections and workmanship, CAN/CSA W117.2 for safety, and other applicable standards as required.
- .2 Protect areas of metal adjacent to weld zone from weld spatter.
- .3 Provide recommended procedures to reduce thermal distortion and provide corrosion resistant sound welds.

- OR -

2.6 **STAINLESS STEEL WORK**

- .1 Take all necessary precautions to safeguard against latent surface discolouration due to disturbance of the natural protective oxide coating of the material or to contamination from other sources.
- .2 Workmanship shall be the best standard practice for this type of Work. Execute stainless steel Work in accordance with the applicable instructions set forth in Atlas Stainless Steels' "Technical Data" handbook on stainless steel.
- .3 Do all stainless steel fabrication in clean shops, located away from areas where carbon steel is burnt, ground, or cut with abrasive wheels to ensure that carbon steel dust will not be embedded into the stainless steel, and as follows:
 - .1 In fabrication of stainless steel do not use tools and dies which have been used on carbon steels.

- .2 Ensure tools and dies used for forming and cutting stainless steel are free of nicks and other damage.
- .3 Do not use carbon grits and grinding wheels which will imbed foreign particles into stainless steel surfaces. Use only stainless steel wool when wool polishing is required.
- .4 Stainless steel items on which rust stains appear, shall be replaced with new fabricated material.

2.7 **CLEANING AND POLISHING STAINLESS STEEL**

- .1 Thoroughly clean welds and surrounding substrate area of weld spatter, flux or scale by wire brushing, grinding and polishing. When wire brushing and grinding, use shield over adjacent mill finished surfaces to protect same, or provide limiting stops on grinder to avoid canting of grinding wheel.
- .2 Remove excess weld by grinding to provide for continuous weld line. Grinding, polishing, and passivating of welds exposed to view in finished construction to match finish of parent material.

2.8 **CLEANING AND GALVANIZING - FERROUS METALS**

- .1 Clean ferrous steel to SSPC SP6 and remove loose mill scale, weld flux and spatter. After fabrication, hot-dip galvanize miscellaneous steel items specified herein. Plug relief vents air tight. After galvanizing, remove plugs, ream holes to proper size and re-tap threads. Straighten shapes and assemblies true to line and plane after galvanizing. Repair damaged galvanized surfaces with galvanize primer in accordance with manufacturer's printed directions.
- .2 Hot-dip galvanize members in accordance with CAN/CSA G164-M and requirements of the following ASTM standards, with minimum coating weights or thicknesses as follows:
 - .1 Rolled, pressed and forged steel shapes, plates, bars and strips: ASTM A123; average weight of zinc coating per square/foot of actual surface, for 4.8 mm and less thickness members 2.0 ounces, for 6 mm and heavier members 2.3 ounces.
 - .2 Iron and steel hardware: ASTM A153; minimum weight of zinc coating, in ounces per square foot of surface shall be in accordance with Table 1 of ASTM A153, for the various classes of materials used in the Work.
 - .3 Steel sheet: ASTM A653/A653M; weight of zinc coating, total per area for both sides of sheet. Coating designation Z275, minimized spangle and chemically treated.
- .3 Drill holes for bolts and screws. Conceal fasteners where possible. Mill exposed ends and edges smooth, with corners slightly rounded. Form joints exposed to weather to exclude water.

3 **Execution**

3.1 **INSTALLATION**

- .1 Install Work to a secure and rigid installation.
- .2 Fastening to in-place construction: Provide anchorage devices and fasteners where necessary for securing metal items to in-place construction including threaded fasteners

for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

.3 Cutting, Fitting and Placement

- .1 Perform all cutting, drilling, and fitting required for installation of the Work.
- .2 Set Work accurately in location, alignment and elevation, plumb, level and true, measured from established lines and levels.
- .3 Provide temporary bracing or anchors in framework for items which are to be built into concrete, masonry or similar construction.
- .4 Form tight joints with exposed connections accurately fitted with uniform reveals and spaces for sealants and joint fillers.
- .5 Do not cut or abrade finishes which cannot be completely restored in field.
- .6 Refinish items rejected by the Engineer or alternatively, replace with new materials without cost to the Owner.

.4 Hollow metal frames: Install hollow metal frames in accordance with Section 08 11 13.

.5 Stainless steel, hollow section railings: Install railing and tempered glazing in accordance with details.

.6 Porcelain Enamel Handrail Markers

- .1 Provide yellow and black porcelain enamel handrail markers.
- .2 Insert near ends of handrails as detailed.
- .3 Railings, balustrades: Erect railings, balustrades, trim, and other fabrications plumb, true to line and level in exact locations using concealed mechanical fastenings, or by countersunk screws with finishing rosettes. Use countersunk fastening on tube railings and concealed fastenings as required and specified, and to details shown.

3.2 **PROTECTION**

- .1 Remove protective coverings when there is no longer danger of damage to specialty metal Work.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 CAN/CSA O80 Series - Wood Preservation
- .2 CAN/ULC-S102 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
- .3 CSA O121-M - Douglas Fir Plywood
- .4 NLGA - National Lumber Grades Authority
- .5 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **QUALITY ASSURANCE**

- .1 Each piece of pressure treated lumber and fire retardant treated lumber supplied to the job Site shall be shop marked with the pressure treatment brand, and ULC monogram respectively, in accordance with CAN/CSA O80-M.

1.4 **PRODUCT DELIVERY, STORAGE AND HANDLING**

- .1 Store lumber in a dry area. Stack 150 mm clear of floor and with 6 mm spacers 1200 mm apart across each layer.
- .2 Cover materials with tarpaulins or polyethylene sheets to prevent moisture absorption and impairment of structural and aesthetic properties. Vent to allow air movement. Tie covering to keep in place.

1.5 **ROOF LUMBER PROTECTION**

- .1 During transit, storage, and immediately following installation, protect roof lumber from rainwater and condensation to prevent decay. Likewise, Provide protection whenever work is interrupted for whatever reason. Use waterproof tarpaulins tied down to prevent wind blow-off. Moisture control must be properly practiced to prevent the occurrence of lumber decay. Pressure treated lumber is not used in this Project.

2 Products

2.1 **MATERIALS**

- .1 Dimension lumber: Grade stamped, dressed, kiln dried lumber having a maximum moisture content at time of installation, of 15% for 50 mm or less in thickness, and 19% for stock over 50 mm thick in accordance with NLGA.
- .1 Interior blocking, furring, nailers: NLGA, 122c - Standard Light Framing Grade Spruce, Pine or Fir (S-P-F), S4S.

- .2 Roof lumber: NLGA, 122b - Construction Light Framing Grade Spruce, Pine or Fir (S-P-F), S4S.
- .3 Roof lumber (for PVC/EPDM roofing): NLGA (202c), "C Cedar Industrial Clear", Western Red Cedar, surfaced, kiln dried. Pressure treated wood is unacceptable.
- .4 Lumber exposed to the exterior elements: Jack Pine, Grade No. 2 or better, pressure treated with CCA salt preservative in accordance with CAN/CSA O80 Series, or "C Cedar Industrial Clear", Western Red Cedar, surfaced, kiln dried..
- .2 Fire retardant treatment of lumber and plywood: "Dricon" fire retardant treatment by J.A. Biewer or equivalent, conforming to CAN/CSA-O80.20 and CAN/CSA-O80.27 respectively, to provide a flame spread rating of 25 or less in accordance with ULC test method CAN/ULC-S102.
- .3 Plywood: 19 mm thick (others), waterproof, grade stamped exterior grade Douglas fir plywood, (select unsanded for concealed uses) (good one side-sanded for use with single ply roofing) in accordance with CSA O121-M.
- .4 Insulation within curbs and parapets: E'NRG'Y 3 AGF as supplied by Johns Manville, "IkoTherm III" by IKO Industries Ltd. Or "ACFoam III" by Atlas, polyisocyanurate insulation, fully adhered with mastic adhesive. Cover with plywood mechanically fastened through insulation to steel curb.
- .5 Loose insulation: Loose type; fiberglass by Owens-Corning Canada, mineral wool by Roxul Inc., or basalt wool by Fibrex Insulations, Inc.
- .6 Rough hardware: Bolts, anchors, nails, screws, expansion shields and other fastenings required to frame and fix rough carpentry as follows:
 - .1 Hardware for lumber to lumber in exterior locations: Steel screws or spiral nails hot-dip galvanized to ASTM A-153. Wood screws shall be countersunk head, full thread type.
 - .2 Hardware for lumber to metal in exterior locations: Self-drilling with fluoropolymer type barrier coating.
 - .3 Hardware for lumber to masonry or concrete in exterior locations: Drilled-in expansion shields or drilled in self-drilling masonry concrete screws with fluoropolymer type barrier coating.
 - .4 Hardware in interior locations: As specified above, but with electrogalvanized coating.

2.2 **SELECTION OF LUMBER PIECES**

- .1 Carefully select all members; select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing or making proper connections.
- .2 Discard wood members with defects which will render a piece unable to serve its intended function; lumber may be rejected by Consultant whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mould, as well as for improper cutting and fitting.

3 **Execution**

3.1 **ROOF LUMBER**

- .1 Construct rough carpentry from wood pieces of longest available length.
- .2 After cutting treated lumber, apply two liberal coats of preservative on cut surfaces of lumber.
- .3 Fasten plywood, wood nailers and blocking at maximum 400 mm o.c. in staggered pattern unless noted otherwise, and in accordance with FM 1-49.
- .4 Install vapour barrier under curb insulation and wood nailers, and in accordance with (FM 1-60) (FM 1-90). Seal as required to provide vapour tight condition.
- .5 Unless held in place by plywood, mechanically fasten insulation to vertical surfaces using screw and plate method. Substrate to receive insulation shall be completely dry.

3.2 **MISCELLANEOUS WOODWORK**

- .1 Install miscellaneous wood blocking, strapping and nailers required for attachment of Work of all trades, in addition to roof woodwork. Set accurately so that they will be completely concealed.
- .2 Except where steel supports are specifically shown, Provide wood blocking and supports in metal stud partitions for fastening of items such as casework and other wall mounted accessories. Have respective trades approve the location of such wood blocking.
- .3 Use fire retardant lumber for blocking/framing in ceiling spaces, partitions and bulkheads.
- .4 Install and secure 50 mm x 250 mm full length temporary spruce, pine or fir treads and landings on steel stairs shown to receive concrete fill.
- .5 Install temporary wood protection strips at door jambs in high traffic areas.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- | | | | |
|----|----------------|---|--|
| .1 | AWI/AWMAC | - | American Woodwork Institute/Architectural Woodwork Manufacturers Association of Canada |
| .2 | CAN3-O188.1-M | - | Interior Mat-Formed Wood Particleboard |
| .3 | CSA O80 Series | - | Wood Preservation |
| .4 | CSA O115-M | - | Hardwood and Decorative Plywood |
| .5 | CSA O121-M | - | Douglas Fir Plywood |
| .6 | CAN/ULC-S102 | - | Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies |
| .7 | NEMA LD3 | - | National Electrical Manufacturers Association, High Pressure Decorative Laminates |
| .8 | AODA | - | Accessibility for Ontarians with Disabilities Act |

1.3 **SUBMITTALS**

.1 Shop Drawings

- .1 Submit in accordance with Section 01 33 00. Show on Shop Drawings, vanities, counters, cupboards, and other casework.
- .2 Show fabrication details, including exact sizes and description of anchorage and hardware, nature of the materials which are to be used as component parts, and installation and interface conditions.

.2 Samples: Submit duplicate samples of plastic laminate for colour and sheen verification.

1.4 **QUALITY ASSURANCE**

.1 Special Experience Requirements

- .1 Manufacturer/fabricator: Architectural woodwork shall be manufactured by a current member firm of AWI/AWMAC, and having a minimum of five years experience on Work of similar size and quality to that indicated and specified.
- .2 Installer qualifications: Engage an installer who is a current member firm of AWI/AWMAC, and who has successfully completed two architectural woodwork projects similar in scope, materials and design to that indicated and specified within the last five years.

.2 Execute plastic laminate Work to CAN3-A172-M, except as specified otherwise.

1.5 **PRODUCT DELIVERY, STORAGE AND HANDLING**

- .1 Deliver units to meet installation schedule. Arrange for strategic, off-the-ground, covered storage locations with constant minimum temperature of 16°C (61°F) and maximum moisture content of 12% when measured with moisture meter.
- .2 Cover plastic laminate faced surfaces and varnished surfaces at the factory with 480 kg/m³ kraft paper. Protect all surfaces with corrugated cardboard.
- .3 Provide adequate protection until finally accepted.

1.6 **WARRANTY**

- .1 Warrant Work of this section against defects and deficiencies for a period of two years from date Work is certified as substantially performed in accordance with the general conditions of the Contract.
- .2 Promptly make good defects and deficiencies which become apparent within the Warranty Period by replacing defective plastic laminate Work satisfactory to the Consultant and at no expense to the Owner.
- .3 Defects shall include, but not be limited to, warping and delamination.

1.7 **COORDINATION**

- .1 Coordinate with the frame Suppliers as to the time at which such items will be required for installation. Receive and store such items.

2 **Products**

2.1 **MATERIALS**

- .1 Wood Materials
 - .1 Restriction of source of supply: 50% of wood Products used in Work of this section must be Forest Stewardship Council (FSC) Certified, with chain of custody verification.
 - .2 Provide materials that comply with requirements of the AWI/AWMAC Manual for each type of woodwork and quality grade indicated and, where Products are part of woodwork, with requirements of the referenced Product standards that apply to Product characteristics indicated.
 - .3 Lumber: To AWI/AWMAC manual with the following requirements:
 - .1 Hardwood for concealed blocking and framing: Economy grade, any species that, when painted, will not show any defects.
 - .2 Moisture content: Provide kiln-dried (KD) lumber with an average moisture content range of 6% to 11% for interior Work. Maintain temperature and relative humidity during fabrication, storage and finishing operations so that moisture content values for woodwork at time of installation do not exceed 5% to 10%.
 - .3 Solid hardwood for transparent finish grade: to Architectural Woodwork Standards, Edition 1-2009, Grade I. Wood species and cut: To later selection by Consultant.

- .4 Architectural lumber: Clear, straight, kiln dried, select yellow birch for urethane or varnish finished fitments and door jambs. Lumber shall be kiln dried to 5% moisture content and free from blemishes that would be apparent after finish is applied.
- .2 Plastic laminate face sheets: Arborite, Formica, Wilsonart, Micarta, Nevamar, or Pionite conforming to NEMA LD3, postforming grade (PF42) for postformed Work, and standard grade (GP50) for flatwork, in solid colour range, furniture finish, as selected by Consultant.
 - .1 Plastic laminate backing: Product of manufacturer of face sheet used, grade PF30.
 - .2 Laminating core: Particleboard core of minimum 720 kg/m³ density conforming to CAN3-O188.1-M, sanded face, or Douglas Fir plywood conforming to CSA O121-M, G2S.
- .3 Kitchen countertop:
 - .1 Plastic laminate by Wilsonart or accepted equivalent. Colour: as indicated on Drawings.
 - .2 Quartz: Cast solid, non-porous homogeneous material composed natural minerals. Refer to Section 09 30 00. Design and colour as indicated on Drawings.
 - .1 Joint adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, non-porous joints by chemical bond.
- .4 Melamine surfaced boards: 720 kg/m³ density particleboard core with thermally fused low pressure laminate finish by Domtar, Arborite or Uniboard. Colour as selected by the Consultant.
- .5 Plywood: Douglas fir conforming to CSA O121-M, G2S, sanded, and stain grade birch conforming to CSA O115-M, G1S and G2S, depending on exposure.
- .6 Exterior wood benches, tables and bearers: Clear "All Heart" Grade California Redwood, free from all sapwood streaks.
- .7 Casework hardware: As follows:
 - .1 Adjustable shelf hardware (janitors' shelves): Extra heavy duty; Knape and Vogt No. 87 ANO standards, No. 187LL ANO shelf brackets and matching shelf rests or Richelieu equivalent, all in anochrome finish. Locate standards at 600 mm o.c. maximum.
 - .2 Adjustable shelf hardware (cupboard shelves): Knape & Vogt No. 255 standards and No. 256 shelf brackets, or Richelieu equivalent, nickel plated (brass) (epoxy coated white) (epoxy coated almond), mortised into cabinet sides.
 - .3 Door and drawer pulls: Canadian Builders Hardware CBH 220, 88 mm long aluminum brass, or stainless steel or Hafele 116.05.922.
 - .4 Hinges: Blum "Clip 170" or Hettich "Euromat Topsafe 4955", 170 degree opening angle, concealed, self-closing, nickel plated.
 - .5 Drawer slides: Full extension, rated 100 lb. load, Knape & Vogt 1400 or Accuride 3832.

- .6 Cabinet door and drawer lock: Knap & Vogt 986, nickel plated.
- .7 Vanity brackets: Hebco table brackets.
- .8 Rough hardware: Supply all rough hardware to frame and fix finish carpentry. This includes bolts, anchors, nails, expansion shields and other fastenings required. Ensure bolts and screws are galvanized or non-ferrous material. Wood screws shall be full thread screws.
- .9 Wood veneer for natural finish: Species: Straight grain, to match approved sample, minimum 0.8 mm thick, architectural quality, premium grade selected for uniformity of colour, figure and grain. Piece veneers shall be parallel chipped, jointed by tapeless splicer and edge glued. Face veneers shall not contain open joints, face depressions, glue stain, patches, plastic repair or any other manufacturing irregularities or defects.
- .10 Fire retardant treated plywood: Pressure-impregnated fire retardant treated plywood conforming to CSA O80.27, to provide a flame spread rating of 25 or less, in accordance with CAN/ULC-S102.
- .11 Insulation: Unfaced fibreglass batt insulation, Roxul or Partec.

2.2 **FABRICATION**

- .1 Obtain and verify dimensions at the building before fabrication of casework takes place, and in ample time to prevent unnecessary delays in the Work.
- .2 Make Work plumb, level and true, in as long lengths as practicable with joints arranged to be as inconspicuous as possible, and with proper provision for shrinkage.
- .3 Machine sand wood surfaces to an even, smooth surface, ready for finish. Hand clean Work and securely fix. Accurately fit joints of shop assembled Work. Dovetail and glue drawer slides to fronts and backs. Groove drawer bottoms 6 mm deep into drawer fronts, sides and back. Connect other joints by means of mortise and tenons, dowels, stub tenons, dovetails, dadoes or lock joints, as applicable for the jointing condition. Ensure end grain on finished surfaces, unless part of the design, are not exposed. Nails shall have concealed heads and with all screw and bolt heads countersunk and covered with matching wood plugs in exposed surfaces.
- .4 Tool marks on exposed surfaces is deemed sufficient cause for rejection.
- .5 Neatly and accurately scribe, mitre and joint Work. Carefully mitre all exposed corners. Neatly cope intersecting moulds at inside corners; do not mitre.
- .6 Rout or groove back of flat trim; kerf backs of wide flat members, except for members with backs exposed in finished Work.
- .7 Assemble Work at the shop, unless impractical, and deliver ready for installation, with ample allowance for cutting, fitting and scribing.
- .8 Ensure that mill assembled units are of sizes that can be transported through the building to their final location.
- .9 Construct Work as shown or noted on the Drawings and Shop Drawings. Adequately frame as required to provide a firm and rigid installation complete with all gables, divisions and other members. Conceal all fastenings.

.10 Plastic Laminate Work

- .1 Veneer plastic laminate to core material in accordance with manufacturer's printed directions. Apply laminate face sheet to exposed surfaces of casework. Apply backing grade to underside of shelves and counters. Use melamine finished core for interior surfaces of drawers and cabinets only.
- .2 Neatly butt plastic laminate, with self edging applied before face veneers. Seal core at joints and edges and where sink cut-outs are provided, with water-resistant material to retard movement of moisture to, or from, the assembly. Mechanically shop fasten backsplash core material to the top core with 1.5 mm (16 gauge) concealed brackets at 300 mm centres. Carry counter laminate material up at back edges to form integral coved backsplash.
- .3 Joints in plastic laminate Work are not permitted except in pieces exceeding 2400 mm in length.
- .4 Cut units for sinks in coordination with mechanical trade.

.11 Solid Composite Countertops

- .1 Factory-fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with reviewed Shop Drawings and manufacturer's printed instructions and technical bulletins.
- .2 Form joints between components using manufacturer's standard joint adhesive without conspicuous joints.
- .3 Provide factory cutouts for plumbing fittings and accessories as indicated on the Drawings.
- .4 Rout and finish component edges with clean, sharp returns. Rout cutouts, radii and contours to template. Smooth edges. Repair or reject defective and inaccurate Work.
- .5 Finish: Provide surfaces with a uniform finish. Semi-gloss: Gloss range of 20-50.

.12 Veneered Panels

- .1 Apply hardwood veneers on (fire retardant) wood particleboard core, in minimum thickness indicated, with solid edge strips.
- .2 Finished panels are required to have a flame spread rating of not more than 150 in accordance with the Ontario Building Code. Finish for veneered panels is supplied and applied under Section 09 91 00. However the responsibility for ensuring that this requirement is met rests with this section. Submit to the Consultant two 300 mm x 600 mm representative sample panels illustrating finish for approval.
- .3 Provide backing sheet of sufficient thickness to compensate stresses caused by facing sheet. Apply uniform coating of sealer on exposed veneered edges. Finish panel edges with self-edge straight-line edging, 1 mm standard material. Apply with same adhesive as facing sheet.
- .4 Provide cut-outs as required for inserts, fixtures and fittings. Use radius corner and chamfer edges around cut-outs to avoid chipping laminated.

- .5 Use specified exposed mechanical fasteners to attach wood panels to strapping in walls.

3 Execution

3.1 **EXAMINATION**

- .1 Inspect existing conditions upon which Work of this section is dependent. Report to the Consultant in writing any defects or discrepancies. Commencement of Work implies acceptance of existing conditions.

3.2 **INSTALLATION**

- .1 Set and secure materials and components in place, rigid, plumb and square, and in accordance with reviewed Shop Drawings. Be responsible for a rigid and secure attachment.
- .2 Casework: Install level plumb and true and complete in all respects. Rigidly and securely fasten to retaining structures using heavy duty hardware. Fit and scribe as required to achieve neat junctures with retaining structure and to conceal voids at such points. Install finish hardware for casework in accordance with manufacturers' directions. Adjust as required for a perfect fit and for ease of operation.
- .3 Wood Handrails
 - .1 Secure wood stair handrails, level, square and true to the required lines, slopes or curves.
 - .2 Bolt balcony handrails to retaining angle welded atop balcony edge steel framing. Likewise, secure handrail to retaining angle at stairs and landings. Let bolt heads in finished Work and cap with edge grain wood caps, dress and finish flush.
 - .3 Finish woodwork in maximum possible lengths. Scarf, glue and properly fasten joints between lengths. Match material being jointed reasonably well for grain and colour.
 - .4 Accurately cut, mitre, fit and joint Work together to produce tight hairline joints, rigidly secured together in a permanent manner using glue or blind screw fixing.
 - .5 Hand sand after installation to remove roughness, planer marks, etc. Sanding shall be done with the grain of the wood and finished with fine grit paper to leave a smooth scratch-free surface suitable to receive finish.
- .4 Hollow Metal Frames
 - .1 Erect door frames, (glazed screen and borrowed light frames) plumb, square and level, maintaining widths and heights.
 - .2 Brace frames solidly in position while being built into masonry. Install temporary wood spreaders at mid-height of door frames, full width, until adjacent masonry Work is complete.
 - .3 Pack the door jamb and head voids which occur in exterior walls with specified insulation.
 - .4 Tap structural steel to coincide with fastener spacing on hollow metal door frame. Place spacer at each fastener location and install fastener.

- .5 Tighten fastener, with head flush to frame. Apply metal filler to fastener head.
Sand filler flush to frame and prepare for paint finish.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.
- .2 By definition, "casework" means cabinets, vanities, counters, countertops, cupboards, wardrobes, lockers, closets, shelving, desks, tables, benches, showcases, door jambs.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 AWMAC - Architectural Woodwork Manufacturers Association of Canada
- .2 CAN3-A172-M - High Pressure, Paper Base, Decorative Laminates
- .3 CAN3-O188.1-M - Interior Mat-Formed Wood Particleboard
- .4 CSA O115-M - Hardwood and Decorative Plywood
- .5 CSA O121-M - Douglas Fir Plywood
- .6 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **SUBMITTALS**

- .1 Submit Shop Drawings to illustrate fully all details of Work and conditions adjoining the Work, in accordance with Section 01 33 00.
- .2 Show fabrication details including exact sizes and description of anchorage and hardware, the nature of the materials which are to be used as component parts.
- .3 Clearly cross reference components on the Shop Drawings to the Contract Working Drawings indicating location, number required and name of unit.
- .4 Certification: Submit a certificate from the National Hardwood Lumber Association stating compliance of supplied hardwood lumber to the Specification.
- .5 Samples: Submit samples of casework sections in accordance with Section 01 33 00. Sample units for submission shall be as follows:
 - .1 Two 150 x 150 mm plastic laminate applied on 19 mm core showing finish for countertops.
 - .2 Two 150 x 150 mm plastic laminate applied on 19 mm core showing finish for cupboard doors and adjustable shelves.
 - .3 One 400 x 400 mm shiplap panelling over plywood back. Sample shall include lacquer finish specified.
 - .4 One drawer unit (except hardware) constructed and finished as specified.
- .6 Apply plastic laminate on sample materials on both faces and on three sides only of core, in thicknesses specified.

- .7 Samples shall depict exactly, the Work required to be provided with regards to finish and material on which finish is applied. Finish all casework equal in quality and finish to those approved.
- .8 Identify samples with Project name and number, date of submission, material name and Subcontractor's name.

1.1 **QUALITY ASSURANCE**

- .1 Special Experience Requirements
 - .1 Manufacturer/fabricator: Architectural woodwork shall be manufactured by a current member firm of AWI/AWMAC, and having a minimum of five years experience on Work of similar size and quality to that indicated and specified.
 - .2 Installer qualifications: Engage an installer who is a current member firm of AWI/AWMAC, and who has successfully completed two architectural woodwork projects similar in scope, materials and design to that indicated and specified within the last five years.
- .2 Quality standard: Comply with AWI/AWMAC Architectural Woodwork Standards Edition 1-2009 ("AWI/AWMAC Manual"), "Custom Grade".
- .3 Execute plastic laminate Work to CAN3-A172-M, except as specified otherwise.

1.2 **PRODUCT DELIVERY, STORAGE AND HANDLING**

- .1 Deliver units to meet installation schedule. Arrange for strategic, off-the-ground, covered storage locations with constant minimum temperature of 16°C (61°F) and maximum moisture content of 12% when measured with moisture meter.
- .2 Cover plastic laminate faced surfaces and varnished surfaces at the factory with 480 kg/m³ kraft paper. Protect all surfaces with corrugated cardboard.
- .3 Provide adequate protection until finally accepted.

1.3 **WARRANTY**

- .1 Warrant Work of this section against defects and deficiencies for a period of two years from date Work is certified as substantially performed in accordance with the general conditions of the Contract.
- .2 Promptly make good defects and deficiencies which become apparent within the Warranty Period by replacing defective plastic laminate Work satisfactory to the Consultant and at no expense to the Owner.
- .3 Defects shall include, but not be limited to, warping and delamination.

1.4 **EXAMINATION**

- .1 Examine the Drawings and Specifications and previously constructed Work which is to receive this Work. Notify the Consultant in writing of any conditions beyond acceptable tolerances which may prejudice the proper completion of this Work.
- .2 Obtain and verify all dimensions at the building before any fabrication of casework takes place, and in ample time to prevent unnecessary delays in the Work.
- .3 Commencement of Work on the Site shall constitute acceptance of existing conditions.

2 Products

2.1 **MATERIALS**

- .1 Construct casework generally with stain (paint) grade, clear birch plywood for light stain (paint) finish. Birch shall conform to the requirements of CSA O115-M. (Construct casework with plastic laminate finished particleboard or plywood core as specified.)
- .2 Hardwood face veneers: Tightly and smoothly cut, selected for uniformity of colour. Knots, open defects, wood inlays, excessive stain or discolouration of plastic fillers are not acceptable. Match face veneers for grain or colour.
- .3 Lumber: Premium grade hardwood lumber in accordance with the National Hardwood Association, air dried to maximum 6% to 8% moisture content. Species: (white birch) (hard maple) (white oak) (red oak).
 - .1 Oak panels: Sized as shown, with shiplap edges to provide (channel) - (shaped recess between adjacent panelling as detailed).
- .4 Plastic Laminate
 - .1 Plastic laminate face sheets: Arborite or Formica, Wilsonart, Micarta or Nevamar, laminate face sheets, 1.25 mm thick, conforming to CAN3-A172, Postforming Standard Grade (PF-S) for postformed work and General Purpose Standard Grade (CGP-S) for flatwork, in solid colour range, (woodgrain) (printed pattern) suede (glossy) (furniture) finish, as later selected by the Consultant at a late date.
 - .2 Plastic laminate backing sheet: Backing Grade (BK) 0.511 mm, Product of manufacturer of face sheet used.
 - .3 Core: Particleboard core of minimum 720 kg/m³ density and conforming to CAN3-0188, sanded faces, or Douglas Fir plywood conforming to CSA O121-M, G2S.
 - .4 Adhesive: Thermosetting to suit laminate application without failure.
- .5 Melamine: Thermally fused on 720 kg/m³ density particleboard core by Domtar or Arborite. Colour as selected by Consultant.
- .6 Rough hardware: Supply all bolts, anchors, nails, expansion shields and other fastenings required for this Work. All bolts and screws shall be non-ferrous materials.

2.2 **SHOP FABRICATION AND WORKMANSHIP**

- .1 Carry out all finish joinery Work in accordance with first quality cabinet making practice, by skilled mechanics, under the supervision of a competent supervisor. Erect casework plumb, level and true, in lengths as long as practicable with joints arranged to be as inconspicuous as possible, and with proper provision for shrinkage.
- .2 Machine sand wood surfaces to an even, smooth surface, ready for finish. Hand clean and securely fix all joints accurately fitted, no end grain exposed on finished surfaces, unless part of the design; and concealing nail heads with all screw and bolt heads countersunk and covered with matching wood plugs in finished Work.
- .3 Tool marks on exposed surfaces is deemed sufficient cause for rejection.
- .4 Do all scribing, mitres and jointing accurately and neatly. Carefully mitre all exposed corners. Neatly cope intersecting moulds at inside corners and do not mitre.

- .5 Assemble and finish Work completely at the shop, unless impractical, and deliver ready for installation. Where Work is to be built in, construct casework with ample allowance for cutting and fitting.
- .6 Ensure that mill assembled units are of sizes that can be transported through the building to their final location.
- .7 Construct Work adequately framed, and complete with gables, divisions, blocking and other members as required to provide a firm and rigid installation. Cover all exposed braces and brackets of wood with plastic laminate covered on all exposed edges and faces. Conceal all fastenings.
- .1 Doors: Cupboard doors, unless otherwise detailed, of 19 mm thick five-ply construction and installed with edging strips on sides, top and bottom, rebated into the core so as to conceal the joint as much as possible. Provide hardwood core.
- .2 Gables and shelving: All gables, divisions and shelving shall be as detailed. Where gables are over 1220 mm high, use 25 mm thick plywood unless otherwise detailed, with all exposed edges covered with wood edging.
- .3 Plywood backs: No horizontal joints on exposed faces and vertical joints at vertical divisions only.
- .4 Adjustable shelves: Shelves in cabinets of 19 mm thick plywood, unless detailed otherwise on the Drawings, edge lipped with solid wood and adjustable at 13 mm intervals on pilaster track and brackets.
- .5 Drawers: All drawers shall have 25 mm solid birch front (cut for lock hardware). Drawer sides shall be 13 mm thick solid birch with top edges rounded and attached to drawer front with carefully fitted glued dovetail joints. Mortised or nailed construction will not be accepted. Drawer backs shall be 13 mm solid birch attached to drawer sides with carefully fitted lock corner joints. Drawer bottoms shall be 6 mm plywood grooved into drawer sides, back and front making box construction. Install all hardware to drawers, doors and fitments.
- .6 Laminated maple tops, aprons and splashbacks: Laminate maple tops and aprons and fabricate from 38 mm wide strip material with standard glue jointing, through-dowelled and matched for graining to prevent warping. Trench tops where shown. Join together tops, aprons and splashbacks with T and G joints and concealed bolts.
- .7 Galvanized iron tops, aprons and splashbacks: Form G.I. work to tops, aprons and splashbacks of tables where shown. Cover all exposed edges, ends and faces. Solder all joints neatly. Clean down with acid-neutralizing cleanser.
- .8 Stainless steel tops, aprons and splashbacks: Fabricate in accordance with details shown on the Drawings of type (302) (304) (316) (321) stainless steel with 2B finish. Weld, grind smooth all joints and brush to same finish as the finish of adjoining surfaces.
- .9 Pipe frames: Construct pipe frames and metal bracing to tables and benches where indicated. Pipe shall be standard 32 mm diameter, Schedule 40 pipe with rails and braces fitted and welded and ground smooth. Form channel braces of 38 x 38 mm sections bolted to framing. Feet shall be standard flange type, welded to legs.

- .10 Wood louvres: Form louvres of solid oak material at sill and head and oak veneered laminated core for blades. Conceal fastenings of blades to framing and framing to other construction.
- .11 Oak work bench: Construct oak bench of solid material with all fastenings concealed by side grain plugs.
- .12 Narcotic cupboard: Provide and install door frame, blocking, cupboard walls and ceiling lining, five shelves and plastic laminate faced solid core door, all built into fitment unit as detailed and shown on the Drawings. (Hardware by Project hardware Supplier).
- .8 Coordinate with mechanical trades and cut fitments for sinks, services and wastes.
- .9 Plastic Laminate Application
 - .1 Veneer plastic laminate to core material in accordance with manufacturer's printed directions. Apply laminate face sheet to exposed surfaces of casework. Apply backing grade to underside of shelves and counters. (Use melamine finished core for interior surfaces of drawers and cabinets only.)
 - .2 Neatly butt plastic laminate, with self edging applied before face veneers. Seal core at joints and edges and where sink cut-outs are provided, with water-resistant material to retard movement of moisture to, or from, the assembly. Mechanically shop fasten backsplash core material to the top core with 1.5 mm (16 gauge) concealed brackets at 300 mm centres. Carry counter laminate material up at back edges to form integral coved backsplash.
 - .3 Joints in plastic laminate Work are not permitted except in pieces exceeding 2400 mm in length.
 - .4 Splashbacks, unless otherwise shown on the Drawings, to be 100 mm high, but where installed over a counter and below an overhead cupboard, the splashback shall be for the full height between the two fitments. Butt joints in all surfaces to be spliced and drawn together with "draw-bolts" of type recommended by manufacturer of laminate material. All such butt joints to be located not nearer than 600 mm from any sink. Splashbacks to be mechanically shop fastened at the counter top with 1.5 mm (16 gauge) brackets at 300 mm centres.

2.3 FINISHES

- .1 Prime paint all metal Work (except galvanized iron) with one coat primer conforming to CISC/CPMA 2.75, finished with two coats alkyd enamel in colours selected later by the Consultant.
- .2 Finish all oak veneer or solid stock oak with sealer and two-coat hand rubbed lacquer treatment.
- .3 Finish all birch, solid and veneered material, including interiors of cabinets, drawers, counters and trim as specified for oak material.
- .4 Cover all exteriors of fitments, braces, shelves, countertops, aprons and splashbacks, and the interior faces of doors, with plastic laminate finish as hereinbefore specified. Exterior shall mean all faces, edges and ends not concealed behind doors. All door edges shall be similarly faced.

- .5 All painted wood to receive one coat of interior wood primer and two coats interior alkyd enamel, low gloss, colours as later selected by the Consultant. Prime all concealed wood surfaces such as cupboard backs against walls, cupboard supports under bottom shelves, etc; before installation.

3 Execution

3.1 **EXAMINATION**

- .1 Inspect existing conditions upon which Work of this section is dependent. Report to the Consultant in writing any defects or discrepancies. Commencement of Work implies acceptance of existing conditions.

3.2 **INSTALLATION**

- .1 Set and secure materials and components in place, rigid, plumb and square, and in accordance with reviewed Shop Drawings. Be responsible for a rigid and secure attachment.
- .2 Rigidly and securely fasten to retaining structures using heavy duty hardware. Fit and scribe as required to achieve neat junctures with retaining structure and to conceal voids at such points. Install finish hardware for casework in accordance with manufacturers' directions. Adjust as required for a perfect fit and for ease of operation.
- .3 Install all finish hardware supplied by the finishing hardware Supplier.

3.3 **CLEAN-UP**

- .1 Clean-up and remove from the Owner's premises on a daily basis all rubbish and surplus materials resulting from this Work.
- .2 Immediately prior to final acceptance of finished Work, thoroughly clean and polish all Work of this trade to an acceptable finish.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 ASTM C836, Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
- .2 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.
- .3 ASTM D570, Standard Test Method for Water Absorption of Plastics.
- .4 ASTM D903, Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
- .5 ASTM D1876, Standard Test Method for Peel Resistance of Adhesives (T-Peel Test).
- .6 ASTM D1970, Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- .7 ASTM D3767, Standard Practice for Rubber-Measurement of Dimensions.
- .8 ASTM D5385, Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes.
- .9 ASTM E96/E96M, Standard Test Methods for Water Vapor Transmission of Materials.
- .10 ASTM E154, Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls or as Ground Cover.
- .11 CAN/CGSB 11.3, Hardboard.
- .12 CAN/CSA A179, Mortar and Grout for Unit Masonry.
- .13 CSA B111, Wire Nails, Spikes and Staples.

1.3 **SUBMITTALS**

.1 Product Data

- .1 Submit manufacturer's Product data in accordance with Section 01 33 00.
- .1 Submit Product data for each Product indicating: Installation details, physical properties and detailed application and installation instructions.

.2 Shop Drawings

.1 Submit Shop Drawings in accordance with Section 01 33 00 indicating:

.1 Typical layouts and special details as required for:

.1 Final configuration, sequence, method of attachment to excavation support system, means and methods of supporting membrane externally or internally which will not puncture or injure membrane and which will prevent sagging or loss of contact with excavation support system.

.2 Location of each membrane penetration and membrane penetration details.

.3 Certificates

.1 Submit certifications for items required at least eight weeks prior to installation of Work of this section.

.2 Submit manufacturer's certification that waterproofing system materials and accessories supplied are compatible and meet Specification requirements and that supervisor and installer is approved by membrane manufacturer.

.3 Submit names of successful membrane installations in which certified personnel have performed tasks of comparable complexity and scope within preceding five years.

.4 Submit inspection reports and certification by manufacturer confirming that installations are in accordance with the Contract Documents and manufacturer's recommendations.

.5 Submit Quality Control Plan detailing quality control procedures to be used to meet manufacturer and Specification requirements. Obtain acceptance of Quality Control Plan from Consultant before starting the Work of this Section.

1.4 **QUALITY ASSURANCE**

.1 Manufacturer's qualifications: Perform Work of this section by company manufacturer's having minimum of ten years recent experience in Work of comparable complexity and scope.

.2 The Work of this section shall be performed by a qualified applicator trained and approved by waterproofing manufacturer.

.3 Applicator shall have minimum three years proven satisfactory experience in this type of Work, having adequate equipment and skilled personnel to complete the Work of this section in an efficient and workmanlike manner.

.4 Applicator must be a member in good standing, prior to bidding, of the Sealant and Waterproofing Association of Ontario.

1.5 **MANUFACTURER'S INSPECTIONS**

.1 Manufacturer's representative shall visit Site prior to commencing the Work and verify, in writing, that conditions and substrates are acceptable to receive this work.

- .2 Manufacturer's representative shall visit Site during this Work and verify in writing, that application is in accordance with this Specification and manufacturer's recommendations. Upon completion of this Work, manufacturer's representative shall verify, in writing, that the application has been completed in accordance with this Specification and manufacturer's recommendation.

1.6 **DELIVERY, STORAGE AND HANDLING**

- .1 Deliver Products to Site undamaged and with seals and labels intact. Inspect containers to verify that they have not been opened.
- .2 Store Products as required by the manufacturer.

1.7 **SITE CONDITIONS**

- .1 Do not install waterproofing system on wet surfaces that would cause waterproofing to hydrate prematurely.
- .2 Do not install waterproofing during rain, showers, inclement weather or conditions detrimental to a proper installation.
- .3 Maintain air temperature and structural base temperature at waterproofing installation area above 5°C for twenty-four hours before, during and twenty-four hours after installation.
- .4 Keep flammable Products away from spark or open flame. Post "NO SMOKING" signs. Do not allow spark producing equipment to be used during installation and until all vapours have dissipated.

1.8 **WARRANTY**

- .1 Submit warranty for waterproofing Work in accordance with the General Conditions, except warranty period extended to ten years against defects and deficiencies. Promptly correct to satisfaction of Consultant and at no expense to the Owner, any defects and/or deficiencies which become apparent within the warranty period. Defects include but are not limited to leakage.

2 **Products**

2.1 **MATERIALS**

- .1 Use Products of only one manufacturer for the Work of this section. The Contractor to ensure that all materials are compatible in order to provide a water-tight finish which meets or exceeds the performance criteria as set out within the Contract.
- .2 Waterproofing system: Pre-applied, integrally bonded sheet waterproofing membrane 1.7 mm thick. When covered with poured-in-place concrete membrane shall form an integral bond to prevent water migration through concrete.
- .3 Acceptable Products
 - .1 "Sikaproof A-12" by Sika Canada Inc.
 - .2 "Coreflex 60" by DRE Industries
 - .3 Or approved alternative

2.2 ACCESSORIES

- .1 Protection board: In accordance with CAN/CGSB 11.3; 6 mm thick.
- .2 Mechanical fasteners: In accordance with CSA B111; hot dip galvanized.
- .3 Adhesive: Recommended by waterproofing membrane manufacturer.
- .4 Joint tape: Recommended by installer and acceptable to Consultant.

3 Execution

3.1 EXAMINATION

- .1 Verify condition of previously installed Work upon which this section depends. Report defects to Consultant. Commencement of Work means acceptance of existing conditions.
- .2 Verify that substrates to receive membrane waterproofing are clean, sound, smooth, free of fins and sharp edges and free of curing agents, loose and foreign matter, oil and grease detrimental to waterproofing membrane adhesion.
- .3 Have manufacturer's technical representative verify that conditions are acceptable for installation of membrane waterproofing, including installation of reinforcement and pouring of concrete.
- .4 Allow a minimum of seven days curing time before application on new concrete.

3.2 PREPARATORY WORK

- .1 Install drainage sheet over lagging in accordance with manufacturer's recommendations.
- .2 Terminate waterproofing at strut penetrations or anchor tie backs as per manufacturer's recommendations. Include additional lap length to tie in waterproofing of openings upon removal of struts.
- .3 Prepare all surfaces as per manufacturer's recommendations to ensure water-tight finish.
- .4 Protect waterproofing membrane to prevent damage caused by backfill or construction traffic.

3.3 INSTALLATION

- .1 Install membrane waterproofing in accordance with reviewed Shop Drawings and manufacturer's recommendations.
- .2 Waterproofing termination details to follow system per manufacturer's recommendations.
- .3 Control joints shall be installed with Sika Hydrotite CJ 725 or approved alternative.
- .4 Take particular care at vertical/horizontal junctions and corners and to seal around all penetrations and obstructions to ensure 100% waterproofing coverage
- .5 Cut and attach a strip of panel waterproofing roll centered over all soldier piles. Extend roll a minimum 100 mm onto the lagging on both sides of soldier piles.
- .6 Detail around all penetrations and tie-backs with 19 mm cant of trowel grade sodium bentonite compound over substrate a minimum of 150 mm around penetrations and tie backs. Cut panel rolls to fit snugly around all penetrations and tie-backs.

- .7 Inspect finished installation and repair any damaged areas, prior to concrete placement.
- .8 Temporarily protect completed waterproofing from precipitation and from contact with ground water in accordance with manufacturer's recommendations until ready for placing of concrete.
- .9 Remove temporary protection for inspection before placing of concrete.
- .10 Ensure that completed waterproofing system is acceptable to Consultant and manufacturer's representative.

3.4

CLEAN-UP

- .1 Upon completion of this Work, remove debris, equipment and excess materials from Site.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 CAN/ULC-S701 - Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering
- .2 CAN/ULC-S702 - Standard for Thermal Insulation, Mineral Fibre, for Buildings
- .3 ULC CAN4-S101-M - Standard Methods of Fire Endurance Tests of Building Construction and Materials
- .4 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials to Site, clean and undamaged, and in manufacturer's distinctly identified cartons or wrappings. Remove unsatisfactory materials from Site and replace at no cost to the Owner.
- .2 Take precautionary measures to avoid fires and abide by fire protection regulations.
- .3 Place suitable forms or skids under the insulation upon delivery to protect the insulation from absorbing dampness from the surrounding terrain or floor. Cover material with approved tarpaulins and secure. Do not store insulation in direct contact with the earth, road surface, or floors.
- .4 Store materials indoors at Site, in an area at a temperature of not less than 4°C (39°F) for a minimum of twelve hours prior to use.

1.4 **PROTECTION**

- .1 Place protective covers, boards, tapes and take other measures to protect all surfaces, and in particular the building cladding, from being marred or contaminated.
- .2 Supervise the Work of other trades where such Work is closely associated with the Work of this section and report any damage.

1.5 **SUBMITTALS**

.1 Submit the following in accordance with Section 01 33 00.

- .1 Samples: Submit representative samples of each specified insulation material, insulation clips, adhesives, fasteners, and other material for review.
- .2 Manufacturer's Product data:
- .1 Submit manufacturer's Product data sheets for Products proposed for use in the Work of this section.

- .2 Submit data and installation instructions for materials and prefabricated devices, providing descriptions sufficient for identification at the place of the Works.
- .3 Submit data from manufacturer's or independent laboratory indicating compatibility and adhesive results of proposed materials.

2 Products

2.1 **MATERIALS - INSULATION**

- .1 Loose insulation: Loose glass fibre by Owens Corning Canada, basalt wool by Fibrex Insulations Inc. or mineral wool by Roxul Inc.
- .2 Batt insulation: Glass fibre vapour barrier faced batts by Owens Corning Canada, or Roxul Inc. or Fibrex Insulations, Inc. equivalents, 17 kg/m³ density.
- .3 Rigid insulation: Owens-Corning Canada "703", Fibrex Insulations Inc. "FBX 1240", or Roxul Inc. "RXL40".
- .4 Spray thermal insulation (exterior quality): Cafco "Heat-Shield", with "Miracote" water repellant topcoat. RSI value as indicated on Drawings.
- .5 Foamed-in-place air seals: One component polyurethane foam for installation within closures and fillers; "Enerfoam" by Abisko Manufacturing Inc. or "Foam Sealant" by Zerodraft Products Inc.
- .6 Concrete Faced Insulation (CFI) shall be faced with 8 mm latex modified grey concrete. Each panel shall be 610 x 1220 mm in size and a 3 mm relief score line shall be cut at 610 mm along the 1220 mm length. Insulation shall be rigid Styrofoam, 50 mm thick. Colour of concrete facing to be determined by the Consultant. Install below-grade at depth noted on the Drawings.
 - .1 Edge Treatment: Tongue and groove along longitudinal foam edges, butt joints on lateral edges
 - .2 Surface Finish: light broom finish.
 - .3 Sealant to Adjacent Substrates: Standard type suitable for use with installation of system; non-staining, non-skinning, non-shrinking and non-sagging; ultraviolet and ozone resistant; Colour as selected by consultant.
 - .4 Wall panel attachment: Galvanized Steel: in accordance with ASTM A123/A123M-08), Z275 to G90 coating designation, preformed as supplied by manufacturer, complete with corrosion proof masonry fasteners.
 - .5 Clips and Fasteners: as recommended by manufacturer to suit application.
 - .6 Perimeter Insulation Flashings: Coordinate supply of end closures and flashings for perimeter insulation system with Section 07 62 00.
 - .7 Acceptable Manufacturer:
 - .1 Tech-Crete Processors Ltd.
 - .2 Unicon Concrete Specialties
 - .3 Or approved equivalent

.7 Adhesives

- .1 Polystyrene foam insulation adhesive: Canadian Adhesive "Lepage PL Premium" or approved equivalent.
- .2 Glass fibre or mineral wool insulation adhesive: Henry "200-02".
- .3 For installing insulation clips direct to masonry, concrete or metal: High strength, resilient adhesive having a drying time of zero to thirty minutes (rapid initial set), and twenty-four hours final set. Adhesive shall be compatible with insulation and air/vapour barrier and shall be non-corrosive to galvanized steel and membrane air/vapour barrier.
- .4 Mechanical fasteners to concrete: Galvanized "Gripcon" screws with plastic plates. For use with vinyl faced insulation, use white head screws and white plastic plates to match vinyl.
- .5 Insulation clips: Insul-Anchors, adhered to substrate with Tactoo adhesive and with self locking washers by Continental Stud Welding. Clip size and type to suit application and insulation thickness. Alternative adhesive at obstructions: Air-Bloc 21 by Henry.

3 Execution

3.1 **MECHANICAL FASTENERS**

- .1 Install rigid insulation on masonry, concrete, metal, behind precast panels and where use of wedges is not possible using stick clips.
- .2 Use five stick clips per 600 mm x 1200 mm x up to 75 mm thick. Use six stick clips per 600 mm x 1200 mm x 100 mm thick or thicker.
- .3 Apply clips with mastic adhesive, allowing it to "ooze" out through the perforations and/or around the clip base.
- .4 Install clips to liquid membrane by softening membrane with torch and installing fasteners into softened areas. Supplement with a small power activated pin fastener applied through fastener base to structure.
- .5 Support adhesive-installed clips in place until adhesive has set.

3.2 **RIGID MINERAL FIBRE INSULATION**

- .1 Clean surfaces to receive rigid insulation free of moisture, grease and oil. Ensure surfaces are reasonably smooth and free of mortar projections.
- .2 Knife cut and fit boards neatly around beams, pipes, ducts, openings and corners, reinforcing and bonding ties, and other obstructions.
- .3 Butt insulation boards together and stagger joints to ensure thermal tight construction. Apply firm hand pressure to level insulation boards.
- .4 Where cutting is necessary, use the largest module of insulation possible to reduce the number of joints. Patch holes and tears with the same material.
- .5 Do not install insulation in any part of the building where protection against inclement weather has not yet been provided, and where the insulation could thereby be exposed to damage.

- .6 Insulation on liquid membrane air/vapour barrier: Apply board in 100% bond to 3.2 mm thick liquid air/vapour barrier.
- .7 Insulation on sheet membrane air/vapour barrier: Apply board using daubs of adhesive at 300 mm o.c.
- .8 Air/vapour barrier covered by insulation: Install "stick clips" to concrete or masonry substrate. After clip adhesive has cured, apply liquid air/vapour barrier to serve as insulation adhesive over the entire area to receive insulation. Apply to a uniform thickness of 3 mm. Press insulation against adhesive and stick clips. Install washers in stick clips to lock insulation in place.
- .9 Insulation covered by air/vapour barrier (and no gypsum board is subsequently applied): Apply daubs of adhesive to substrate at 300 mm o.c. into which, press insulation board. To ensure positive adhesion of insulation, mechanically fasten insulation at the middle and at each end with galvanized fasteners with smooth plastic washer buttons, at the rate of 4 per 600 mm x 1200 mm board. Depress fastener heads slightly from surface of insulation. Double tape all fastener points with vapour barrier tape.
- .10 Where more than one layer of insulation is required, stagger successive layer joints with the joints of the preceding layer and bed in adhesive trowelled solidly over the preceding layer.

3.3 **HIGH DENSITY INSULATION**

- .1 Place high density insulation under or within poured-in-place concrete in accordance with the Drawings.
- .2 Foamed-In-Place Insulation
 - .1 Install foam insulation at jambs of all doors and windows in pool in accordance with manufacturer's recommendations.
 - .2 Insulation will be inspected by the Consultant prior to the installation of the internal caulking seal.

3.4 **LOOSE INSULATION**

- .1 Install in exterior hollow metal frames, wall voids formed by metal closures, and at locations where loose insulation packing is shown on Drawings.

3.5 **SPRAYED THERMAL INSULATION**

- .1 Pre-wet surfaces to be sprayed with water; then spray the sprayed mineral fibre to required thickness, then lightly overspray with water.
- .2 Apply adhesive, if required, in accordance with manufacturer's recommendation.
- .3 Install pinned chicken wire reinforcing in accordance with standards of manufacturer of specified material.
- .4 Patch and repair mineral fibre which has been damaged. Exposed finished walls and floor areas where fireproofing has been deposited shall be swept or scraped and left in a broom clean condition after completion of Work.

3.6 CONCRETE FACED INSULATED WALL PANELS

- .1 Install dampproofing or air/vapour barrier horizontally on walls to receive concrete faced insulated wall panels.
- .2 Weather lap barriers, stagger vertical joints of each course. Repair incidental tears.
- .3 Seal securely to achieve air and moisture tightness.
- .4 Ensure snug fit between panel tongue and grooves, and lateral butt joints.
- .5 Fasten concrete faced insulated panels to structural supports; aligned level and plumb.
- .6 Install panels with vertical joints and panel control joints in alignment.
- .7 Use manufacturer's fasteners. Maintain neat appearance.
- .8 Cover exposed insulation at corners and top of perimeter insulation with prefinished flashing as specified in Section 07 62 00.
- .9 Where concrete flatwork or asphalt is to be laid adjacent to CFI Wall Panels, an isolation joint should be provided to protect the CFI mortar surface from differential movement.

3.7 WALL VOID INSULATION

- .1 Fill exterior wall voids, such as within and around beams, under metal closures at sills of openings, and other miscellaneous locations as shown, using specified glass fibre material.

3.8 BATT INSULATION

- .1 Install batt insulation between steel studs; at metal closures and where shown elsewhere. Extend nailing flanges over stud faces and secure with adhesive or sheet metal screws. Install batts with vapour barrier face on warm side. Tape at top and bottom of stud spaces and at junctions with other materials, provide a complete vapour seal.

3.9 PATCHING

- .1 Perform cutting and patching necessary to accommodate irregularities in the Work including piping, ductwork and electrical conduit projecting through the insulation.
- .2 Ensure the continuity of the insulation where such above items project through the insulation. Allow for expansion and contraction and linear movement of these items.
- .3 Where there is a possibility of heat loss through ductwork or conduit which passes through the insulation, extend insulation around the duct or conduit a distance of 300 mm minimum on both sides of the barrier.
- .4 After installation under other sections of heating equipment and other construction adjacent to the Work of this section, conduct an inspection and replace insulation as necessitated by unavoidable minor damage caused in the course of the Work of the other sections.

3.10 FIELD QUALITY CONTROL

- .1 Insulation installations will be inspected and approved by the Consultant prior to the installation of ceiling and wall finishing materials. Notify Consultant forty-eight hours in advance of inspection.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 ASTM C920 - Standard Specification for Elastomeric Joint Sealants
- .2 ASTM-E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
- .3 CAN/ULC-705.1 - Standard for Thermal Insulation - Spray-Applied Rigid Polyurethane Foam, Medium Density: Material Specification
- .4 CAN/ULC-705.2 - Spray Application of Rigid Polyurethane Cellular Plastic Thermal Insulation for Building Construction
- .5 CAN/ULC-S710.1 - Standard for Thermal Insulation - Bead-Applied One Component Polyurethane Air Sealant Foam, Part 1: Material Specification
- .6 CCMC - Canadian Construction Materials Centre
- .7 CUFCA - Canadian Urethane Foam Contractors Association
- .8 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00.
- .2 Submit manufacturer's Product data, confirmation of compliance to requirements specified herein. Submit in addition, copy of Subcontractor's licence as specified under Quality Assurance.

1.4 **TEST RESULTS**

- .1 Submit the following prior to commencing with the Work:
 - .1 Test reports verifying quantities of insulation meet or exceed requirements of this Specification.
 - .2 Submit the results of all air barrier system tests including transition membrane adhesion verification to an approved CCMC testing facility approved according to the CCMC's Technical Manual #07272 conducted in order to prove that the air barrier system with transition membrane meets National Building Code requirements.
 - .3 Name of installer complete with proof that installer is licensed by CUFCA.

1.5 **PROTECTION**

- .1 Ensure the Work area is adequately ventilated.
- .2 Install temporary partitions in order to prevent any effect on the ambient air – outside of the Work area – from the sprayed-on insulation material.
- .3 Protect all adjacent structures in accordance with the manufacturer's recommendations.
- .4 Protect all adjacent surfaces and equipment against any damage that may be caused by dispersion and overspray of insulation material beyond prescribed limits.
- .5 Clean equipment in areas designated for this purpose and neutralize the contents of the empty containers according to CAN/ULC-705.2.
- .6 Provide adequate protection against possible overspray onto nearby vehicles or properties. Carry liability insurance for this purpose in amount mutually agreed upon with the Contractor.

1.6 **DELIVERY, STORAGE AND HANDLING**

- .1 All materials should be delivered and stored in their original packaging bearing the manufacturer's name, quantity, CCMC numbers, and other appropriate technical indicators or references. The production and expiry date must also appear on the containers as per CAN/ULC-705.1.

1.7 **QUALITY ASSURANCE**

- .1 Contractor performing Work under this section shall be licensed under CUFCA for a minimum of five years. Applicators shall be trained and certified by CUFCA. These certified individuals must have their certification cards in their possession and available for presentation upon request.
- .2 Keep a copy of the manufacturer's installation manual or guide for the application of sprayed-on polyurethane foam and membrane on Site.
- .3 Conduct tests daily on both core density and cohesion/adhesion to the substrate in accordance with CAN/ULC-S705.2. Enter the results of these tests in the daily report forms.
 - .1 Upon request submit copy of all completed forms to Consultant prior to making application for payment.
- .4 Once the curing time required by the membrane manufacturer has elapsed, conduct a test to verify adhesion between the membrane and the substrate. Perform all adhesion tests using Com-Ten Industries Series 301N1M equipment or an equivalent. If adhesion is lower than the required minimum of 110 kPa (16 psi), the membrane must be mechanically fastened.
- .5 Perform adhesion tests on all corners and building angles, wall to concrete slab, and wall to roof intersection.
- .6 Perform transition membrane adhesion tests at perimeter openings.
- .7 Perform adhesion tests on the transition membranes at every tenth column or beam.
- .8 Adhesion tests are not required if the membrane is mechanically attached.

- .9 Permit access to the jobsite by manufacturer's representative for the purpose of technical assistance, verification of operator certification or the confirmation of the quality of the polyurethane foam application.

- .10 Submit a copy of all adhesion tests to Consultant prior to making application for payment.

1.8 **ENVIRONMENTAL REQUIREMENTS**

- .1 Apply insulation material only within the manufacturer's prescribed surface and ambient air temperature limits.
- .2 Comply with requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of Material Safety Data Sheets acceptable to Labour Canada.

2 **Products**

2.1 **MATERIALS**

- .1 Sprayed Air/Vapour Barrier/Insulation
 - .1 Polyurethane foam: A spray polyurethane foam listed under CAN/ULC-S705.1 and CAN/ULC S705.2, with CCMC listed as an air barrier system, according to CCMC technical manual #07272. Choose one from the following Products:
 - .1 Walltite Eco by BASF as distributed by Everest Supply and represented by Building Resource Inc., Phone 416-410-4055.
 - .2 Heatlock Soya by Demilec. Phone 519-896-9307.
 - .3 Icynene MD-C-200 Foam by Icynene Inc. Phone 905-363-4040.
 - .2 Primers: As recommended by sprayed air/vapour barrier/insulation.
- .2 Air sealant foam (for window installations and for gaps less than 50 mm wide): Bead applied, gun foam, one-component polyurethane sealant conforming to CAN/ULC-S710.1 (Material Specification), with flame spread of 25 and smoke developed of 50 as tested to CAN/ULC-S102 or ASTM-E84. Zerodraft Foam Sealant manufactured by Zerodraft and represented by Building Resource Inc., or Handi Foam by Fomo Products.
- .3 Insulating air sealant (for window installations and for gaps greater than 50 mm wide): Bead applied, gun foam, two-component polyurethane sealant conforming to CAN/ULC-S711.1 (Material Specification), with flame spread of 25 and smoke developed of 50 as tested to CAN/ULC-S102 or ASTM-E84. Zerodraft Insulating Air Sealant manufactured by Zerodraft and represented by Building Resource Inc., or Handi Foam by Fomo Products.
- .4 Sealant: Non-sag type, per ASTM C920, Type S, Grade NS, Class 25, Use NT, M and A. Novalink by ChemLink. Furnish in standard colours as selected by the Contractor.
- .5 Membrane air/vapour barrier/transition membrane: 1 mm thick modified bituminous composite sheet, Perm-A-Barrier by W.R. Grace, Blueskin SA by Bakor Inc., Air-Shield by W.R. Meadows, or Sopraseal Stick 1100 by Soprema, Tremco EXO AIR 110 complete with primer, mastic and liquid membrane as required
- .6 Sprayed thermal barrier: Z3306 by Grace Canada or Cementitious Thermal Barrier by A/D Fire Protection.

3 Execution

3.1 **PREPARATION**

- .1 Ensure that surfaces to receive insulation are clean, dry, firm, straight, and free from loose material, projections, ice, frost, slick, grease, oil or other matter detrimental to bond of insulation.
- .2 Check metallic surfaces to ensure oxidization has not occurred. Perform an adhesion test to determine bond strength. If bond is below prescribed requirements the use of a primer is strongly recommended.
- .3 Maintain surface and ambient temperatures during application and curing of insulation at temperature recommended by insulation manufacturer.

3.2 **INSTALLATION - TRANSITION MEMBRANE**

- .1 Install airseal transition membrane in width to properly bridge and seal joints around windows, door frames, dissimilar materials, and where indicated.

3.3 **INSTALLATION - FOAM SEALANTS**

- .1 Fill miscellaneous voids, hidden cavities, and penetrations with foam sealant of type suitable for the size of opening. Trim excess spray.

3.4 **INSTALLATION - SPRAYED AIR/VAPOUR BARRIER/INSULATION**

- .1 Cover or fill all excessively wide joints before applying the polyurethane foam.
- .2 Install transition membranes. Roll in place to ensure positive contact onto substrate.
- .3 Install sealant at outside edge of transition membrane at vertical to horizontal membrane locations.
- .4 Spray polyurethane foam with a tolerance of +6/-0 mm in relation to the thickness indicated or specified.
- .5 Avoid the formation of sub-layer air pockets when applying.
- .6 Avoid spraying the foam on any surfaces other than those indicated. Use drop sheets or masking tape to protect other surfaces.
- .7 Once the foam has hardened, remove all overspray from non-prescribed surfaces.
- .8 Do not allow polyurethane foam, once applied, to be damaged during Work by other trades.
- .9 Ensure the subsequent coverage of the applied insulating foam will be completed within the manufacturer's prescribed timeframe.
- .10 Spray polyurethane foam in overlapping layers, so as to obtain a smooth, uniform surface.
 - .1 When applying on a flat surface of more than 30 lineal meters in either direction, apply the first layer in 3 m strips at 1 m intervals. After the curing period (\pm four hrs) has elapsed, spray the polyurethane foam on the unfilled spaces.
 - .2 In cold weather follow the same procedure for a minimum surface area of 15 lineal meters.

- .11 Do not spray polyurethane foam any closer than 75 mm from heating vents, steam pipes, recessed lighting fixtures, and other heat sources. Do not spray the insides of any exit openings or electrical junction boxes.
- .12 In temperatures below +10°C (50°F) use transition membranes specifically formulated for low temperature application. If required, mechanically fasten transition membranes to achieve the required pull strength.
- .13 Cover all mechanical fixation with polyurethane foam in order to reduce thermal bridging. This can be achieved through the use of a galvanized drywall corner bead, screwed 200 mm oc through the membrane.
- .14 Spray under through-wall flashings to provide the same integrity of air/vapour barrier/insulation at such locations. Foam board is unacceptable as substitute.

3.5 **SPRAYED THERMAL BARRIER**

- .1 Where exposed to open flame or welding, protect spray insulation in accordance with CAN/ULC S705.2.
- .2 Cover exposed sprayed insulation above ceiling space (not covered with gypsum board) with a spray application of cementitious thermal barrier. Spray to provide complete cover, to a thickness of 18 mm in accordance with the manufacturer's directions.

3.6 **SITE TESTS**

- .1 Conduct daily visual inspection, adhesion/cohesion testing and density measurements as outlined by the CAN/ULC S705.2 installation standard.
- .2 Complete the daily Work record and record all information required including the results of the testing. Keep the daily Work record on Site for routine inspection. Forward a copy of the daily Work record to the Consultant upon request. Submit a copy of the daily Work record or monthly summaries to the insulation manufacturer.
- .3 Bear the costs incurred for daily testing and inspection and the completion of the daily Work record.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCE**

.1 Conform to the latest edition of the following:

- .1 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **AIR/VAPOUR BARRIER REQUIREMENTS**

- .1 Every situation where an air/vapour barrier is required is not necessarily shown on Drawings. However it is a requirement in the design of the building that an integral monolithic impermeable air/vapour barrier be provided to resist the diffusion of water vapour and air movement under a vapour and air pressure difference, at the inner face of the insulation.
- .2 Be responsible for the continuity of the air/vapour barrier from the wall to the roofing system and/or doors and windows as required to complete the building envelope. Ensure compatibility prior to starting Work.

1.4 **PRE-INSTALLATION CONFERENCE**

- .1 A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this Work with related and adjacent Work. Agenda for meeting shall include but not be limited to the following:
- .1 Review of submittals.
- .2 Review of surface preparation, minimum curing period and installation procedures.
- .3 Review of special details and flashings.
- .4 Sequence of construction, responsibilities and schedule for subsequent operations.
- .5 Review of mock-up requirements.
- .6 Review of inspection, testing, protection and repair procedures.

1.5 **MANUFACTURER'S REPRESENTATIVE**

- .1 Provide a manufacturer's trained technician on-site periodically during membrane Work to review installation procedures.

1.6 **DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials to Site, clean and undamaged, and in manufacturer's distinctly identified cartons or wrappings. Remove unsatisfactory materials from Site and replace at no cost to the Owner.

- .2 Take precautionary measures to avoid fires and abide by fire protection regulations.
- .3 Place suitable forms or skids under the insulation upon delivery to protect the insulation from absorbing dampness from the surrounding terrain or floor. Cover material with approved tarpaulins and secure. Do not store insulation in direct contact with the earth, road surface, or floors.
- .4 Store materials indoors at Site, in an area at a temperature of not less than 4°C (39°F) for a minimum of twelve hours prior to use.

1.7 **PROTECTION**

- .1 Place protective covers, boards, tapes and take other measures to protect all surfaces, and in particular the building cladding, from being marred or contaminated.
- .2 Supervise the Work of other trades where such Work is closely associated with the Work of this section and report any damage.

1.8 **INSPECTION AND TESTING**

- .1 Cooperate and coordinate with the Owner's inspection and testing agency. Do not cover any installed air and vapour barrier membrane until it has been inspected, tested and approved.

1.9 **SUBMITTALS**

- .1 Submit the following as Shop Drawings in accordance with Section 01 33 00.
 - .1 Product data of all materials.
 - .2 Details of metal air/vapour barrier.

2 **Products**

2.1 **MATERIALS - AIR/VAPOUR BARRIER**

- .1 Air/vapour barrier membrane: Minimum 1 mm thick modified bituminous composite sheet. Choose one of the following:
 - .1 Perm-A-Barrier by W.R. Grace Co. of Canada Ltd.
 - .2 Blueskin SA by Henry
 - .3 Air-Shield by WR Meadows
 - .4 Sopraseal Stick 1100 by Soprema
 - .5 ExoAir 110/110LT by Tremco
- .2 Primer, mastic, liquid membrane and adhesive: Manufacturer's standard with the air/vapour membrane system used.
- .3 Air/vapour barrier - liquid type: For sealing breaks, holes and wall ties, use Henry "Air-Bloc 06" or Soprema "Sopracol 300".
- .4 Air/vapour barrier sealant: Recommended by manufacturer of air/vapour adhesive and sheet membrane. Material to be a permanent air/vapour seal and be compatible with the Products used for the air/vapour barrier for the building.

- .5 Self-Adhered air/vapour barrier membrane: Acrylic, pressure sensitive adhesive. Primer as recommended by manufacturer.

- .1 3M "3015 Self-adhered Air and Vapor Barrier Membrane"

- .2 Or accepted equal

3 Execution

3.1 **PREPARATION**

- .1 Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods that are acceptable to manufacturer of the fluid-applied air/vapour barrier.
- .2 New concrete should be cured for a minimum of fourteen days and must be dry before air/vapour barrier membranes are applied.
- .3 Seal joints between panels of exterior grade gypsum, plywood and other panel type substrates prior to the application of liquid membrane. Exterior sheathing panels: Ensure that the boards are sufficiently stabilized with corners and edges fastened with appropriate screws. Pre-treat all board joints with 50-75 mm wide, reinforced self-adhesive tape or fibreglass mesh style wallboard tape. Fill gaps greater than 6 mm with mastic or caulk, allowing sufficient time to fully cure before application of the tape and liquid membrane.
- .4 Seal large cracks in masonry and concrete with a strip of air/vapour barrier membrane. Lap a minimum of 75 mm on both sides of the crack. Apply to the substrate prior to the application of liquid membrane.
- .5 Related materials: Treat construction joints and install flashing as recommended by manufacturer.

3.2 **PRIMER FOR PRIMARY AND THROUGH-WALL FLASHING MEMBRANE**

- .1 Apply primer for self-adhering membranes at rate recommended by manufacturer.
- .2 Apply primer to all areas to receive transition sheet and or through-wall flashing membrane as indicated in Drawings, by brush or heavy nap natural-material roller or spray and allow minimum thirty minute open time.

3.3 **MEMBRANE AIR/VAPOUR BARRIER**

- .1 Install the membrane in strict accordance with the manufacturer's written instructions and the representative's on-site instructions.
- .2 Ensure complete coverage of and adhesion to all substrate to receive the air/vapour barrier membrane, including all wall protrusions. Extend membrane 150 mm below top of foundation walls. Co-operate with other sections to ensure continuity of the barrier.
- .3 Apply the membrane to primed substrate in 2400 mm lengths or as recommended by the membrane manufacturer.
- .4 Apply membrane so that horizontal joints overlap with the upper sheet over the lower sheet, shingle style. Lap all horizontal joints minimum 50 mm all side joints minimum 64 mm and all end joints minimum 150 mm. Stagger vertical joints to avoid four way joints.

- .5 Apply a trowelled head of mastic to all terminations of the membrane at the end of a day's work and at membrane terminations.
- .6 Reinforce all inside and outside corners with a continuous 300 mm wide sheet membrane prior to installing the air/vapour barrier.
- .7 Fill gaps and joints with liquid membrane and reinforce with a continuous 300 mm wide sheet membrane prior to installing the air/vapour barrier.
- .8 Use liquid membrane at all protrusions and difficult detail areas and provide a minimum 64 mm overlap with the sheet membrane.
- .9 Apply air/vapour barrier so that the exterior wall is airtight, with airtight junctures at openings, penetrations and edges.
- .10 Inspect air/vapour barrier for continuity immediately prior to installation of insulation. Do not cover the air/vapour barrier until it has been inspected.
- .11 Repair punctures, rips and tears with pieces of membrane completely adhered to the damaged membrane.
- .12 Where punctures and tears are extensive, replace entire damaged section.
- .13 Install membrane over doors, windows and other openings to exterior walls.
- .14 At openings, extend membrane 200 mm beyond jambs, heads and sills.
- .15 Use mastic or fixing bars to adhere membrane to windows, doors, etc. to maintain continuity of the barrier.

3.4 **PATCHING**

- .1 Perform cutting and patching necessary to accommodate irregularities in the Work including piping, ductwork and electrical conduit projecting through the air/vapour barriers.
- .2 Ensure the continuity of the air/vapour barriers where such items project through the barriers. Allow for expansion and contraction and linear movement of these items.
- .3 After installation under other sections of heating equipment and other construction adjacent to the Work of this section, conduct an inspection and perform such reasonable taping and patching of air/vapour barriers and replacing of insulation as necessitated by unavoidable minor damage caused in the course of the work of the other sections.

3.5 **PROTECTION AND CLEANING**

- .1 Remove any masking materials after installation. Clean any stains on materials that would be exposed in the completed Work using procedures as recommended by manufacturer.
- .2 Protect membranes to avoid damage from other trades and construction materials during subsequent operations. Protection Products may be installed on the same day as the membrane. Bonding of the insulation is achieved if the compatible insulation Products are installed when the membrane is tacky, generally within one to two hours after the membrane is installed.
- .3 Schedule work to ensure that the air and vapour barrier system is covered as soon as possible after installation. Protect air and vapour barrier system from damage during

subsequent operations. If the air and vapour barrier system cannot be covered within thirty days after installation, apply temporary UV protection such as dark plastic sheet or tarpaulins.

3.6 **FIELD QUALITY CONTROL**

- .1 Installations will be inspected and approved by the Consultant prior to the installation of wall finishing materials. Notify Consultant 48 hours in advance of inspection.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- | | | |
|----|------------------|--|
| .1 | ASTM A167 | - Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip |
| .2 | ASTM A653/A653M | - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process |
| .3 | ASTM B370 | - Standard Specification for Copper Sheet and Strip for Building Construction |
| .4 | ASTM C920 | - Standard Specification for Elastomeric Joint Sealants |
| .5 | CAN/CGSB-37.29-M | - Rubber Asphalt Sealing Compound |
| .6 | CSA B111-74 | - Wire Nails, Spikes and Staples |
| .7 | AODA | - Accessibility for Ontarians with Disabilities Act |

1.3 **SUBMITTALS**

.1 Shop Drawings and Samples

- .1 Submit in accordance with Section 01 33 00.
- .2 Submit detailed Shop Drawings showing proposed method of shaping, forming, jointing, fastening, and application of sheet metal Work. Submit lists of materials to be used.
- .3 Submit a representative sample section of prepainted metal flashing illustrating "S" lock jointing, minimum 600 mm long. Submit sample well in advance of material fabrication.

1.4 **DELIVERY, STORAGE AND HANDLING**

- .1 Protect the Work of this section from damage. Replace damaged Work which cannot be satisfactorily repaired, restored or cleaned, at no cost to Owner.

1.5 **WARRANTY**

- .1 Warrant Work of this section for one year from damage including but not restricted to loosening and splitting of the flashing seams.

2 Products

2.1 **MATERIALS**

- .1 Prepainted sheet steel: 0.607 mm (24 ga) minimum thickness, commercial quality to ASTM A653/A653M, with Z275 zinc coating designation, prepainted with baked-on "WeatherX" or "Perspectra Series" in colour selected by Consultant.
- .2 Sheet steel: 0.607 mm (24 ga) minimum thickness, commercial quality to ASTM A653/A653M, with Z275 zinc coating designation.
- .3 Utility sheet aluminum: Furnish plain (embossed) pattern, 1.2 mm minimum thickness.
- .4 Copper sheet: Conforming to ASTM B370 cold rolled with a mass of 4882 g/m².
- .5 Stainless steel sheet: Conforming to ASTM A167, Type 316 (302) (304).
- .6 Isolation coating: Henry "410-02" or approved alternative.
- .7 Sealing compound: Rubber asphalt conforming to CAN/CGSB-37.29-M.
- .8 Sealant: One part polyurethane, Sika "RC-1", Tremco "Dymonic", or Sonneborn "NP-1", conforming to ASTM C920, Type S, Grade NS, Class 25.
- .9 Sealer for sealant boxes: "Chemlink M1 primer and 1-Part Pourable Sealer" as distributed by Building Resource.
- .10 Starter strips: Furnish a continuous run of starter strips of Z275 galvanized sheet metal, 20 gauge thick, of height shown on Drawings, with metal flashing interlocked to the starter strip. Where shown on the Drawing or where starter strips are exposed to view, use same prepainted metal as for flashing.
- .11 Back-up plates: Of same material and gauge as flashing used, (minimum 300 mm wide).
- .12 Fasteners: Conforming to CSA B111 of same material as sheet metal secured, of type, length and size suitable for the particular conditions. Where exposed fasteners are permitted, use colour matched nylon heads with cupped neoprene washers.

2.2 **SHEET METAL FABRICATION**

- .1 Brakeform prepainted sheet material to form copings shown on Drawings. End joints where adjacent length of metal flashing meet shall be made in accordance with jointing method specified hereinafter.
- .2 Brakeform miscellaneous metal flashings and accessories on roof such as:
 - .1 Sheet metal flashings at roof expansion joints
 - .2 Starter strips
 - .3 Flashings at roof openings
 - .4 Overflow scuppers
- .3 Use competent tradesmen and work accurately to details indicated and as herein specified.
- .4 Hem exposed edges at least 12 mm for appearance and stiffness. Mitre and seal corners with sealant. Provide 25 mm upstand joint at corners.
- .5 Apply a coat of isolation coating on the back side of aluminum in contact with dissimilar materials.

- .6 Downspouts and Overflow Scuppers
 - .1 Fabricate scupper drains, gutters and downspouts in shapes and sizes indicated, with mitered and welded corners. Include steel straps formed from galvanized sheet of thickness indicated. Include hangers and other attachment devices, end plates, trim, and other accessories required for complete installation.
 - .1 Gutters, scupper drains and downspouts: Form from galvanized steel sheet not less than 1.5 mm thick before galvanizing, and prepainted.
 - .2 Profiles
 - .1 Gutter: Three-sided, size and profile as indicated.
 - .2 Downspout: Rectangular, four-sided.
 - .3 Scupper drains: Four-sided.
 - .3 Additional Parts and Features
 - .1 Downspout hangers: Rigid construction.
 - .2 Downspout starters or fascia sump with downspout starter hole.
 - .3 Expansion joints: Loose-locked waterproof, at least one midway between outfall points.
 - .4 Transition for downspout to grade: Provide forty-five degree section.
- .7 Sealant Boxes and Sealant Fill
 - .1 Form sealant boxes as open topped boxes with topped edges stiffened by seaming. Make boxes not less than 50 mm larger than the object being flashed, 100 mm depth, and with minimum 100 mm flanges for stripping-in.

3 Execution

3.1 **INSTALLATION**

- .1 Install Work to details shown on Drawings.
- .2 Exposed fastenings will not be permitted on horizontal Work exposed to view from the building exterior.
- .3 Install starter strips where indicated or required to present a true, non-waving, leading edge. Anchor to back-up to provide rigid, secure installation. Secure starter strips with screws only, in accordance with FM 1-49 requirements.
- .4 End joints where adjacent lengths of metal flashing meet shall be made using an "S-lock" joint. Execute by inserting the end of one coping length in a 25 mm deep "S" lock formed in the end of adjacent length. Extend concealed portion of the "S" lock 25 mm outwards and nail to substrate prior to installation of subsequent sheets. Face nailing of joints will not be permitted.
- .5 End joints where adjacent lengths of metal flashing meet shall be made using a 300 mm long back-up flashing secured in place before installing flashing. Apply two beads of caulking compound on each side on the face of the back-up plate to seal ends of metal flashing. Leave 12 mm wide space between ends of adjacent lengths of metal flashing.

Fabricate back-up plates of the same material and finish as the metal flashing with which it is being used. Make back-up plate profile of the flashing allowing for metal thickness.

- .6 Install sealant boxes at locations and to details indicated. Fill boxes with insulation and sealer and slope top away from object being flashed. Coordinate with ACCU manufacturer for number of conduits, wires, etc.
- .7 Prepare and touch up scratches on prepainted material with air drying formulation of the coil coating paint. Replace material at no cost to Owner, if touching up is unacceptable to the Consultant.

3.2 **SEALANT**

- .1 Apply sealant where required to form weathertight seal between flashing and adjoining surface and between flashing and other Work of this section. Sealant Work consists of bedding between members where possible and with neatly formed sealant bead where exposed.

End of Section

- 1 General
 - 1.1 **SUMMARY**
 - .1 Section Includes
 - .1 Labour, Products, equipment and services necessary to complete the Work of this section.
 - 1.2 **REFERENCE**
 - .1 Conforms to the latest edition of the following:
 - .1 AODA - Accessibility for Ontarians with Disabilities Act
 - 1.3 **QUALITY ASSURANCE**
 - .1 Employ tradesmen skilled in the Work of this trade using equipment approved for fireproofing Work. Have a full time, qualified foreman on the job site to direct the Work. Foam applicator shall be licensed by foam manufacturer.
 - 1.4 **COORDINATION**
 - .1 For sprayed fireproofing, coordinate with trades involved and advise dates where hangers must be in place throughout the various areas of the Work. Make trades concerned fully aware that attachment to hangers for installation of mechanical and electrical Works shall be carried out after completion of fireproofing Work.
 - 1.5 **DELIVERY, HANDLING AND STORAGE**
 - .1 Deliver materials to the Site in the manufacturer's sealed and labelled containers. Materials shall be subject to the Consultant's inspection.
 - .2 Store materials in an area designated by the Consultant; handle and store in a manner to prevent damage from wetting, breaking of containers or any other damage that may be detrimental to the material.
 - 1.6 **PROTECTION**
 - .1 For sprayed fireproofing, protect walls, windows, floors and all other surfaces around areas to be fireproofed, from marring or damage.
 - 1.7 **ENVIRONMENTAL CONDITIONS**
 - .1 Maintain a minimum temperature of 5°C (40°F) for a minimum period of one week before application, during application and until application is fully cured. Adequately ventilate areas in which fireproofing is being applied.
- 2 Products
 - 2.1 **SPRAY FIREPROOFING – MINERAL FIBRE**
 - .1 System: This system is spray-applied to a rough, semi-compressible finish and is generally used where aesthetics is not a factor (i.e. concealed works - above ceiling, etc.).

- .2 Product: Mineral fibre, asbestos-free, factory mixed, in any of those listed below, and as listed and labelled or approved by Underwriters Laboratories of Canada or Warnock Hersey:

- .1 Cafco "Blaze-Shield Type DC/F" with "Bond-Seal" topcoat.
- .2 W.R. Grace "Monokote Type MK-6" with "Daraweld-C" topcoat.
- .3 A/D Fire Protection Systems "Type FP" with topcoat.

OR

2.2 **SPRAY FIREPROOFING - CEMENTITIOUS**

- .1 System: This system is spray applied and trowelled to a smooth, hard finish and is generally used where finished Work is subject to damage by mechanical impact, etc., and where aesthetics is a factor.

- .2 Product: Medium density cementitious, asbestos-free, factory mixed, in any of those listed below, and as listed and labelled or approved by Underwriters Laboratories of Canada or Warnock Hersey:

- .1 Cafco "400"
- .2 W.R. Grace "Type Z-106"
- .3 A/D Fire Protection "Type 5MD"

2.3 **EXTERIOR FIREPROOFING - HIGH DENSITY CEMENTITIOUS**

- .1 System: This system is used for exterior applications.
- .2 Product: Waterproof, asbestos-free, in any of those listed below; listed and labelled or approved by Underwriters Laboratories of Canada or Warnock Hersey:

- .1 Cafco "800"
- .2 W.R. Grace "Z-146"
- .3 A/D Fire Protection Systems "Exterior Fireproofing"

2.4 **CEMENT BOARD FIREPROOFING**

- .1 As listed by Underwriters Laboratories for designs Z203 and 0100 for columns and beams respectively, to provide the fire rating specified.

- .1 Boards: Promat "H", manufactured by Eternit and distributed by ABS Fibre Reinforced Products. Thicknesses as shown on Drawings.
- .2 Fasteners, support strips, base plate cover and bolts: In accordance with manufacturer's printed literature.

2.5 **ACCESSORIES**

- .1 Adhesive base, primer: As recommended and supplied by fireproofing manufacturer.
- .2 Primer and lath for boxed installations: If part of fireproofing, to be as recommended and supplied by fireproofing manufacturer.

- .3 Water: Clean, fresh and free from organic and mineral impurities which would be harmful to the application.

3 Execution

3.1 **INSPECTION OF JOB CONDITIONS**

- .1 Inspect existing conditions upon which the Work of this section is dependent. Report to the Consultant, in writing, any defects or discrepancies. Commencement of Work implies acceptance of existing conditions.

3.2 **SPRAYED FIREPROOFING**

- .1 Clean surfaces to be fireproofed free of any foreign matter which would affect adhesion.
- .2 Ensure that all hangers, clips and other attachments to the building structure by other trades have been completed and accepted by the Consultant before sprayed fireproofing application.
- .3 Apply primer and/or adhesive (or lath) if part of fireproofing system and recommended by fireproofing Supplier for the particular substrate to be fireproofed.
- .4 Apply by the contour method in sufficient thickness to achieve the fire ratings shown on the Drawings.
- .5 If boxed method of installation around beams or columns is required, provide metal furring and lath around structural member and apply fireproofing in sufficient thickness to achieve fire ratings shown on Drawings.
- .6 Maintain continuity of fireproofing without gaps or voids.
- .7 In the case of medium to high density fireproofing, trowel fireproofing to achieve a smooth, uniform surface.
- .8 Apply material in separate coats, to the total thickness required to achieve the required fire rating. Apply sealer as part of mineral fibre fireproofing.
- .9 Where exposed to view in the finished work, board tamp mineral fibre fireproofing to an even smooth surface texture, and apply sealer.
- .10 The Consultant will require this section to prove thickness of applied material. Additional coats, if required, shall be applied at no cost to the Owner.

3.3 **INSTALLATION - BOARD FIREPROOFING**

- .1 Clean surfaces to be fireproofed free of any foreign matter.
- .2 Apply fireproofing in accordance with the manufacturer's instructions to provide fire resistive rating required or shown on Drawings.
- .3 Fasten boards with approved fasteners and spaced in accordance with manufacturer's printed instructions.

3.4 **FIELD TESTS**

- .1 The Owner will select and pay for an independent testing laboratory to sample and verify the thickness and density of fireproofing in accordance with ASTM E-605 "Standard

Method for Density of Sprayed Fire Resistance Material Applied to Structural Members.
Make good defective or insufficiently applied fireproofing at no cost to the Owner.

3.5

CLEANING UP

- .1 Clean all exposed wall, ceiling, or other surfaces free of deposits of fireproofing materials to the satisfaction of the Consultant.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.
- .2 Work of this section includes but is not necessarily limited to, the following:
 - .1 Firestopping and smoke seals at penetrations through fire rated assemblies to match fire rating of such structures, in accordance with the Contract Documents, including but not limited to the following locations:
 - .1 Penetrations through fire resistance rated masonry and gypsum board
 - .2 Top of fire resistance rated masonry walls and gypsum board walls
 - .3 Intersection of fire resistance rated masonry and gypsum board
 - .4 Control joints in fire resistance rated masonry and gypsum board
 - .5 Openings and sleeves installed for future use in fire resistance rated separations
 - .6 Perimeter of floors at exterior walls
 - .7 Process and building services penetrations through floors
- .2 Ensure firestopping system provides fire-resistance rating (flame and temperature) not less than fire resistance rating of surrounding floor, wall or assembly, in accordance with requirements of OBC.
- .3 Firestop system rating: Comply with F, FH, FT, or FTH ratings as required by authorities having jurisdiction.

1.2 **RELATED SECTIONS**

- .1 Divisions 21, 22, 23, 26 and 27: Mechanical, Electrical and Communications: Firestopping and smoke seals within mechanical assemblies (i.e. inside ducts, dampers) and electrical/communication assemblies (i.e. inside bus ducts).

1.3 **REFERENCES**

- .1 Conform to the latest edition of the following:
 - .1 ULC-S115, Standard Method of Fire Tests of Firestop Systems
 - .2 CAN/ULC S102-M, Standard Test Method for Surface Burning Characteristics of Building Materials
 - .3 ASTM E2174, Standard Practice for On-Site Inspection of Installed Fire Stops
 - .4 ASTM E2307, Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi Story Test Apparatus

.5 International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgements

.6 AODA, Accessibility for Ontarians with Disabilities Act

1.4 **QUALIFICATION**

.1 Subcontractor qualifications: Accredited firm with not less than five years satisfactory experience as recommended by firestopping/smoke seal manufacturer.

1.5 **SUBMITTALS**

.1 Shop Drawings: Submit in accordance with Section 01 33 00.

.2 Submit manufacturer's Product data for each material to be used, and fire test certifications for assemblies as applicable to the Work.

.3 Submit details of each type of penetration and materials to be incorporated as smoke stop and/or firestopping assembly.

1.6 **QUALITY ASSURANCE**

.1 Job mock-up: Provide sample application at each type of penetration at the Site, in the presence of Consultant. After approval, such mock-up to constitute standard of acceptance for remainder of Work.

.2 Firestopping assemblies through fire rated structures are to comply with ULC or Warnock Hersey approved assemblies.

.3 An approved manufacturer's representative to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.

.4 Firestop systems do not re-establish the structural integrity of load bearing partitions/assemblies or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

.5 For those firestop applications that exist for which no ULC or cUL tested system is available through a manufacturer, a manufacturer's engineering judgement derived from similar ULC or cUL system designs or other tests will be submitted to local Authorities Having Jurisdiction for their review and approval prior to installation. Engineer judgement drawings must follow the requirements set forth by the International Firestop Council.

1.7 **DELIVERY, STORAGE AND HANDLING**

.1 Deliver materials in original unopened containers or unopened packages, with manufacturer's labels attached, installation instructions, and lot numbers intact and legible.

.2 Store materials in original containers, out of weather, and at a temperature below 32°C (90°F).

1.8 **JOBSITE CONDITIONS**

.1 Unmixed liquid components of foam are to rest in their original, unopened containers at a temperature between 18°C and 27°C (65°F and 80°F) for twelve hours before use.

.2 Sealant may be applied at temperatures ranging from -38°C to +71°C (-35°F to +160°F).

- .3 Do not apply materials when temperature of substrate or ambient air exceeds manufacturer's stated limits.

2 Products

2.1 **PERFORMANCE REQUIREMENTS**

- .1 Provide fire stopping composed of components that are compatible with each other, the substrates forming openings and the items, if any, penetrating the fire stopping under conditions of service and application, as demonstrated by the fire stopping manufacturer based on testing and field experience.
- .2 Provide components for each fire stopping system that are needed to install fill material. Use only components specialized by the fire stopping manufacturer and approved by the qualified testing agency for the designated fire resistance rated systems.
- .3 Fire stopping materials are either "cast-in-place" (integral with concrete placement) or "post-installed". Provide cast-in-place firestop devices prior to concrete placement.
- .4 Provide a round fire-rated cable management device whenever cables penetrate the fire rated walls, where frequent cable changes and additions may occur. The fire-rated cable management device shall consist of a corrugated steel tube with zinc coating, contain an inner plastic housing, intumescent material rings and inner fabric smoke seal membrane. The length of the sleeve shall be 315 mm. The fire-rated cable management device shall contain integrated intumescent firestop wrap strip materials sufficient to maintain the hourly rating of the barrier being penetrated. The fire-rated cable management device shall contain a smoke seal fabric membrane or intumescent firestop plugs sufficient to achieve the L-rating requirements of the barrier type. Install device per the manufacturer's published installation instructions.
- .5 Penetrations in the fire resistance rated walls: Provide fire stopping with ratings determined in accordance with CAN/ULC S115-11.
 - .1 F-Rating: Not less than the fire resistance rating of the wall construction being penetrated.
- .6 Penetrations in horizontal assemblies: Provide fire stopping with ratings determined in accordance with CAN/ULC S115-11.
 - .1 F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
 - .2 T-Rating: When penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
 - .3 W-Rating: Class 1 rating in accordance with water leakage test per UL 1479.
- .7 Penetrations in smoke barriers: Provide fire stopping with ratings determined in accordance with UL 1479 or ASTM E814.
 - .1 L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at both ambient and elevated temperatures.
- .8 Mold resistance: Provide penetration fire stopping with mold and mildew resistance rating of 0 as determined by ASTM G21.

2.2 MATERIALS

- .1 Fire stopping and smoke seal systems - general: Asbestos-free systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with ULC-S115, and suitable to actual Project application and installation conditions.
 - .1 Acceptable manufacturers of rated systems:
 - .1 Hilti
 - .2 A/D Fire Protection Systems
 - .3 Tremco
 - .4 Dow Corning
 - .5 3M
 - .6 Or accepted equal
 - .2 Firestop fibre: Mineral fibre (complete with galvanized steel insulation clips and) bearing ULC or Warnock Hersey label, in width 25% - 33% larger than the space to be filled. Use one of the following:
 - .1 "Firebarrier Firestopping" by A/D Fire Protection Systems
 - .2 "RXL Safe" by Roxul
 - .3 "Fire-Bloc 1" by M.W. McGill and Associates Limited
 - .3 Cable management: Re-penetrable device for installation in wall and floor applications and resists temperatures up to 100°C. Steel with zinc coating, ABS plastic and glass-fiber fabric:
 - .1 "Speed Sleeve CP 653" by Hilti Canada.
 - .4 Damming materials, supports and anchorages: To firestopping/smoke and seal manufacturer's recommendations, as required by assembly.
 - .5 Sheet metal closures: Galvanized sheet metal closures and fasteners appropriate to adjacent structures to be secured to. Sheet metal to be in accordance with ASTM A653/A653M with ZF75 zinc coating designation.

3 Execution

3.1 PREPARATION

- .1 Remove combustible materials and loose impediment from penetration opening and involved surfaces.
- .2 Remove oil and other free liquids from penetration opening. Clean metal substrates with non-alcohol solvent.

3.2 INSTALLATION

- .1 Install firestopping and smoke seal systems in accordance with manufacturer's instructions and fire rated assembly requirements to establish continuity and integrity of fire separations.

- .2 Install primers as recommended by firestop Product manufacturers.
- .3 Install temporary forming, damming and back-up as required. Remove after firestopping and smoke seal materials have achieved initial cure and able to resist displacement.
- .4 Use resilient, elastomeric firestopping systems in the following locations:
 - .1 Openings and sleeves for future use.
 - .2 Penetration systems subject to vibration or thermal movement.
 - .3 Penetration systems in acoustical containment enclosures.
- .5 Trowel and tool exposed firestop Product surfaces to uniform, smooth finish.
- .6 Repair damaged firestopped surfaces to acceptance of Consultant.

3.3 **FIBRE FIRESTOPPING INSTALLATION**

- .1 Install fibre firestopping with minimum 25% to 33% compression in accordance with Product manufacturer's recommendations.
- .2 Butt succeeding sections of firestopping tightly against preceding piece. Do not leave any void.
- .3 Use two impaling clips per 1220 mm length of firestopping.

3.4 **FOAM INSTALLATION**

- .1 Follow manufacturer's installation instructions for damming penetration.
- .2 Seal gaps or cracks left after damming materials are in place.
- .3 Immediately after mixing, dispense liquid foam into penetration opening in accordance with manufacturer's installation instructions.
- .4 Do not overfill penetration openings with liquid foam. Foam expands approximately three times its original volume during cure. Comply with the following:
 - .1 When dispensing liquid foam continuously, be sure the thickness of liquid foam does not exceed 25 mm at any given spot.
 - .2 If opening is not filled when cured foam has completed its expansion, repeat injection and cure procedure until opening is filled to desired level.
- .5 Leave temporary damming in place for twenty-four hours to allow foam to fully cure.

3.5 **SEALANT INSTALLATION**

- .1 Apply sealant from cartridge or with trowel or putty knife from pail as applicable to detail or condition. Ensure sealant contacts with substrates of opening.

3.6 **FIELD QUALITY CONTROL**

- .1 Perform manufacturer's in-line quality control check at least once daily, and upon changing to new lot of material, to ensure performance of both dispensing equipment and foam Product prior to installing penetration seals.

- .2 Inspect cured penetration seal after twenty-four hour cure by removing temporary damming materials to examine seal.
- .3 Cured foam should completely fill penetration. Fill remaining gaps with freshly mixed foam or fire stop sealant. Reinspect after added material has cured twenty-four hours.
- .4 Damming materials required to achieve a specific fire rating must remain in penetration. Sheet metal closures which are shown on Drawings are to be reinstalled after inspections.

3.7 **IDENTIFICATION**

- .1 Identify each firestop penetration assembly with permanent label listing following:
 - .1 Assembly and rating in hours.
 - .2 Date of installation.
 - .3 Installing company's name and telephone number.

3.8 **ADJUSTMENT AND CLEANING**

- .1 Clean up foam or sealant spills following manufacturer's instructions on container label.
- .2 Trim excess cured foam with a sharp knife or blade if required for finished appearances.
- .3 Remove equipment, materials and debris, leaving area in undamaged, clean condition.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

.1 Labour, Products, equipment and services necessary to complete the Work of this section, including but not limited to, the following:

.1 Type "A" conditions: All exposed joints on the exterior and interior of wall envelope and all joints throughout that are subject to movement. The principal locations are as follows:

.1 Perimeter of exterior hollow metal frames and steel channel frames at junctions with adjacent construction.

.2 Control joints in exterior masonry and concrete walls.

.3 Joint between truck dock shelter or door seals and adjacent construction.

.4 Other locations indicated on the Drawings.

.2 Type "B" conditions: All joints on the building interior that are not subject to movement and that require filling for appearance or sanitary reasons. The principal locations are as follows:

.1 Masonry control joints.

.2 Joints between metal frames of all kinds and adjacent construction, in interior partitions.

.3 Masonry wall inside corners in exposed locations; masonry-to-column junctures where masonry is anchored to steel.

.4 Other locations indicated on the Drawings.

.3 Type "C" conditions: Exposed areas on the building interior which require a mildew resistant sealant. The principal locations are as follows:

.1 Joints around washroom accessories, water closets, urinals, lavatories, vanities and shelves.

.2 Joints around counters at walls.

.3 Joints around shower accessories.

.4 Other locations indicated on the Drawings.

1.2 **SEALANTS SPECIFIED IN OTHER SECTIONS**

.1 Section 03 30 00: Sealant in "vee" groove control joints.

.2 Section 07 60 00: Sealant within roof flashings.

.3 Section 08 40 00: Sealant around aluminum entrances, windows, glazed curtain walls or windowwalls, both sides of wall.

- .4 Section 08 80 00: Sealant in conjunction with glazing.
- .5 Section 09 29 00: Sealant in conjunction with acoustically insulated gypsum board partitions.
- .6 Divisions 22 and 23: Packing and sealant around pipe and ductwork penetrations.
- .7 Divisions 26 and 27: Packing and sealant around electrical conduit and equipment penetrations.

1.3 REFERENCES

- .1 Conform to the latest edition of the following:
 - .1 ASTM C920 - Standard Specification for Elastomeric Joint Sealants
 - .2 SCAQMD - State of California's South Coast Air Quality Management District
 - .3 AODA - Accessibility for Ontarians with Disabilities Act

1.4 SUBMITTALS

- .1 Shop Drawings
 - .1 Submit in accordance with Section 01 33 00.
 - .2 Submit as Shop Drawings, printed literature of each sealant Product specified describing composition, together with recommendations or directions for surface preparation, material preparation and material installation.
 - .3 Product data submitted to show validation by the Sealant, Waterproofing and Restoration Institute (SWRI) for exterior sealants.
 - .4 In addition, submit colour charts for each sealant material for colour selection.

1.5 QUALITY ASSURANCE

- .1 Installer qualifications: The Work of this section shall be carried out by an installer having specialized in this Work as its primary business for at least five years, and having performed satisfactorily Work of this type, size and scope. Employ craftsmen who are thoroughly skilled and completely familiar with the specified requirements. Provide the services of a competent foreman or supervisor who shall be available at all times during the progress of the Work of this section.
- .2 Single source: Provide sealants of each joint type from one manufacturer.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in manufacturers' original unopened containers with manufacturers' labels and seals intact. Labels to identify manufacturer's name, brand name, date of manufacture, grade and type, application directions, and expiry date or shelf life.
- .2 Handle and store materials in accordance with manufacturers' printed directions. Arrange for suitable storage areas. Store flammable materials in safe, approved containers to eliminate fire hazards.

1.7 **PROJECT SITE CONDITIONS**

- .1 Protect adjacent Work from damage resulting from Work of this section. Replace damaged Work at no increase in Contract Price.
- .2 Do not install sealants when ambient air temperature is less than 4°C (40°F) (-28°C (-20°F) for silicones) or when recesses are wet or damp; Provide temporary heated enclosures to comply with this requirement.
- .3 Protect adjacent exposed finished surfaces from damage, by masking or other approved means, prior to performing Work. Remove protection when no longer required and clean adjacent, exposed surfaces of any sealant deposited upon such surfaces.

1.8 **WARRANTY**

- .1 Warrant the Work for three years. Repair leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion or staining adjacent surfaces, occurring during the Warranty Period.

2 **Products**

2.1 **SEALANT**

- .1 General
 - .1 Low VOC: Use sealants with low volatile organic content to comply with SCAQMD Rule 1168
 - .2 Validation: Sealants are to have the validation of Sealants, Waterproofing and Restoration Institute (SWRI).
 - .3 Provide joint sealants that are compatible with backing material, accessories, substrates and adjacent sealants for the intended uses based on the testing, recommendations, experience, and written instructions of the sealant manufacturer.
 - .4 Colours for exposed joint sealants caulking: Provide joint sealant colours as selected by the Consultant from the manufacturer's full range of colours.
- .2 Sealant - type "A" conditions: Multi-component type in polysulphide or polyurethane type, as follows:
 - .1 Multi-component polysulfide: ASTM C920, Type M, Grade NS, Class 25, in standard colours as selected by the Consultant:
 - .1 W.R. Meadows "CM-60-7900-252"
 - .2 Sonneborn "Sonolastic Polysulfide Sealant"
 - .3 Sika "Duoflex NS/SL"
 - .4 Euclid Chemical, "Tammsflex NS/SL"
 - .2 Multi-component polyurethane: ASTM C920, Type M, Grade NS, Class 25, in standard colours as selected by the Consultant:
 - .1 W.R. Meadows "Dualthane 7900-232"

- .2 Sonneborn "Sonolastic NP 2"
 - .3 Tremco "Dymeric" or "Vulkem 227"
 - .4 Sika "Sikaflex 2C NS/SL"
 - .5 Euclid Chemical, "Eucolastic 2 NS or SL"
- .3 Sealant - type "A" conditions: One-component polyurethane or one-component silicone sealant to ASTM C920, Type S, Grade NS, Class 25, Use NT, M and A in standard colours as selected by the Consultant.
- .1 Tremco "Dymonic"
 - .2 Sonneborn "NP 1"
 - .3 Dow Corning "CWS or CCS"
 - .4 Bondaflex "PUR 25" (polyurethane) or Bondaflex "SIL 199" (silicone)
 - .5 Euclid Chemical, "Eucolastic 1 NS or SL"
- .4 Sealant - type "A" conditions: Silicone sealant to ASTM C920, Type S, Grade NS, Class 25, Use T, NT and M in standard colours as selected by the Consultant.
- .1 Dow Corning Corp. "790 Building Sealant" or "795 Building Sealant"
 - .2 GE "Silpruf LM"
 - .3 Tremco "Spectrem 1"
 - .4 Bondaflex "SIL 290"
- .5 Sealant - type "B" conditions: Non-sag, one part, acrylic polymer caulk, in standard colours as selected by the Consultant.
- .1 Tremco "Mono 555"
 - .2 DAP Inc. "Acrylic Polymeric Sealant"
- .6 Sealant - type "C" conditions: Mildew resistant silicone sealant to ASTM C920, Type S, Grade NS, Class 25, and meeting the requirements of FDA Regulation 21 CFR 177.2600, in standard colours as selected by the Consultant.
- .1 Dow Corning "786 Mildew Resistant Silicone Sealant" or "Tub Tile and Ceramic"
 - .2 GE Silicones "Sanitary 1700"
 - .3 Sonneborn "Sonolastic Omnipus"
 - .4 Bondaflex "SIL 100 WF"
- .7 Sealant - type "C" conditions: One-part mildew resistant sealant, Novalink by Chemlink, in standard colour as selected by the Consultant.
- .8 Sealant type "D": Low dirt-pick-up, non-staining silicone sealant to ASTM C920, Type S, Grade Ns, Class 50, Use T, NT and M in standard colours as selected by the Consultant.
- .1 Dow Corning "756 SMS Silicone Building Sealant"

.2 Bondaflex "SIL 295"; Matt Rogers (440) 487-2397

.9 Sealant - exterior immersion conditions: Vulkem 171 primer and two-part chemically curing, pour grade Vulkem 245 polyurethane sealant or Bondaflex "PUR 25 with Primer 1000".

2.2 ACCESSORIES

.1 Primers: As recommended by sealant manufacturers for various substrates, to allow proper adhesion and to prevent staining of adjacent surfaces.

.2 Joint backing: Round, solid section, skinned surfaced, soft polyethylene foam gasket stock, to be under compression and to suit joint width and anticipated movement. Skin shall be of proper consistency to prevent bonding to sealant.

.3 Bond breaker: Recommended by sealant manufacturers to prevent bonding of sealant to backing surface of recess.

.4 Cleaning agents: As recommended by sealant manufacturer.

3 Execution

3.1 PREPARATION

.1 Prepare joints to receive sealant and verify suitability. Failure of sealant in the future, due to claimed unsuitability of joint, will not be valid. Installation of sealant is considered as evidence that joint is suitable to receive sealant.

.2 Clean recesses to receive sealant, free of dirt, dust, loose material, oil, grease, form release agents and other substances detrimental to sealant's performance. Remove lacquer or other protective coatings from metal surfaces, without damaging metal finish, using oil-free solvents.

.3 Apply masking tape to metal surfaces adjacent to recesses to prevent smearing or staining of such metal surfaces.

.4 Depth of recess to receive sealants are not to exceed one-half the joint width up to a maximum of 12 mm and not less than 6 mm at centre of joint.

.1 Where depth of recess is in excess of specified depth, place back-up material in recess, forced into place under compression, to provide specified recess depth.

.2 Where recess is less than specified depth, cut the back surface of recess to specified recess depth.

.5 Recess to be dry when sealants are installed. Where recess for sealants is at proper depth, apply bond-preventative material to back surface of recess. Prime sides in accordance with sealant manufacturer's recommendations, to develop proper mechanical adhesion to negate latent moisture.

3.2 INSTALLATION

.1 Use materials as received from manufacturers, without additives or adulterations. Use one manufacturer's Product for each kind of Product specified.

.2 Mix multi-component sealant until the sealant is thoroughly and uniformly blended and install sealant prior to start of hardening or curing cycle.

- .3 Fill joints completely, regardless of variation of joint widths, and to proper depth as specified. Install sealants under pressure, without smearing adjacent surfaces.
 - .1 Type "A" sealant must have full and uniform contact with, and adhesion to, side surfaces of recess.
 - .2 Type "B" and Type "C" sealants must have full and uniform contact with, and adhesion to, all surfaces of recess.
- .4 Finish face of sealant smooth and even. At recesses in angular surfaces, finish sealant with a flat face, flush with face of material at each side. At recesses in flush surfaces, finish sealant with a concave face, flush with face of material at each side.
- .5 Sealant may be tooled, provided that such tooling does not damage seal nor tear sealant. Surface of sealants to be free from dirt, stain or other defacements and be uniform in colour.

3.3 **ADJUSTING AND CLEANING**

- .1 Remove any sealants not complying with requirements specified herein. Re-prepare recesses and install new sealants to provide finish Work complying with requirements specified, at no increase in Contract Price.
- .2 Clean surfaces adjacent to filled joints and remove sealant smears. At metal surfaces, remove masking tape and other residue. Exercise care in cleaning and removal operations, so as not to mar or damage finishes on materials adjacent to joints. Repair or replace marred or damaged materials, at no increase in Contract Price.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process
- .2 CAN4-S104-M - Standard Method for Fire Tests of Door Assemblies
- .3 CAN4-S105-M - Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104
- .4 CSA W47.1 - Certification of Companies for Fusion Welding of Steel
- .5 CSA W59-M - Welded Steel Construction (Metal Arc Welding)
- .6 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **SUBMITTALS**

.1 Shop Drawings

- .1 Submit in accordance with Section 01 33 00. Clearly show in detail, gauges of metal Work, assemblies, large screen frame sections and assembly details, fastenings, hardware cutouts and reinforcing, anchorage and finish.
- .2 Indicate doors and frames which are fire rated.
- .3 Submit manufacturer's Product data brochure as part of Shop Drawing submittal.

1.4 **COORDINATION**

- .1 Coordinate with finish hardware Supplier to ensure proper preparation of hollow metal doors and frames for finish hardware.
- .2 Coordinate with electrical division for doors requiring conduits.

1.5 **DELIVERY, STORAGE AND HANDLING**

- .1 Protect Work against rust and damage during manufacture and delivery. Handle carefully to prevent distortion and wracking.
- .2 Protect hollow metal Work from damage. Replace damaged Work which cannot be satisfactorily repaired, restored or cleaned. Store materials on site in a manner to prevent damage.

2 Products

2.1 **DESCRIPTION AND SOURCE**

- .1 Doors are of the insulated/sound deadened, steel-stiffened type using the spot welding or adhesive method to attach face sheets to the rib stiffeners.
- .2 Frames are of the welded type. Knockdown frames are not permitted.
- .3 Source doors and frames from one of the following:
 - .1 Fleming Door Products Limited
 - .2 Artek Door
 - .3 Baron Metal Industries
 - .4 Daybar Industries Limited

2.2 **MATERIALS**

- .1 Sheet steel: Commercial grade sheet steel conforming to ASTM A653/A653M, with ZF75 zinc-iron alloy coating designation. Sheet steel thicknesses specified are base metal thicknesses prior to galvanizing.
- .2 Hollow Metal Doors (and Transom Panels)
 - .1 Facings, rails, stiles: 1.5 mm thick (16 ga) steel.
 - .2 Interior stiffeners: 0.91 mm thick (20 ga) steel.
 - .3 Sound deadening and insulating material: Semi-rigid fibreglass, 24 kg/m³ minimum density, to fill core space.
 - .4 Top caps: Rigid PVC extrusions conforming to CGSB 41-GP-19Ma.
 - .5 Glazing stops: 1.5 mm thick (16 ga) steel, formed, drilled and countersunk for fastenings.
 - .6 Door louvres: Vee shaped sight tight, with double flat frames, with 40% minimum free area, of W25 galvanized steel sheet with manufacturer's standard shop primer finish in grey colour; Airvector "T20F", Kreuger "600A", K.N. Crowder "SDL-V90", or M.W. McGill "DG 2000".
 - .7 Fusible link door louvres: 1.6 mm (16 ga) cold rolled steel, fire actuated fusible link closure mechanism, minimum 25% free louvre area, baked enamel finish in colour selected by Consultant, listed and bearing the mark of ULC or Warnock Hersey. Accepted manufacturers: E. H. Price, Airflow, or K.N. Crowder.
- .3 Hollow Metal Door Frames
 - .1 Steel: 1.5 mm thick (16 ga) steel.
 - .2 Hardware reinforcement: 3.4 mm thick (10 ga) steel.
 - .3 Channel door spreaders: 1.2 mm thick (18 ga) steel.

- .4 Glazed Screen and Borrowed Light Frames and Mullions
 - .1 Steel: 1.5 mm thick (16 ga) steel.
 - .2 Glazing stops: 1.5 mm thick (16 ga), formed, drilled and countersunk for fasteners.
- .5 Frame Anchors
 - .1 Frames in masonry: Adjustable "T-strap" anchors and base anchor.
 - .2 Frames in precast (concrete): Countersunk galvanized expansion bolts complete with base anchors, and spacers behind hollow metal frame.
 - .3 Frames in steel channel sub-frames: Countersunk fluorocarbon coated self drilling screws complete with spacers behind hollow metal frame.
 - .4 Labeled frames: To conform to ULC or Warnock Hersey requirements.
 - .5 Frames in gypsum board partitions: Steel anchor clips and adjustable base anchors of suitable design securely welded inside each jamb.
 - .6 Floor anchors: Minimum 3.5 mm thick adjustable hot-dip galvanized base anchors with two holes for bolting to floor.
- .6 Rubber bumpers: Glynn-Johnson GJ64.
- .7 Conduit in hollow metal frames: To CSA C22.2 No. 83-M. EMT galvanized cold rolled steel tubing.
- .8 Dutch door shelves: 1.5 mm thick (16 ga) steel, rolled bottom edges. Secure to door leaves on underside only, with no exposed fasteners.

2.3 **FABRICATION**

- .1 Arc weld joints in accordance with CSA W59-M to produce a finished unit, square, true and free of distortion. Continuous weld joints unless specified otherwise. Execute welding by a firm fully approved by Canadian Welding Bureau to requirements of CSA W47.1.
- .2 Accurately form profiles.
- .3 Perform all cutting in door fabricator's shop.
- .4 Ream and remove burrs from cutouts and from drilled and punched holes.
- .5 Finish Work free from warp, open seams, buckles, weld and grind marks and other surface defects detrimental to attainment of a good paint finish in field.
- .6 Doors that do not require labels shall have label holes properly filled at the factory prior to shipping to Site.
- .7 Hollow Metal Doors
 - .1 Flush welded type, seamless, of sizes to conform to details and schedules, and reinforced to receive hardware fastenings.
 - .2 Provide cutouts for glass and door louvres.

- .3 Vertically stiffen doors with galvanized metal stiffeners at 150 mm o.c. For bonded face sheets, apply continuous mastic adhesive to stiffeners into which, bond face sheets. For spot welded face sheets, apply welding at 150 mm o.c. Fill voids with fibreglass insulation. Fill and grind smooth weld marks.
- .4 Weld doors on the hinge side with a minimum of ten points of 13 mm welds in the following locations:
 - .1 Top and bottom
 - .2 On either side of the hinge
 - .3 At the intermediate points between the hinges
- .5 Weld doors on the strike side with a minimum of eight 13 mm welds in the following locations:
 - .1 Top and bottom
 - .2 On either side of the hinge
 - .3 Two welds above and below the strike, spread equally between the top and bottom welds
- .6 After welding, dress and fill door joints. Clean, sand, flood coat with air drying paste filler and again sand to eliminate unevenness or irregularities.
- .7 Using premoulded PVC, cap top of exterior doors, and interior doors on which the tops can be seen from stair landings or other high elevations.
- .8 Blank, drill, reinforce and tap doors to receive hardware.
- .9 Accurately fit and mitre glazing stops and loosely screw in position with cadmium plated countersunk tamperproof oval head screws, spaced 150 mm o.c. maximum.
- .10 Install door louvres to fit tight and secure into framed openings.
- .8 Hollow Metal Door Frames
 - .1 Assemble using welded construction only.
 - .2 Provide thermally broken frames for exterior doors, with polyvinylchloride thermal breaks separating exterior and interior portions of frame.
 - .3 Weld vertical centre mullion where indicated at double door openings.
 - .4 Cut frame mitres accurately and weld continuously on inside of frame profile.
 - .5 Grind welded frame corners to smooth finish, fill with metallic paste filler, sand smooth, and prime paint.
 - .6 Make cutouts to suit hardware. Blank, drill, tap and reinforce frames to receive template hardware. Protect mortised butts and strike cutouts with metal mortar guard boxes welded on inside of frames. Reinforce frames for installation of hardware.
 - .7 Weld, grind smooth and seal a continuous integral steel weather drip at head of exterior door frames.

- .8 Provide three door bumpers per single door frame, two per double door frame without centre mullion, six per double door frame with centre door mullion.
 - .9 Provide mortar guard box at strike and header, and separate EMT conduit for each, extended 100 mm above header rebate with pull wire in all conduits.
 - .10 Tack weld two channel or angle spreaders on door jambs at bottom of door opening to prevent bending of frame and to maintain alignment when setting.
 - .11 If frame requires anchorage by mechanical fastening through exposed face of frame, determine spacing of fasteners and prepare frame for countersunk fasteners.
- .9 Hollow Metal Frames for Glazed Screens and Borrowed Lights
- .1 Assemble using welded construction. Construct large screens in sections with provision for on-site assembly to suit site conditions.
 - .2 Form perimeter frames, tubular mullions and transoms with 50 mm face members. Accurately cope and mitre sections to fit together, carefully align and weld on inside of frame.
 - .3 Accurately cut, mitre and fit steel glazing stops. Loosely screw in position with cadmium plated countersunk tamperproof oval head screws spaced at maximum 450 mm o.c. and 50 mm from each end.
 - .4 Prepare frames by grinding, sanding and filling same as specified for door frames.
- .10 Fire Rated Doors and Frames
- .1 Fabricate doors and frames for hourly rating noted on door schedules in conformance with CAN4 S104-M and CAN4 S105-M. Furnish door and frames with the appropriate label of a testing organization accredited by Standard Council of Canada in conformance with the foregoing standards.
 - .2 Label the entire assembly of fire rated screens containing doors.
 - .3 Locate fire rating label on doors on hinged edge midway between top hinge and head of door. Locate fire rating label on frames in door rebate.
 - .4 Mortise, reinforce, drill and tap doors to receive template hardware and reinforce for surface mounted hardware, all as per requirements of foregoing standards.
- .11 Temperature Rise Limit
- .1 Where located in a firewall, fabricate doors to achieve the Temperature Rise Limit (TRL) indicated in the Ontario Building Code.
 - .2 Provide such doors with a combined fire rating/temperature rise limit label. Locate as previously specified.
- .12 Insulated hollow metal transom panels: Same as for hollow metal door construction complete with drip flashings on exterior panels.
- .13 Preparation for security system: Hollow metal doors will be monitored to a central security system. Prepare frames and doors to accommodate concealed rotary switch hinge (C.R.S.) at the centre hinge point. Provide frame with metal mortar guard at back side of hinge and

with a 19 mm diameter rigid galvanized steel conduit from top of mortar guard to 300 mm above door head.

- .14 Masonry anchors: Fit specified anchors into frames. Furnish number of anchors on each jamb as follows:

- .1 Frames up to 2285 mm height: Three "T" anchors.
- .2 Frames 2285 mm to 2440 mm height: Four "T" anchors.
- .3 Frames over 2440 mm height: One "T" anchor for each 600 mm or fraction thereof of height.

- .15 Stud wall anchors: Fit specified anchors into frames. Furnish number of anchors for each jamb as follows:

- .1 Frames up to 2285 mm height: Four anchors.
- .2 Frames 2285 mm to 2440 mm height: Five anchors.
- .3 Frames over 2440 mm height: Five anchors plus one additional for each 600 mm or fraction thereof over 2440 mm.

3 Execution

3.1 **INSTALLATION**

- .1 Building-in of hollow metal frames in masonry is specified in Section 04 22 00 - Concrete Unit Masonry.
- .2 Setting of hollow metal frames is specified in Section 06 20 00 - Finish Carpentry.
- .3 Installation of doors and finish hardware is specified in Section 08 71 05 - Installation of Doors and Finish Hardware.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- | | | | |
|----|-----------------------|---|--|
| .1 | ASTM E152 | - | Methods of Fire Tests of Door Assemblies |
| .2 | CAN3-0188.1-M | - | Interior Mat Formed Wood Particleboard |
| .3 | CAN/CSA-0132.2 Series | - | Wood Flush Doors |
| .4 | CAN4-S104-M | - | Fire Tests of Door Assemblies |
| .5 | AODA | - | Accessibility for Ontarian with Disabilities Act |

1.3 **QUALITY ASSURANCE**

- .1 Except where more rigid requirements are specified, the current CAN/CSA-0132.2 series governs this section.

1.4 **SUBMITTALS**

.1 Submit Shop Drawings in accordance with Section 01 33 00.

- .1 Clearly show in detail, thicknesses, core construction, sizes, quantities, fastenings and finishes.
- .2 Submit certification from a nationally recognized independent inspection and testing organization substantiating that fire doors, and acoustic doors meet or exceed ASTM E152 requirements.

1.5 **DELIVERY, HANDLING AND STORAGE**

- .1 Wrap finished Products individually in protective wrapping for shipment and Site storage. Maintain a relative humidity of not less than 25% or not more than 55% in storage area.
- .2 Mark individual architectural door numbers in the top hinge cavity created by the machining of the hinges.
- .3 Deliver only after the building is enclosed and dry, heated and ventilated. Do not store in a damp area.
- .4 Handle to prevent damage thereto. Do not drag across each other or across other surfaces.
- .5 Pile delivered Products inside the building on 100 mm x 100 mm wood skids, with bottom face protected from air currents. Use three skids per pile.

1.6 **PROTECTION**

- .1 Protect the Work of this section from damage. Replace damaged Work which cannot be satisfactorily repaired, restored or cleaned. Store materials in a manner which will prevent damage thereto.

1.7 **WARRANTY**

- .1 Warrant the Work for the periods stated below. Further to requirements in the foregoing warranty, replace doors showing defects including warping, twisting, splitting, delamination, bubbling, sagging or showing core ghost lines, occurring within the warranty period.
- .2 Warranty periods as follows:
 - .1 Units with 448 kg/m³ core: Minimum three years.
 - .2 Units with 512 kg/m³ core: Life time of the doors.

2 Products

2.1 **ACCEPTABLE MANUFACTURERS**

- .1 Masonite
- .2 Lambton Doors
- .3 Cambridge Door Ltd.
- .4 Or accepted equal

2.2 **MATERIALS**

- .1 Core: Minimum 448 kg/m³ density, solid mat formed wood particleboard core conforming to CAN3-0188.1-M, or 512 kg/m³ particleboard conforming to ANSI A208.1 LD2.
- .2 Core (fire rated doors): Particleboard or incombustible mineral sections depending on rating, as required by a certification organization accredited by Standards Council of Canada. Reinforce finish hardware locations with wood blocking.
- .3 Core (acoustic doors): High density material with dampening fill to provide a Sound Transmission Class (STC) of 42 (51) (36).
- .4 Adhesive: Hot pressed, water resistant type conforming to glue line requirements of CAN/CSA 0132.2 series.
- .5 Stiles: 19 mm thick hardwood laminated to 95 mm finger jointed softwood.
- .6 Rails: 36 mm clear or finger jointed softwood.
- .7 Stiles and rails for fire doors: As required for the fire rating specified.
- .8 Cross banding: 1.6 mm hardwood veneer.
- .9 Plastic laminate facing: 1.6 mm thick "Arborite", "Formica", Durolam, Nevamar or "Wilsonart", in woodgrain, furniture finish as selected by the Consultant from manufacturer's standard range.

- .1 Wood veneer facing: Select painted grade mahogany, birch, oak, or match existing. Minimum 0.8 mm thick, architectural quality, premium grade selected for uniformity of colour, figure and grain. Piece veneers to be parallel dipped, jointed by tapeless splicer and edge glued. Face veneers with open joints, face depressions, glue stain, plastic repairs and other defects will not be accepted.
- .2 Facing for paint finish: Medium density overlaid plywood.
- .3 Facing for paint finish: 3 mm thick industrial grade hardboard by Canwell or Canadian Masonite, factory primed.
- .4 Door louvres: Vee shaped sight tight, with double flat frames, 25% minimum face area, of W25 galvanized steel with manufacturer's standard shop primer; Airvector "T20F", Kreuger "600A", K.N. Crowder "SDL-V90" or M.W. McGill "DG2000".
- .5 Glass stops: Solid birch or maple, sanded smooth and sealed.
- .6 Sealer: Compatible with field applied finish. Coordinate with Section 09 91 00. In an unpainted condition, sealer to be visually recognizable for ease of inspection in the field.
- .7 Rubber bumpers: Glynn-Johnson GJ64.
- .8 Wood frame: Plain sawn solid stock hardwood in the same species as wood door face veneer complying with premium grade requirements of AWMAC and matching the colour and graining of the door face veneer.
- .1 Hollow Metal Door Frames
 - .1 Steel: 1.5 mm thick (16 ga) steel.
 - .2 Hardware reinforcement: 3.4 mm thick (10 ga) steel.
 - .3 Channel door spreaders: 1.2 mm thick (18 ga) steel.
- .2 Frame Anchors
 - .1 Frames in masonry: Adjustable "T-strap" anchors and base anchor.
 - .2 Frames in precast (concrete): Countersunk galvanized expansion bolts complete with base anchors, and spacers behind hollow metal frame.
 - .3 Labeled frames: To conform to ULC or Warnock Hersey requirements.
 - .4 Frames in gypsum board partitions: Steel anchor clips and adjustable base anchors of suitable design securely welded inside each jamb.

2.3 **GENERAL FABRICATION**

- .1 Fabricate units under conditions which permit a balance control of the moisture content of all component parts to within range of 6% to 12%.
- .2 Fabricate doors with core specified, five-ply construction, with stiles and rails bonded to core.
- .3 Incorporate solid wood blocking at locations where finish hardware is installed.
- .4 Thoroughly sand back face of facing to provide a homogeneous bonding surface. Apply facing on cross banding to both faces of doors. Bond materials under pressure in

accordance with the material manufacturer's printed specifications, to a perfectly smooth surface free from distortion, waves, ridges or core ghost lines.

- .5 Job application of door facing is not acceptable.
- .6 Hollow Metal Door Frames
 - .1 Assemble using welded construction only. Knockdown frames are not permitted.
 - .2 Cut frame mitres accurately and weld continuously on inside of frame profile.
 - .3 Grind welded frame corners to smooth finish, fill with metallic paste filler, sand smooth, and prime paint.
 - .4 Make cutouts to suit hardware. Blank, drill, tap and reinforce frames to receive template hardware. Protect mortised butts and strike cutouts with metal mortar guard boxes welded on inside of frames. Reinforce frames for installation of hardware.
 - .5 Weld, grind smooth and seal a continuous integral steel weather drip at head of exterior door frames.
 - .6 Provide three door bumpers per single door frame, two per double door frame without centre mullion, six per double door frame with centre door mullion.
 - .7 Tack weld two channel or angle spreaders on door jambs at bottom of door opening to prevent bending of frame and to maintain alignment when setting.
 - .8 If frame requires anchorage by mechanical fastening through exposed face of frame, determine spacing of fasteners and prepare frame for countersunk fasteners.
- .7 Fabricate transoms the same as doors; faces to match door face colour and pattern. Rebate transoms to door heads.
- .8 Glass Sidelites and Transoms:
 - .1 Tempered glass, clear glazing quality, 6 mm thickness, to CAN/CGSB-12.1-M, Type 2, Class B, Category II.

2.4 **FIRE RATED DOORS**

- .1 Fabricate doors to comply with the requirements of a certification organization accredited by Standards Council of Canada in conformance with CAN4-S104M for fire ratings indicated.
- .2 If fire rated doors incorporate wired glass lites, include wired glass lites as part of the Work.
- .3 Provide fire rating label on the hinged edge of the door, midway between the top hinge and the head of the door.
- .4 Field scribing or cutting of doors is not permitted.

2.5 **FACTORY MACHINING**

- .1 Coordinate with allied trades and perform factory machining.
- .2 Undercut doors to accommodate carpet floor finish and bevel edges as required.

- .3 Accurately cut out openings to receive door louvres and glazing. Openings shall be square with internal corners slightly rounded. Install door louvres in doors, in accordance with door schedule.
- .4 Tack stops in place with countersunk head wood screws ready for final setting in the field.
- .5 Do preparation, accurately cut openings for and pre-fit mortise hardware in accordance with hardware manufacturer's templates and finish hardware schedule.

2.6 **SEALING**

- .1 Completely seal all exposed wood edges and edges of cutouts before units are shipped from the manufacturer's mill or are placed in the open air or unheated storage areas at the mill which would result in a change in the specified moisture content of the wood. Apply sealer in accordance with sealer manufacturer's directions.

2.7 **PRIMING**

- .1 Shop prime doors for finish painting in the field.

3 **Execution**

3.1 **INSTALLATION**

- .1 Supply doors to Section 08 71 05 for installation.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- | | | |
|-----|--------------------------|---|
| .1 | CAN/CGSB-12.8-M | - Insulating Glass Units |
| .2 | CAN/CGSB-12.3-M | - Flat, Clear Float Glass |
| .3 | CAN/CGSB-12.4-M | - Heat Absorbing Glass |
| .4 | CAN/CGSB-12.1-M | - Tempered or Laminated Safety Glass |
| .5 | CAN/CGSB-12.10-M | - Glass, Light and Heat Reflecting |
| .6 | CAN/CGSB-1.108-M | - Bituminous Solvent Type Paint |
| .7 | CAN/CSA G40.20/ G40.21-M | - Welded Structural Quality Steel/Structural Quality Steels |
| .8 | CAN/CGSB 19.24-M | - Multi-Component, Chemical-Curing Sealing Compound |
| .9 | ASTM A446/A446M | - Specification for Steel Sheet, Zinc Coated (Galvanized) by the Hop Dip Process, Structural (Physical) Quality |
| .10 | NAAMM AMP-505 | - The National Association of Architectural Metal Manufacturers, Applied Coatings |
| .11 | NAAMM AMP-501 | - The National Association of Architectural Metal Manufacturers, Finishes for Aluminum |
| .12 | AODA | - Accessibility for Ontarians with Disabilities Act |

1.3 **SUBMITTALS**

.1 Samples

- .1 Submit in accordance with Section 01 33 00.
- .2 Submit duplicate sample sections of all component parts of entrances, curtain wall, windows, glass and spandrel panels, finished in specified colours. Sizes of samples as follows:
- | | |
|----|-----------------------------------|
| .1 | Extruded shapes: 300 mm |
| .2 | Each type of glass: 300 mm square |

- .2 Shop Drawings
 - .1 Submit in accordance with Section 01 33 00.
 - .2 Show fabrication and erection details of all components and accessories. (Prior to review by the Consultant, submit Shop Drawings and calculations to structural silicone sealant manufacturer for review and approval.) Show the following on the Shop Drawings:
 - .1 Interface conditions with adjoining works.
 - .2 Sealant locations and joint detail including joint back-up.
 - .3 Interior structure and/or reinforcements.
 - .4 Extruded framing system for all members (plans and sections, in half full size, if not of the manufacture specified and drawn). Show thermal breaks and what material.
 - .5 Glazing and glass stop details, vinyl or neoprene mouldings (in half full size), and all anchorage and assembly fixings.
 - .6 Ventilator details showing hardware locations and a note confirming that operating hardware is accessible for unobstructed hand operation.
 - .7 List of materials used for every component.
 - .3 Indicate how thermal expansion and contraction are to be accommodated and to what degree. Show connections to adjacent construction and provision made for structural deflections, contractions, expansion and other normal movement..
- .3 Test reports: Submit with Shop Drawings, a report from an independent testing laboratory which was done on a window wall test specimen composed of the same components as that specified herein. Report shall verify that the metal construction and the insulating glass units used meet the following test results:
 - .1 Air infiltration and exfiltration: ASTM E283
 - .1 Test pressure: 1.57 psf (equivalent to 25 mph)
 - .2 Pass criteria: Maximum air leakage of 0.03 cfm/ft³ of fixed test area
 - .3 Results: No measurable air leakage; pass
 - .2 Static pressure water infiltration: ASTM E331
 - .1 Test pressure: 10.5 psf
 - .2 Test duration: Fifteen minutes
 - .3 Pass criteria: No uncontrolled water leakage
 - .4 Results: No water leakage observed; pass
 - .3 Dynamic pressure water infiltration: NAAMM TM-1-68T
 - .1 Test pressure: 10.5 psf for fifteen minutes

- .2 Test pressure: 20.0 psf for five minutes (15 psf dynamic plus 5 psf static pressure)
- .3 Total test duration: Twenty minutes
- .4 Pass criteria: No uncontrolled water leakage
- .5 Results: No leakage observed; pass
- .4 Structural loads: ASTM E330
 - .1 Test pressure: +15 psf to remove slack
+30 psf positive design pressure
-15 psf to remove slack
-30 psf negative design pressure
 - .2 Test duration: Each load held for ten seconds
 - .3 Pass criteria: Allowable deflections of framing members at design load are window framing members L200
 - .4 Main framing members instrumented with dial indicators to measure typical deflections
- .5 Repeat static pressure water infiltration: ASTM E331
 - .1 Test pressure: 10.5 psf
 - .2 Test duration: Fifteen minutes
 - .3 Test criteria: No uncontrolled water leakage
 - .4 Results: No water leakage observed; pass

1.4 **GENERAL DESIGN**

- .1 Make thorough examination of all Drawings and details, check interfacing with Work of other Contracts and other factors influencing the engineering design and performance of the Work and be fully cognizant of requirements.
- .2 Drawings and Specifications do not intend to identify or solve the requirements of thermal, structural, vapour and air movement, methods of anchorage, flatness and other requirements. Be responsible for all of these aspects. Base design on the "rainscreen principle" as advocated by National Research Council of Canada (NRC).
- .3 Design to withstand without failure, the positive and negative forces imposed by wind, earthquake, temperature and shrinkage stress, deflections of the supporting or adjacent structures, all within deflection limitations governed by the design of the supporting structure. Calculate external pressure of suction due to wind on part or all of the surface of the units in accordance with the Ontario Building Code.
- .4 Design in such a way that completed installation is free from rattles, wind whistles and noise due to thermal and structural movement and air pressure..

1.5 **DESIGN REQUIREMENTS**

- .1 Be responsible for the design of components and accessories thereof and connections in accordance with the requirements of the Ontario Building Code.

- .2 Design to prevent accumulation of condensate on interior side of window frame under the following service conditions:
 - .1 Interior temperature: 25°C (77°F).
 - .2 Exterior temperature: -20°C (-4°F).
 - .3 Interior RH: 40%.
- .3 Restrict air infiltration/exfiltration, through window assembly to 0.25 m³/h/m⁻¹ and doors to 2.79 m³/h/m⁻¹ at reference pressure differential of 75 Pa, when measured in accordance with ASTM E283.
- .4 No water infiltration when tested to ASTM E331 with pressure differential of 720 Pa (15.0 psf).
- .5 Design aluminum curtainwall, windows and ventilators system in accordance with following CAN/CSA-A440-M classification ratings:
 - .1 Air tightness: Fixed. A3 for operable windows.
 - .2 Water tightness: B7.
 - .3 Wind load resistance: C5.
 - .4 Condensation resistance: Temperature index: Minimum 60.6.
- .6 Design glass in accordance with CAN/CGSB-12.20-M. Perform stress analysis. Design units to accommodate live, dead, lateral, wind, seismic, handling, transportation, and erection loads.
- .7 Design and detail controlled drainage path to actively discharge water, which enters into or forms within curtain wall/window system, to exterior; design to prevent accumulation or storage of water within curtain wall, or window system. Prevent water from entering interior when tested in accordance with ASTM E331.
- .8 Design and detail air barrier, vapour retarder, insulation and rainscreen Products and assemblies into continuous and integrated curtain wall/window envelope. Optimize curtain wall/window design to align envelope layers and to minimize thermal bridges.
- .9 Prevent deflection and permanent or progressive glazing displacement. Restrict horizontal and vertical mullion deflection to less than L/175 (under uniformly distributed positive design wind load), and 10 mm maximum regardless of span.
- .10 Design anchorage inserts for installation as part of other sections of Work. Design anchorage assemblies to accommodate construction and installation tolerances.

1.6 **DELIVERY, HANDLING AND STORAGE**

- .1 Transport materials to the job site storage compound in such a manner as to prevent in-transit damage. These measures shall include, but not limited to, crating, polyethylene wrapping system, etc.
- .2 Store in a dry, protected area on site, in original undamaged containers with manufacturers labels and seals intact.
- .3 Provide interleaving protection between glass. Keep glass and interleaving dry and store cases in clean, cool, dry areas with temperatures above the dewpoint. Circulation of cool,

dry air in storage areas is essential. Open cases and inspect units periodically for moisture accumulation. Do not store glass in direct sunlight without an opaque protective covering over same.

- .4 Remove damaged or unsatisfactory materials from the site and replace with new materials to the satisfaction of the Consultant at no cost to the Owner.

1.7 **QUALITY ASSURANCE**

- .1 Have a senior, qualified representative of the silicone sealant manufacturer present at the job site to supervise the butt glazing Work at all times.

1.8 **TESTING AND INSPECTION**

- .1 The Owner may retain an independent inspection company approved by the Consultant to inspect Work of this section and to perform additional shop and field inspection as required. Inspections and tests will be paid for by the Owner except that the Contractor will be required to pay for inspection tests which show results not meeting the requirements of the Specifications or Drawings and for subsequent inspections made necessarily thereby.
- .2 The inspection company will verify that Shop Drawings show that the Work of this section has been designed in accordance with established building envelope design principles.

1.9 **PROTECTION**

- .1 Protect the Work of this trade from damage. Protect Work of other trades resulting from the Work of this section.
- .2 Install at the factory, strippable coatings on all exposed surfaces of aluminum. Leave coating and protective wrappings on the surfaces through the period that other trades work proceed on the building. Remove on completion of the Work.
- .3 Comply with unpacking procedures as recommended by framing and glass manufacturers.
- .4 Make good all damaged Work caused by failure to provide adequate protection. Remove unsatisfactory Work and replace at no expense to the Owner.

1.10 **WARRANTY**

- .1 Warrant Work of this section against defects and deficiencies for the periods specified below from date Work is certified as substantially performed in accordance with the general conditions of the Contract.
- .2 Promptly make good defects and deficiencies which become apparent within the Warranty Period by replacing defective Work satisfactory to the Consultant and at no expense to the Owner.
- .3 Warrant the Work as follows:
 - .1 Work in general: Two-year warranty against defects and failure of system, and to remain completely weathertight and air and water leakproof within the tolerances and limits specified.
 - .2 Insulating units: Five-year warranty against breakage due to faulty workmanship or materials, loss of air seal and condensation.

- .3 Tinted or reflective units: Ten-year warranty against peeling or becoming defective due to normal weather conditions.
- .4 Anodized finish: Five-year warranty against fading, coating conversion and coating separation from metal.
- .5 Fluoropolymer finish: Five-year warranty against peeling, checking, blistering or cracking, and be nonconvertible; fading shall be within ± 5 NBS.

2 Products

2.1 **MATERIALS**

.1 Aluminum

- .1 Extrusions: AA6063-T5 alloy, anodizing quality, conforming to ASTM B221.
- .2 Plate and sheet: AA1100-H14 alloy, anodizing quality unless otherwise indicated minimum 3 mm thick, conforming to ASTM B209.
- .3 Exposed surfaces of aluminum shall be free of die marks, scratches, blisters, "leave-off marks", or other blemishes, whether left unfinished or finished.
- .2 Doors (exterior): Thermally broken exterior doors with insulated units, with top rail and stiles, bottom and mid-rail or as indicated on Drawings. Dual weatherstripping, mechanically fastened and welded corner construction. Both the door and frame are thermally broken, and to accept most universal hardware. Use one of the following:
 - .1 Kawneer "Insulclad "360"
 - .2 Alumicor "ThermaPorte 7700"
 - .3 Or accepted equal
- .3 Doors (interior): Interior doors single glazed. Use one of the following Products:
 - .1 PC-350 "Aluminum Swing"
 - .2 Kawneer "Medium Stile 350"
 - .3 Alumicor "Canadiana 200 Series"
- .4 Interior vestibule glazing framing: Extend vertical framing to underside of structural framing and provide required support, use one of the following Products
 - .1 PC-350 "Elite Glazing"
 - .2 Kawneer "Tri Fab 450"
 - .3 Alumicor "800 Series"
- .5 Sliding Doors/Sidelight
 - .1 Aluminum Frame, glazed sliding door and stationary sidelight system to fit standard 4-5/8" wall thicknesses.
 - .2 Trackless Threshold: System is surface mounted to finished or unfinished floor with a concealed guide roller at post locations

- .6 Aluminum Interior Screens and Swing Doors:
 - .1 Aluminum Framing: "Elite Glazing System" by PC350, or similar, with same or better physical properties and performance criteria.
 - .2 Aluminum Swing Doors without electrical devices:
 - .1 "Series 200-P2" by PC350, or similar, with same or better physical properties and performance criteria.
 - .3 Aluminum Swing Doors with electrical devices:
 - .1 "Series 200-P5" by PC350, or similar, with same or better physical properties and performance criteria.
 - .4 Finishes: To be selected by Consultant from manufacturer's full range.
- .7 Sliding Door:
 - .1 Trackless aluminum sliding door with extruded-aluminum tubular rail and stiles members.
 - .1 Sliding configuration: inline, concealed track systems, Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
 - .2 Framing Members for sidelites, and transom frames: Manufacturer's standard extruded aluminum frames, reinforced as required to support imposed operational loads.
 - .3 "SRT In-line Sliding Glass Door System" by PC350 or similar, with same or better physical properties and performance criteria.
- .8 Windows: Use one of the following Products:
 - .1 Kawneer "516 Series"
 - .2 Alumicor "970 Series"
 - .3 Or accepted equal
- .9 Windows: Top hung, bottom projected out window, complete with claw handles and a pivot shoe roto operator, with aluminum insect screens; use one of the following:
 - .1 Kawneer 526 Isoport
 - .2 Alumicor 1350
 - .3 Or accepted equal
- .10 Column covers and trim rings: Aluminum plate, roll formed curved 3 mm thick; two panels opposing; reveal (open) joints; columns with supports of Z275 galvanized support struts and clip assembly designed and engineered to hold the assembly in place.
- .11 Insulated metal back pan: Minimum 0.76 mm thick (22 gauge) galvanized steel face sheet with rigid fibreglass or mineral wool insulation core of thickness shown.
- .12 Stools, sills and cover plates: Extruded aluminum and brake formed sheet stock.

.13 Aluminum Finish

- .1 Anodized finish: Treat all visible interior aluminum surfaces except as noted otherwise under "Laminated Coating Finish" with a clear (colour) anodic oxide finish in accordance with AMP-501, AA-M12C22A41 (AA-M12C22A42).
- .2 Laminated coating finish: Aluminum Association Designation AALIX, manufacturer's standard factory applied baked, polyvinylidene fluoride Kynar 500, 70% solid finish system, consisting of cleaning, conversion coating, prime coating and finish coating. The finish coat shall be Valspar Inc. "Fluoropon", ICI Devco-Durkee Division SCM Corp. "Nubelar" or PPG Industries "Duramar".

2.2 **SPANDREL PANEL BACK-UP**

- .1 Material: Minimum 0.76 mm thick (22 gauge) galvanized steel face sheet with rigid fibreglass insulation core of thickness shown bonded to same, supplemented by mechanical fasteners as applicable.

2.3 **GLASS AND GLAZING MATERIALS**

.1 Glass Component Types

- .1 Float glass, clear glazing quality, 6 mm thickness to CAN/CGSB-12.3-M.
- .2 Tempered glass, clear glazing quality, 6 mm thickness, to CAN/CGSB-12.1-M, Type 2, Class B, Category II.
- .3 Heat strengthened glass, glazing quality, 6 mm thickness, to U.S. Federal Spec. DD-G-1403, Type HS.
- .2 Insulating units: Conforming to CAN/CGSB-12.8-M. Glass to be reflective units composed of minimum 6 mm thick heat strengthened glass outboard lite and minimum 6 mm thick clear float glass inboard lite. Install units in exterior window wall as vision panels where reflective glass is noted.
- .3 Insulating units: Conforming to CAN/CGSB-12.8-M. Glass to be tinted units composed of minimum 6 mm thick float glass outboard lite and minimum 6 mm thick clear float glass inboard lite. Install units in exterior window wall as vision panels where tinted glass is noted except at exterior vestibule doors, sidelites and transom.
- .4 Insulating units: Conforming to CAN/CGSB-12.8-M. Glass to be tinted, with a Low "E" coating on the #2 surface, and composed of minimum 6 mm thick heat strengthened glass outboard lite and minimum 6 mm thick clear float glass inboard lite.
- .5 Insulating units: Conforming to CAN/CGSB-12.8-M. Glass to be tinted, with Low "E" coating on the #3 surface, and composed of minimum 6 mm thick float glass outboard lite and minimum 6 mm thick clear float glass inboard lite.
- .6 Insulating units: Conforming to CAN/CGSB-12.8-M. Glass to be clear units composed of minimum 6 mm thick clear float glass outboard and inboard lites. Install units in exterior doors, sidelites and transom at main entry.
- .7 Double glazed insulating glass: Conforming to CAN/CGSB-12.8-M argon filled stainless steel spacers, grey sealant, as manufactured by Viracon, Guardian, LOF, PPG, AFGI, 6 mm thick clear outer pane and clear inner pane, with Low E coating on the #3 surface. All vision glass to have a % Light Transmittance of 66 at the minimum. Glass to be float, tempered or heat strengthened in accordance with glass manufacturer's

- recommendations as substantiated by glass manufacturer's stress analysis for each glass location.
- .8 Spandrel glass: Heat strengthened monolithic glass with water based silicone opaque coating. Refer to Drawings for colours. Submit sample for Consultant review. Opaci-Coat 300 by Industrial Control Development.
- .9 Glass for Vestibule Doors, Sidelites and Transoms
- .1 Interior: 6 mm thick clear heat absorbing tempered glass as specified herein.
- .2 Exterior: 6 mm thick tinted heat absorbing tempered glass as specified herein, tinted same as for insulating units.
- .10 Glazing Materials
- .1 Tape: Tremco "Polyshim II" or approved equivalent.
- .2 Backer rod: Closed cell foam polyethylene rod, outsized minimum 25% larger than joint width and compatible with joint sealant.
- .3 Neoprene setting blocks: Durometer hardness of 85 \pm 5, Shore A.
- .4 Silicone spacer blocks: Durometer hardness of 55 \pm 5 Shore A.
- .5 Gaskets: Extruded EPDM.
- .11 Structural glazing sealant: One part structural silicone sealant, "SSG 4000 Ultraglaze" by GE Silicones or equal by Dow Corning. Confirm compatibility with glazing manufacturer's secondary sealant.

2.4 **DOOR FINISH HARDWARE**

- .1 As supplied by Building Finish Hardware Supplier in Section 08 71 00.

2.5 **ACCESSORIES**

- .1 Perimeter sealant: One part silicone neutral cure low modulus sealant, GE Silicones "Silpruf SCS 2000" or equal by Dow Corning. Colour as selected by the Consultant from standard colour selection.
- .2 Screws, bolts and fasteners: Self tapping electrozinc plated or cadmium plated steel for aluminum to aluminum contact and stainless steel for aluminum to steel contact.
- .3 Steel reinforcements and anchors: Conforming to CAN/CSA-G40.20/G40.21-M, Grade 300W hot-dip galvanized to CSA G164-M requirements.
- .4 Isolation coating: Henry "410-02" bituminous paint or zinc chromate paint.
- .5 Thermal break material: Polyvinylchloride, of semi-rigid durometer hardness of 80, plus or minus 5, located on the external side of the glass pane.
- .6 Door weatherstripping: Heavy duty mohair pile material designed for easy removal and replacement when worn, complete with adjustable fixing to ensure a full "wipe" of the threshold below.
- .7 Compressible filler: Ceramar by W.R. Meadows or CPD Closed Cell Foam.

- .8 Airseal transition membrane: Soprema "Soprasolin" or W.R. Grace "Permabarrier", in width sufficient to properly bridge and seal joints around windows. Provide stainless fasteners and bars necessary to keep membrane in place.
- .9 Foamed-in-place air seals: Class 1, single component polyurethane foam conforming to CAN/ULC-S710.1, with flame spread rating of twenty or less and smoke developed of twenty-five or less. Density of 20.8 to 28.8 kg/m³, "Zerodraft Foam Sealant" by Canam Building Envelope Specialists Inc., or "Great Stuff Pro" by Dow Chemical Company, or "LEF" by Tremco, or approved alternative.
- .10 Backpan insulation: Semi-rigid glass fibre thermal insulation or mineral wool (roxul) as follows:
 - .1 Owens Corning "703"
 - .2 Roxul "RXL 40"
 - .3 Fibrex Insulation, Inc. "Curtain Wall Type 4"
 - .4 Ottawa Fibre "OFI 48"
- .11 Insulation fasteners on backpan: Adhesive bonded pin and disc type insulation fasteners/impale clips, "Stic-Klip" by Eckel Industries of Canada Ltd., or "Kelty" by Dewar Insulations Ltd. Secure in place with galvanized sheet steel lock washers.
 - .1 Gun welded pins: Alternative to the Contractor's option to stick clips, 3 mm diameter galvanized steel pins with cup heads, of length to suit insulation thickness and suitable for gunshot welding to the metal air/vapour barriers.
 - .2 Insulation adhesive: Fire retardant, compatible with insulation, Air Bloc 21 by Bakor.
 - .3 Adhesive to apply clips: High-strength, resilient adhesive having a drying time of zero to thirty minutes (rapid initial set), and twenty-four hours final set. Adhesive shall be compatible with the specified insulation adhesive, insulation and galvanized steel.
 - .4 Primer for adhesives: As recommended by the adhesive manufacturer for the particular materials to be adhered.
- .12 Loose insulation: Loose fibreglass or mineral wool.
- .13 Temporary strips: 25 mm wide, light reflecting, easily removable, pressure sensitive tape applied over all glass. Doors shall have two cross stripes at eye level, windows and curtain wall shall have corner to corner cross stripes from aluminum frames.
- .14 Safety decals: 25 mm wide pressure sensitive tape applied at eye level on the No. 4 surface of all glass lites in curtain wall at ground floor level. Design as selected by the Consultant.

2.6 **FABRICATION**

- .1 General
 - .1 Form all sections true to detail, free from defects impairing appearance, strength and durability.
 - .2 Fabricate frames with thermal breaks.

- .3 Mullions and frames shall be tubular extruded shapes with sharp, well defined corners.
- .4 Overall assembled profiles shall be as detailed on the Drawings. Curtain wall glazing shall be replaceable from the exterior while window glazing shall be replaceable from the interior.
- .5 Make provision at all sealed horizontals to lead moisture accumulation to the exterior. Provide drainage leads in the pressure plates and horizontal snap-on covers for this purpose.
- .6 Pressure plates shall be of extruded aluminum with integrally aligned sockets to receive and hold the latch bulbs of the snap-on face caps.
- .7 Form continuous sills, stools and flashings with intermediate clips, anchorages and reinforcing and as much as possible, be shop assembled. Furnish all filler and closure pieces as required.
- .8 Locate thermal break on the exterior side of the glazing and secure by snap-in methods without the use of any metallic fasteners which could reduce the effectiveness of the thermal barrier.
- .9 Make provision in the Work for vertical and horizontal expansion and contraction and structural deflections.
- .10 Mitre and closely fit all corners of formed Work. Apply back-up sealants on the inside of joints. Provide drainage towards the exterior at the bottom of all glazing rebates.
- .11 Attach all anchorages to the warm side.
- .12 Carry out all welding with argon shielded electric arcs to ensure complete fusion of the metal.
- .2 Doors
 - .1 Aluminum doors shall have square snap-on glazing beads designed for EPDM glazing gaskets.
 - .2 Equip doors with full weatherstripping at perimeter. Install weatherstripping throughout the full length and width of the doors at jambs and heads.
 - .3 Fabricate doors and frames complete with all necessary internal reinforcements, cutouts, recesses, mortising or milling operations required for a rigid assembly and to accommodate finish hardware. All connections shall ensure adequate strength.
 - .4 Fabricate frames with joints accurately fitted and securely jointed together in a manner to ensure tightly fitting joints. Internally seal corners of frames and all joints exposed to water penetration using a material compatible to resist flow at the high surface summer temperatures to be experienced by the metal.
- .3 Doors - Barrier Free Access
 - .1 Prepare doors where indicated to accommodate power operators and pushbutton controls to allow barrier-free access. Provide a barrier-free logo above pushbutton.

- .2 Coordinate as required for the satisfactory installation of finish hardware by Section 08 71 05.
 - .4 Insulated Spandrel Panel Back-Up
 - .1 Form panels with offset edge flange to provide flush surface at edge of pan. Bond insulation to panel back-up with daubs of mastic adhesive.
 - .2 Provide integral reinforcing and stiffeners as required.
 - .3 Weld corners of panels and grind smooth or butter corner joints with butyl sealant.
- 2.7 **PROTECTION OF METALS**
 - .1 Provide protection against galvanic action wherever dissimilar metals are in contact, either by painting the contact surfaces with a heavy coat of zinc chromate primer, or by the application of an appropriate sealant or tape.
 - .2 Protect aluminum which is to be in contact with cured concrete with zinc chromate primer or bituminous paint, and wherever crevices between the contact surfaces may entrap moisture or other corrosive elements.
- 3 Execution
- 3.1 **INSPECTION OF JOB CONDITIONS**
 - .1 Inspect existing conditions upon which Work of this section is dependent. Report to the Consultant in writing any defects or discrepancies. Commencement of Work implies acceptance of existing conditions.
- 3.2 **INSTALLATION**
 - .1 Windows
 - .1 Set units in their correct location, level, square and plumb and at proper elevations, with the nominal face of the framing aligned in a single vertical plane. Fasten and anchor framing in place.
 - .2 Accurately measure glass openings and calculate glass size based on manufacturer's installation tables allowing for proper edge engagement, rabbet width, rabbet depth and expansion.
 - .2 Curtain Wall
 - .1 Set units in their correct location, level, square and plumb and at proper elevations, with the nominal face of the units aligned in a single vertical plane. Fasten and anchor units in place.
 - .3 Assembly and Anchorage
 - .1 Anchor component parts securely in place by bolting, welding or other permanent mechanical attachment system, which will comply with performance requirements and permit movement as intended or necessary. Install slip-joint linings where required to ensure movement as per design.
 - .2 Allow for complete adjustment in anchorage for levelling and positioning of units during installation.

- .3 Where welding is unavoidable for exposed non-ferrous Work during erection of curtain wall assembly, comply with CSA W59-M and recommendations of fully certified firm to CSA W47.1 for the particular metals and alloys being welded. Use methods and welding rods which will not distort members and will result in closest possible colour match. Grind exposed surfaces smooth, using wheels and compounds which are free of iron and other substances which would result in stains or discoloration of surfaces. Restore finishes after welding and grinding.

.4 Erection Tolerances

- .1 Limit variations from plumb, level or dimensioned angle to the following:
 - .1 3 mm maximum deviation in storey height, or in 3000 mm vertical run, or in 6000 mm horizontal run.
 - .2 6 mm maximum deviation in 12000 mm in any direction.
- .2 Limit variations from location (theoretical calculated positions in plan or evaluation based on established floor lines and column lines), including variations from plumb and level, to the following:
 - .1 9 mm total maximum deviation for member at any location.
 - .2 3 mm maximum change in deviation for member for 3000 mm run, any direction.
- .3 Limit offsets in end-to-end and edge-to-edge alignment of adjoining and consecutive members, which form planes, continuous runs and profiles, to the following:
 - .1 1.5 mm maximum offset in flush alignment, including those which are to be 12 mm or less out-of-flush, and including those which are separated 50 mm or less by a reveal or protrusion in plane of wall.

.5 Doors

- .1 Install doors plumb, square, level, free from warp, twist and superimposed loads.
- .2 Secure Work adequately and accurately to structure in the required position, in a manner not to restrict thermal movement.
- .3 Provide compressible filler over aluminum work at locations shown on Drawings.
- .4 Use aluminum or long-life coated steel screws, nuts, bolts, washers, rivets and all other fastening devices, colour to match doors and frames where exposed to view.

3.3 **GLAZING**

- .1 Use extruded gaskets for door and sidelight glazing.
- .2 Thoroughly wipe all surfaces receiving glazing materials with a cloth dampened in xylol to assure a clean surface.
- .3 Use glazing tape for glass and aluminum spandrel panels except at butt glazing, use structural silicone sealant and spacer blocks. Provide temporary pinning at butt glazed joints.

- .4 At horizontal mullions and frames secure lites with screw applied pressure plates into the main grid members. Mitre glazing tape at all end joints, corners and at junctions. Screw fasteners shall be 1/4-20 machine screws. Contain glazing tape on pressure plates with a rigid polyvinyl chloride spacer. Internal seal shall be bulb type silicone extrusions.
- .5 Place setting blocks at quarter points from each corner of glass. Centre glass in opening and press firmly against tape (and combination of structural sealant and spacer blocks at butt glazed back-up vertical mullions). (Provide isolation tape at edges of laminated glass to prevent staining of interply plastic from glazing materials). Roll-in inside resilient extrusion.

3.4 **JOINT SEALANT AND SEALS**

- .1 Pre-application conference: Arrange with the sealant manufacturer(s) for a visit to the job site by one of its technical representatives before beginning the sealing installation to discuss with the Contractor and the Consultant the procedures to be adopted, to analyze site conditions and inspect the surfaces and joints to be sealed, in order that recommendations may be made, should adverse conditions exist. Discuss the following items:
 - .1 Weather conditions under which Work will be done.
 - .2 Anticipated frequency and extent of joint movement.
 - .3 Joint design.
 - .4 Number of beads to be used in the sealing operation.
 - .5 Have manufacturer(s) send report to the Consultant.
- .2 Joint Sealant
 - .1 At interior and exterior joints between aluminum framing and adjacent Work of others execute the following Work:
 - .1 Install backer rod as required to provide sealant joints of proper form, thickness-to-width ratios, and to provide bond break at back side of sealant. Where backer rod cannot be used, use bond breaker tape to back side of sealant joint substrate.
 - .2 Clean substrate surfaces to which sealant is to bond and apply sealant primers as recommended by sealant manufacturer.
 - .3 Seal joints continuous to produce weatherproof and visually acceptable joint installation.
 - .2 Install backer rod between butt glazed insulating and spandrel glass units, and between units to adjacent structures as shown. Seal joints continuous to produce weatherproof and visually acceptable joint installation.
 - .3 Seal all joints required for a weatherproof installation and against air/vapour leakage. Use materials in strict accordance with the manufacturer's printed instructions, and applied only by tradesmen specially trained or experienced in their use. Before applying sealants, completely remove all mortar, dirt, dust, moisture and other foreign matter from surfaces it will contact. Mask adjoining surfaces when required, to maintain a clean and neat appearance. Total sealing compounds to fill the joint and provide a smooth finished surface.

- .4 Refer to and comply with workmanship requirements of Section 07 92 00.
 - .3 Foamed-In-Place Air Seals
 - .1 Prior to application, remove mortar, dirt, dust, moisture and other foreign matter from joints to be sealed.
 - .2 Apply seal in accordance with manufacturer's directions. Fill all joints. Trim off excess seal.
 - .4 Airseal Transition Membrane
 - .1 Apply primer and airseal transition membrane in accordance with membrane manufacturer's instructions. Use primer in conjunction with adhesive if part of system.
 - .2 Re-prime surfaces not covered with transition membrane during the same working day.
 - .3 Overlap airseal transition membrane 75 mm minimum. Lap in the direction of waterflow.
 - .4 Coordinate the airseal transition with adjacent parts of the Work.
 - 3.5 **CLEAN UP**
 - .1 Maintain the units in a clean condition throughout construction period, so that they will be without deterioration or damage at time of Owner's acceptance. Select methods of cleaning which will promote achievement of uniform appearance and stabilized colours and textures for materials that weather or age with exposure.
 - .2 Immediately before time of Substantial Performance, wash glass thoroughly, inside and out.
 - .3 Do not use steel wool, wire brushes or steel scrapers on finished surfaces.
 - .4 Daily during this Work, and on completion, remove from the job site, all rubbish, debris, broken glass, temporary safety markings and excess materials resulting from this Work.
 - .5 Remove protective covering and coating from aluminum surfaces, inside and out, and clean all surfaces, remove all labels, temporary stripes and protective devices and polish all glass surfaces, immediately prior to final acceptance of the Work by the Consultant.
- End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.
- .2 Fire rated door and framing in complete systems for installation as vision lights in fire rated doors, full vision fire rated doors, sidelights, borrowed lights, windows, transoms in exterior and interior openings and fire rated partitions.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 AAMA 501.1-2005 - Standard Test Method for Water Penetration of Windows, Curtain Walls, and Doors Using Dynamic Pressure
- .2 AAMA 501.2-2003 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems
- .3 AAMA 501.5-2005 - Test Method for Thermal Cycling of Exterior Walls
- .4 AAMA 1503-1998: - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections
- .5 AAMA 2603-2002 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels
- .6 AAMA 2604-2005 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
- .7 ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2007.
- .8 ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2006b
- .9 ASTM E283-04 - Test Method for Determining the Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences across the Specimen
- .10 ASTM E330-02 - Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference Procedure A

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|-----|---------------|---|
| .11 | ASTM E331-04 | - Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference |
| .12 | ASTM E783-02 | - Test Method for Field Measurement of Air Leakage through Installed Exterior Windows and Doors |
| .13 | ASTM E1105-00 | - 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 |
| .14 | ASTM E90-04 | - Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements |
| .15 | ASTM E413-04 | - Standard Classification for Rating Sound Insulation |
| .16 | CAN-S101 | - Fire Endurance Tests of Building Construction and Materials |
| .17 | CAN4-S104 | - Fire Tests of Door Assemblies |
| .18 | CAN4-S106 | - Standard Method for Fire Tests of Window and Glass Block Assemblies |
| .19 | NFPA 80 | - Standard for Fire Doors and Fire Windows |
| .20 | NFPA 251 | - Standard Methods of Tests of Fire Endurance of Building Construction and Materials |
| .21 | NFPA 252 | - Standard Methods of Fire Tests of Door Assemblies |
| .22 | NFPA 257 | - Standard on Fire Test for Window and Glass Block Assemblies |

1.3 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 Submittal Procedures.
- .2 Product Data: Submit latest edition of manufacturer's product data including product descriptions, technical data, ULC listings and installation instructions.
- .3 Shop Drawings: Include plans, elevations and details of product showing component dimensions, including framed opening requirements, dimensions, tolerances and attachment to structure.
- .4 Hardware Schedule: List of manufacturer-supplied hardware and verification of cylinder size complying the Section 08 71 00.
- .5 Samples:
 - .1 Glass sample as provided by the manufacturer
 - .2 Sample of frame
 - .3 Verification of selected finish sample.

- .6 Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.
- .7 Certificate of compliance from glass and glazing manufacturers attesting that glass and glazing materials for project comply with the requirements and this Section.

1.4 **QUALITY ASSURANCE**

- .1 Installer qualifications: An installer who has completed a minimum of 5 glazing projects similar in material, design and extent to that of this Project in the last 2 years, and whose work has resulted in construction with a record of successful in-service performance.
- .2 Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are classified and labeled by ULC for fire ratings indicated. Assemblies must be factory welded or come complete with factory-installed mechanical joints and must not require job site fabrication.
- .3 Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are classified and labeled by ULC, for fire ratings indicated. Assemblies must be factory-welded or come complete with factory-installed mechanical joints and must not require job site fabrication.

1.5 **DELIVERY, HANDLING AND STORAGE**

- .1 Deliver materials to the site in original crates and containers with the maker's name and brand distinctly marked thereon and with glass labeled as to types. Do not remove labels on glass until after Work is accepted by the Consultant.
- .2 Store materials within the building, in a clean, dry location. Fully protect materials from damage until ready for use.

1.6 **WARRANTY**

- .1 Warrant the following Work against defects and deficiencies for the 5 years from date Work is certified as substantially performed in accordance with the general conditions of the Contract:
- .2 Promptly make good defects and deficiencies which become apparent within the Warranty Period by replacing defective Work satisfactory to the Consultant and at no expense to the Owner.

2 **Products**

2.1 **MANUFACTURERS**

- .1 Fire Rated Door and Window Assembly:
 - .1 Glass Material: Fire-rated glass ceramic clear and wireless glazing material listed for use in non-impact safety rated locations with fire rating requirements from 20 to 90 minutes. "FireLite Plus" manufactured by Nippon Electric Glass Company, distributed by Technical Glass Products, equal by Safti-First or accepted equal.
 - .2 Frame System: Fire-rated brushed stainless steel (up to a 45-minute rating) frame system. "Fireframes Designer Series" by Technical Glass Products, equal by Safti-First or accepted equal.

2.2 **PERFORMANCE REQUIREMENTS**

- .1 Doors: Capable of providing a fire rating for 20, 45, 60 or 90 minutes.
- .2 Window Assembly: Capable of providing a fire rating for 20, 45, 60 or 90 minutes.
- .3 Openings: Applications in fire partitions or area separation walls and corridors where opening protection is specified. Capable of providing 20, 45, 60 or 90 minute rating.
- .4 Structural Performance:
 - .1 Design and size the system to withstand structural forces placed upon it without damage or permanent set when tested in accordance with ASTM E330 using load 1.5 times the design wind loads and of 10 seconds in duration.
 - .2 Positive wind load: as indicated on Drawings
 - .3 Negative wind load: as indicated on Drawings
 - .4 Member deflection: Limit deflection of the edge of the glass normal to the plane of the glass to flexure limit of glass, 1/175 of the glass edge length or 3/4 inch, whichever is less of any framing member.
 - .5 Accommodate movement between storefront and adjoining systems.
- .5 Air infiltration: Provide systems that allow a maximum air leakage through fixed glazed openings of 0.06 cfm/sq. ft. of area when tested per ASTM E 283 at a static air differential of 1.57 or 6.24 lbf/sq ft.
- .6 Water Penetration:
 - .1 Under Static pressure, provide systems that do not show uncontrolled water leakage when tested according to ASTM E 331 under static pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
 - .2 Under Dynamic pressure, provide systems that do not show uncontrolled water leakage when tested according to AAMA 501.1 under static pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

2.3 **DESIGN REQUIREMENTS**

- .1 Dimensions – Door and Framing:
 - .1 Door framing face dimension: 1 15/16-inch
 - .2 Depth of door framing: 1 15/16-inch
 - .3 Door style face dimension: 3 1/8-inch
 - .4 Door cross rail (if applicable) face: 3 9/16-inch
 - .5 Depth of stile, header, sill and cross rail: 1 15/16-inch
- .2 Dimensions – Window Assembly:
 - .1 Perimeter framing face dimension: 2 3/4-inch at head, sill and jamb
 - .2 Horizontal and/or vertical mullions: 3 9/16-inch on the face.

.3 Depth of perimeter and mullion: 1 15/16-inch

.3 Construction: Narrow-profile, roll-formed steel architectural grade specialty fire doors. Conventional break-shape type hollow metal steel fire-rated doors will not be considered an acceptable substitute for the doors specified in this section as they do not conform to the project design intent and/or aesthetic and quality standards.

.1 Knock down frames are not permitted.

2.4 **MATERIALS**

.1 Fire Rated Glazing:

.1 Thickness: 8 mm overall.

.2 Weight: 4 lbs./sq.ft.

.3 Approximate Visible Transmission: 85%.

.4 Approximate Visible Reflection: 9%

.5 Fire-Rating: 20 minutes to 3 hours for doors; 20 minutes to 90 minutes for other applications.

.6 Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).

.7 STC Rating: Approximately 38 dB.

.8 Surface Finish:

.1 Standard Grade is polished for a surface quality that is comparable to alternative fire-rated ceramics marketed as having a premium finish.

.2 Premium Grade is finish ground and polished on both surfaces to provide superior surface quality, improving overall clarity and providing a surface that is unmatched by alternative products.

.9 Positive Pressure Test: UL 10C; passes.

.10 Labeling: Permanently label each piece of glazing with the manufacturer's logo, cUL logo and fire rating in sizes up to 3,325 sq. in.

.11 Fire Rating: Fire rating classified and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ULC Standards CAN4 S-104 and CAN4 S-106.

.2 Glazing Compound for Fire-Rated Glazing Materials

.1 Glazing Tape: Closed cell PVC foam, maximum water absorption by volume of 2%. Glass panels exceeding 1,393 sq. inches for 90 minute ratings must be glazed with fire-rated glazing tape supplied by the manufacturer.

.2 Glazing Compound: DAP 33 putty.

.3 Silicone Sealant: One-part neutral curing silicone, medium modulus sealant, Type S, Grade NS, Class 25 with additional movement capability of 50% in both extension and compression (total 100%):

.1 "Dow Corning 795" by Dow Corning Corp.

- .2 "Silglaze-II 2800" by General Electric Co.
- .3 "Spectrum 2" by Tremco Inc.
- .4 Setting Blocks: Neoprene, EPDM or silicone, tested for compatibility with glazing compound, of 70 to 90 Shore A hardness.
- .5 Cleaners, Primers and Sealers: As recommended by glazing manufacturer.
- .3 Steel Frames and Doors
 - .1 Steel Framing System: 45, 60 or 90 minute rated doors or as indicated on Drawings.
 - .1 Frame: Brushed stainless steel up to 45 minute rating profiled formed tubing.
 - .2 Fasteners: As recommended by the manufacturer.
 - .3 Glazing Accessories: Calcium silicate setting blocks.
 - .4 Glazing Compounds: FireLite Plus approved closed cell PVC tape or pure silicone sealant or accepted equal.

2.5 **FABRICATION**

- .1 Obtain accepted Shop Drawings prior to fabrication.
- .2 Fabricate glass and other glazing products in sizes required to glaze openings indicated, with edge and face clearances, edge and surface conditions, and bit complying with recommendations of product manufacturer and referenced glazing standards as required to comply with system performance requirements.
- .3 Furnish frame assemblies pre-welded. When necessary, splice frames too large for shop fabrication or shipping or to fit into available building openings and fit with suitable fasteners.
- .4 Furnish interior frame assemblies "K-D". When necessary, splice frames too large for shop fabrication or shipping or to fit in available building openings and fit with suitable fasteners.
- .5 Field glaze door and frame assemblies.
- .6 Factory prepare steel door assemblies and install all hardware.
- .7 Fabricate to fire-rated field dimensions.

2.6 **POWDERCOAT FINISHES**

- .1 Finish after fabrication.
- .2 Powdercoat Finish: Polyester Super Durable powder coating which meets AAMA 2604 for chalking and fading. Apply manufacturer's standard powder coating finish system applied to factory-assembled frames before shipping, complying with manufacturer's recommended instructions for surface preparation including pretreatment, application and minimum dry film thickness.
- .3 Colour and Gloss: As selected by the Consultant from the manufacturer's standard range.

- .4 Acceptable manufacturers:
 - .1 Tiger Drylac
 - .2 Or accepted equal and as compatible with the framing manufacturer.

2.7 **DOOR HARDWARE**

- .1 Refer to Section 08 71 00 Door Hardware.

2.8 **ACCESSORY MATERIALS**

- .1 Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30 mil thickness per coat.

3 Execution

3.1 **EXAMINATION**

- .1 Examine substrates and members to which the Work of this section attaches or adjoins prior to frame installation.
- .2 Provide openings plumb, square and within allowable tolerances. Provide 3/8 inch shim space at all walls.
- .3 Notify the Consultant of any conditions which jeopardize the integrity of the proposed fire wall/fire door system. Do not proceed until such conditions are corrected.
- .4 Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.2 **INSTALLATION**

- .1 Refer to the manufacturer's installation manual for framing installation.
- .2 Protect glass from edge damage during handling and installation. Inspect glass during installation and discard pieces with edge damage that could affect glass performance.
- .3 Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
- .4 Cut glazing tape to length and set against permanent stops, flush with sight lines to fit openings exactly, with stretch allowance during installation.
- .5 Place setting blocks located at quarter points of glass with edge block no more than 150 mm from corners.
- .6 Glaze vertically into labelled fire rated metal frames or partition walls with same fire rating as glass and push against tape for full contact at perimeter of pane or unit.
- .7 Place glazing tape on free perimeter of glazing in same manner described above.
- .8 Install removable stop and secure without displacement of tape.
- .9 Install in vision panels in fire rated doors to requirements of NFPA 80.
- .10 Install so that appropriate cUL and FireLite Plus markings remain permanently visible.

3.3 REPAIR AND TOUCH UP

- .1 Limited to minor repair of small scratches. Use only manufacturer's recommended products. Such repairs shall match original finish for quality or material and view.
- .2 Remove and replace glass that is broken, chipped, cracked, abraded or damaged.

3.4 ADJUSTING

- .1 Adjust door function and hardware for smooth operation. Coordinate with other hardware suppliers for function and use of any other attached hardware.

3.5 PROTECTION AND CLEANING

- .1 Protect glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
 - .1 Do not clean with astringent cleaners. Use a clean "grit-free" cloth and a small amount of mild soap and water or mild detergent.
 - .2 Do not use any cleaning products not recommended by the manufacturer.
 - .3 Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If contaminating substances do come into contact with the glass, remove them immediately as recommended by the glass manufacturer.
 - .4 Wash glass on both exposed surfaces in each area not more than four days before the date scheduled for inspections.

End of Section

1 General

1.1 **FINISH HARDWARE**

- .1 Supply finish hardware for this Project, complete with templates, installation instructions, screws, expansion shields, anchors and other related accessories, and schedule delivery to avoid delaying the progress of the Work. Deliver hardware to the job site packaged, labelled and cross-referenced to the hardware schedule in such a manner that all items may be readily located to their scheduled location on the Work.
- .2 Hardware is listed in Part 3 of this section.

1.2 **REQUIREMENTS OF REGULATORY AGENCIES**

- .1 Use ULC listed and/or Warnock Hersey International labelled hardware for doors in fire separations and exit doors.

1.3 **QUALITY ASSURANCE**

- .1 Standards: Comply with standards specified in this section.
- .2 Qualifications of manufacturers: Products supplied under this section shall be from manufacturers regularly engaged in manufacture of similar items and with history of successful production acceptable to the Consultant.

1.4 **SUBMITTALS**

- .1 Submit the following as Shop Drawings in accordance with Section 01 33 00:
 - .1 Three copies of a detailed finish hardware list reviewed by a qualified AHC member of American Society of Hardware Consultants. List all items proposed to be furnished and delivered under this section.
 - .2 Manufacturer's specifications, catalogue cuts and other data required to demonstrate compliance with specified requirements.
- .2 Following review, the Consultant will return two copies to the Contractor. If copies are marked "Revised as Noted - Do Not Resubmit" or "Reviewed as Submitted", make photocopies and distribute to the following:
 - .1 Section 08 11 13 - one copy
 - .2 Section 08 14 10 - one copy
 - .3 Section 08 40 00 - one copy
 - .4 Section 08 71 05 - one copy
- .3 Identify each hardware item by manufacturer, manufacturer's catalogue number, material, function, finish and location of item in Work.
- .4 Review of hardware list by Consultant shall not relieve Contractor from responsibility for furnishing all required finish hardware.

1.5 **SAMPLES**

- .1 Deliver physical samples of approved finish hardware items to Consultant within fifteen Calendar Days.

- .2 Identify each sample by label indicating applicable Specification paragraph or line number, brand name and number, finish and hardware package number.
- .3 Substitute new samples for those rejected by Consultant.
- .4 Consultant will retain samples until completion of Project, at which time, samples will be returned to Supplier.
- .5 Do not deliver any hardware to Site until all samples have been approved.

1.6 **PRODUCT HANDLING**

- .1 Packaging and marking: Individually package each unit of finish hardware, complete with proper fastenings and appurtenances, clearly marked on outside to indicate contents and specific locations in the Work.
- .2 Replacements: In the event of damage, immediately make all repairs and replacements necessary to approval of Consultant and at no additional cost to Owner.

1.7 **MAINTENANCE**

- .1 Maintenance data: Submit maintenance data, parts list and manufacturer's instructions for each type of door closer, lockset, latchset, door holders and fire exit hardware for incorporation into maintenance manual specified in Section 01 33 00.
- .2 Brief maintenance staff regarding proper care, cleaning and general maintenance.
- .3 Supply four sets of wrenches for door closers, locksets and fire exit hardware.

1.8 **DELIVERY AND STORAGE**

- .1 Store finish hardware in locked, clean and dry area on site.
- .2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .3 Maintain inventory list with hardware schedule.

1.9 **HARDWARE LIST**

- .1 The Supplier shall thoroughly check the hardware list forming part of this section and shall bring to the attention of the Consultant any errors or omissions therein.
- .2 Confirm degrees of swing for door holders and closers.

1.10 **DOOR SCHEDULES**

- .1 The Supplier shall thoroughly check the door schedules and Working Drawings to ensure that hardware listed can be used as specified in accordance with building codes and function. Bring to attention of the Consultant any errors or omissions therein.
- .2 Doors shown on Drawings and omitted from the schedules shall be included on the detailed finish hardware list.

1.11 **WARRANTY**

- .1 Warrant all exit devices for three years and door closers for ten years.

1.12 **SUPERVISION AND INSPECTION BY HARDWARE SUPPLIER**

2 Products

2.1 **GENERAL**

.1 Manufacturers: Products listed in the hardware schedule are from the first manufacturers listed below. Alternative Suppliers other than those listed will not be considered.

- | | | |
|----|-------------------------------|----------------------------|
| .1 | Hinges: | Hager Hinge Canada |
| .2 | Door closers: | LCN |
| .3 | Cylinders: | Schlage |
| .4 | Locksets/latchsets/deadlocks: | Schlage |
| .5 | Exit devices: | Von Duprin |
| .6 | Overhead door stops/stays: | Glynn-Johnson |
| .7 | Flatware: | Gallery Specialty Hardware |
| .8 | Weatherstrip/threshold: | Aluminum Door Supplier |

.2 Fasteners: Furnish all finish hardware with all screws, bolts and other fasteners of suitable size and type necessary to anchor hardware in position for trouble-free service under heavy duty usage.

- .1 Furnish fastenings where necessary with expansion shields, toggle bolts and other anchors acceptable to Consultant, depending on material to which hardware is to be applied and recommendations of hardware manufacturer.
- .2 Fastenings shall harmonize with hardware as to material and finish.
- .3 Exposed screws for installing hardware shall have Phillips or Robertson heads.
- .4 Finishes: Hardware shall match finish of locksets. Take special care to coordinate all various manufactured items furnished under this section, to ensure an acceptable uniform finish.

2.2 **MATERIALS**

.1 Full Mortise Hinges

- .1 Non-removable pins at outswinging exterior doors.
- .2 Ball bearing type "BB".

.2 Exit Devices/Mullions

- .1 Exterior doors equipped with exit devices must have security deadlatching and cylindrical dogging.
- .2 All doors equipped with exit devices to have lever trim to match lock/latchsets.

.3 Locksets/Latchsets/Strikes

- .1 All mortise sets to come complete with three point anti-friction latchbolt, thru-bolted trim.
- .2 All mortise levers to be solid stainless steel or forged brass as specified.

.4 Door Closers

- .1 Use full through bolt fastening, "CTB". With "Top Jamb" application, supply arm through bolt fastening.
- .2 Spring power is to be of proper size to operate door efficiently. All door closers to be supplied as multi-sized. For exterior doors, supply closers multi-sized but pre-adjusted to size 4 for "Top Jamb" application, or size 5 for "Parallel Arm" application. For interior doors, supply closers multi-sized but pre-adjusted to size 3 for "Regular Mount" or "Top Jamb" application or size 4 for "Parallel Arm" application. It is the responsibility of Section 08 71 05 to make final adjustment on the door closers. This final adjustment is to include closing speed, latching speed and backcheck.
- .3 All door closers are to be supplied with full cover and are to be of a complementary design from one model type to the next. Door closers are to be of the same manufacturer throughout the Project.
- .4 Finish door closers supplied for all exterior door locations and for wet or damp interior door locations are to be with special rust inhibitor paint protection, "SRI".
- .5 Where specified for labelled wood fire doors, supply through bolts "CTB" for installing closers.
- .6 Supply screws for door closer arms/brackets of sufficient length to penetrate jamb head seals and still provide adequate securement to the frame surface.
- .7 Protect all door closers, except those having a built-in stop system such as "DS (Door Saver) or "CUSH" (Cushion Stop) models, with an auxiliary door stop. Such auxiliary stops shall be as specified, and may include either overhead, floor or wall mounted types.

.5 Automatic Entrance System

- .1 Complete system supplied by this section as specified in the hardware schedule.

.6 Overhead Door Stops/Stays

- .1 Where an overhead door holder is to be used in conjunction with a door closer, provide stop only, or stop with hold open as specified. Where a door closer is not required, use a friction type, non-friction type, or non-friction with hold open type device as specified.
- .2 Supply screws for the jamb brackets for overhead door holders/stays of sufficient length to penetrate jamb head seals and still provide adequate securement to the frame surface.
- .3 All surface mounted overhead door holders/stays are to be supplied with through bolts for the door attachment.

.7 Kickplates/Armour Plates

- .1 1.2 mm minimum thickness stainless steel, Type 304, #4 finish, rounded corners, free of rough or sharp edges; drill for countersunk fixing with stainless steel flat head screws flush with finished surface. Supply with 3M tape only where specified.
- .2 Where door pulls are scheduled on one side of door and push plates on other side issue installation instructions so that the pull is secured through door from reverse side and countersunk flush with door prior to installation of push plate.

.8 Wall Stops

- .1 Furnish wall stops of height to engage doors.
- .2 Where wall stops cannot be used, use overhead door stops and/or floor stops as specified. Adjust to proper degree of stop.

2.3 **KEYING**

- .1 All locksets, panic hardware and key switches will be supplied complete with Medeco high security, removable core cylinders, master keyed to a grand master key system. Supply cylinders less cores. Supply 50 temporary cores for use during the construction period which shall be master keyed and keyed differently.
- .2 Supply the following:
 - .1 Three keys for each permanent cylinder core
 - .2 Two keys for each construction (temporary core)
 - .3 Three construction master keys
 - .4 Twelve grand master keys
 - .5 Thirty-six sub master keys

2.4 **KEY CONTROL AND KEY CABINET**

- .1 Provide one only Moore Key Control System AWC 150S (others).
- .2 Finishes - Description
 - .1 600 Primed for paint
 - .2 605 Polished Brass
 - .3 606 Satin Brass
 - .4 612 Satin Bronze
 - .5 613 Oil Rubbed Bronze
 - .6 618 Polished Nickel (on brass or bronze base metal)
 - .7 619 Satin Nickel (on brass or bronze base metal)
 - .8 622 Flat Black (on brass or bronze base metal))

.9	625	Polished Chrome (on brass or bronze base metal)
.10	626	Satin Chrome (on brass or bronze base metal)
.11	628	Satin Aluminum (anodized)
.12	628/B	Extruded Satin Aluminum/Brush
.13	628/P	Extruded Satin Aluminum/Pile
.14	629	Polished Stainless Steel
.15	630	Satin Stainless Steel
.16	631	Flat Black Steel
.17	632	Polished Brass Steel
.18	633	Satin Brass Steel
.19	640	Oil Rubbed Bronze Steel
.20	645	Polished Nickel Steel
.21	646	Satin Nickel Steel
.22	651	Polished Chrome Steel
.23	652	Satin Chrome (on steel base metal)
.24	671	Flat Black Aluminum
.25	689	Satin Aluminum Paint
.26	693	Flat Black (painted/powder coat)
.27	695	Oil Rubbed Bronze (painted/powder coat)
.28	702	Satin Chrome Aluminum
.29	703	Oil Rubbed Bronze Aluminum
.30	ALUM	Extruded Aluminum Mill Finish (thresholds)

3 Execution

3.1 **DELIVERY**

- .1 Stockpile all items sufficiently in advance to ensure their delivery to the site in a timely manner to ensure orderly progress of Work.

3.2 **INSTALLATION INSTRUCTIONS**

- .1 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their Work to receive hardware.
- .2 Furnish manufacturer's instructions for proper installation of each hardware component.

- .3 Fully adjust all non-sized or universal door closers in strict accordance with the manufacturer's printed instructions for spring power closing speed, latching speed and backcheck at the time of installation.

3.3 **EXAMINATION**

- .1 Confirm kickplate and threshold sizes before ordering.
- .2 Do not use wall stops on drywall, demountable or moveable partitions.

3.4 **KEY SECURITY**

- .1 Deliver to, and install all cylinders at the jobsite.
- .2 Key all doors to receive locks according to an approved key schedule.

3.5 **INSTALLATION**

- .1 Hardware installation is specified in Section 08 71 05 – Installation of Doors and Finish Hardware.

3.6 **ADJUSTMENT**

- .1 Coordinate with hardware installer and adjust all items of hardware to operate smoothly. If a manufacturer's representative has done this Work, forward written confirmation of same.
- .2 Prepare or replace any hardware found defective.

3.7 **HARDWARE SCHEDULE**

- .1 As per list following this section. Hardware schedule was prepared by Spyder SC.

End of Section

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DOOR HARDWARE

08 71 00

PROJECT:



CITY OF TORONTO ACCESSIBILITY UPGRADES

Fire Hall #145

20 Beffort Road, North York, Ontario

ARCHITECT:



IBI GROUP

175 Galaxy Blvd, Unit 100

Toronto, Ontario

Prepared By: Alex Bekmansourov

Date: May 13th, 2021

Revised: May 20th, 2021

Revised: July 23rd, 2021

Revised: October 5th, 2021



Architectural Hardware Finishes

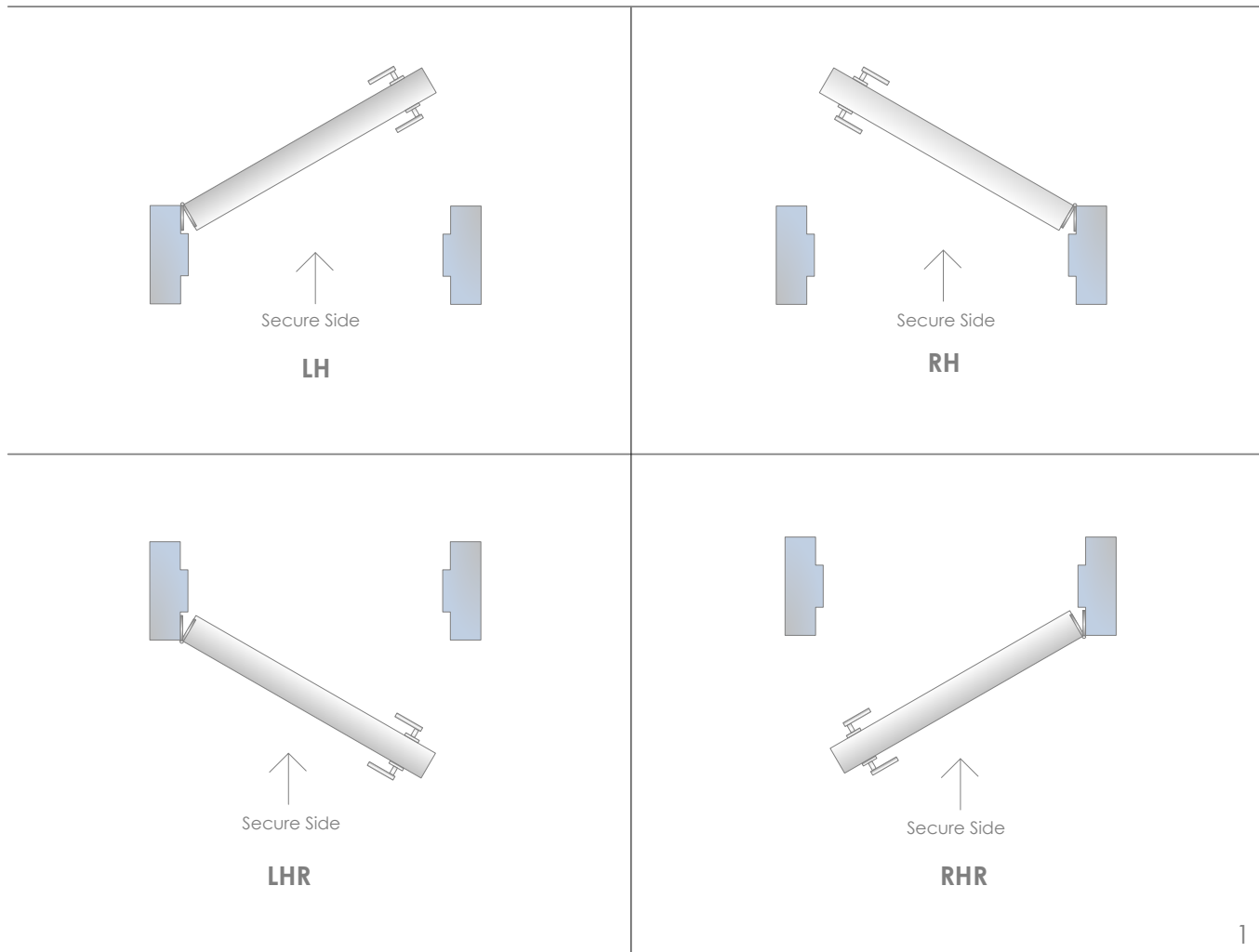
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Satin Nickel					
646		619	670		US15
Polished Nickel					
645		618	669		US14
Satin Stainless Steel					
	630				US32D
Polished Stainless Steel					
	629				US32
Satin Chrome					
652		626	702		US26D
Polished Chrome					
651		625	672		US26
Satin Brass					
633		606	667	678	US4
Polished Brass					
632		605	666	677	US5
Satin Bronze					
639		612	668	680	US10
Oil Rubbed Bronze					
640		613	703	695	US10B
Flat Black / Anodized Black					
631		622	671	693	US19

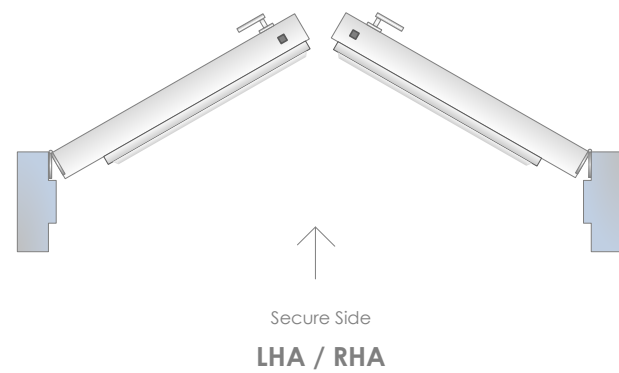
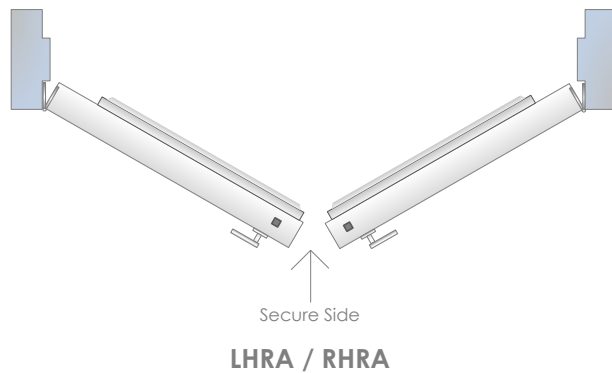
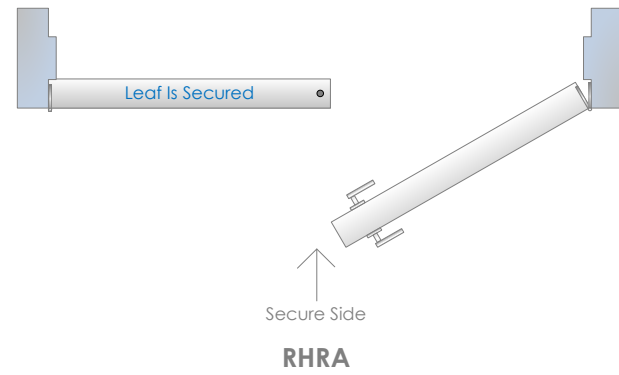
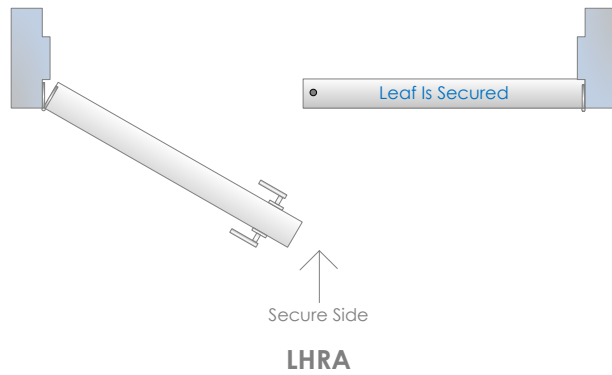
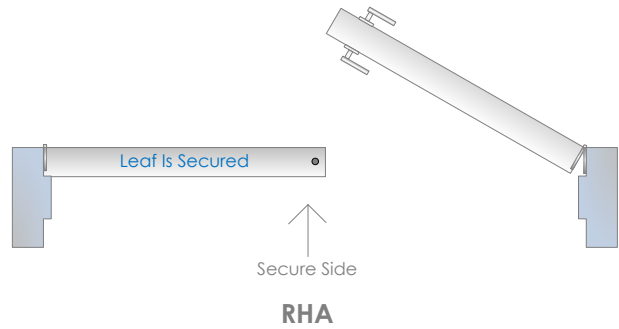
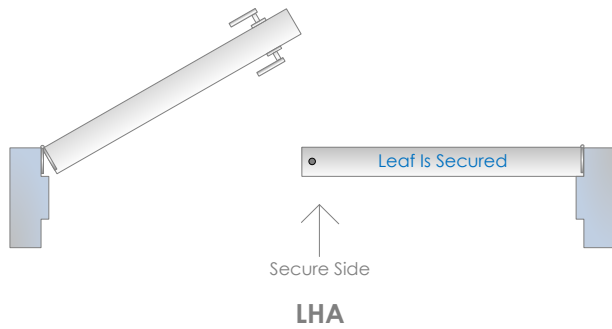
Door Types & Handing

Abbreviations

RH – Right Hand	RHA – Right Hand Active	SS- Single Slider
LH – Left Hand	LHA – Left Hand Active	BP – Bi-Parting Slider
RHR – Right Hand Reverse	RHRA/LHRA – Right & Left Hand Reverse Active	BP – Bi-Passing Slider
LHR – Left Hand Reverse	RHA/LHA – Right & Left Hand Active	BF – Bi-Folding Slider
RHRA – Right Hand Reverse Active	DA- Double Acting	TS – Telescopic Slider
LHRA – Left Hand Reverse Active	DE – Double Egress	PKT – Pocket Slider

Note: The handing on a swing door is determined by placing yourself on the secure side or keyed side of the door.







Symbols



- Door has a fire rating and all associated hardware must have a fire label to suit. Must comply with local requirements.



- Door is automatic and is equipped with an auto operator. Door must meet local barrier free codes



- Door has an electrical requirement and requires power to be brought to the appropriate location above the door or to the latch, for either security or barrier free applications. Refer to security & electrical drawings for further information.



- Door requires security card access. Refer to security / electrical drawings for further information.

Abbreviations

Door:

HMD = Hollow Metal Door
IHMD = Insulated Hollow Metal Door
ALD = Aluminum Door
SCWD = Solid Core Wood Door
HCWD = Hollow Core Wood Door
FGD = Frameless Glass Door
FRP = Fiberglass Reinforced Plastic Door

Frame:

HMF = Hollow Metal Frame
ALF = Aluminum Frame
Cased Open HMF = Cased Open Hollow Metal Frame
WDF = Wood Frame
Cased Open WDF = Cased Open Wood Frame
Cased Open Drywall = Cased Open Drywall

Fire Ratings:

0 HR – Zero Hour Fire Rating / Smoke Barrier
20 MIN – 20 Minute Fire Rating
¾ HR – 45 Minute Fire rating
1 ½ HR – 90 Minute Fire Rating
2 HR – 120 Minute Fire Rating
3 HR – 180 Minute Fire Rating

Disclaimer

Installation Instructions:

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Weblinks:

Weblinks do change from time to time as manufacturers move around their websites, please inform us if you have a none functioning weblink.

HARDWARE SCHEDULE



Heading# 1

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	ALD	Frame Material:	ALF	Fire Rating	None

1 Total Openings

1	Door#	N-102A	Location:	Exterior from Vestibule N-102	Handing:	LHR
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

1	Continuous Hinge	112XY x 2108	628	Ives	X	X	<input type="checkbox"/>
1	Exit Device	CD-35A-NL-OP x 388NL x 4'0	626	Von Duprin	X	X	<input type="checkbox"/>
1	Rim Cylinder	80-116	626	Schlage			<input type="checkbox"/>
1	Mortise Cylinder	80-110	626	Schlage	X		<input type="checkbox"/>
1	Electric Strike	6300 x 12/24VCD	630	Von Duprin	X	X	<input type="checkbox"/>
1	Door Pull	GSH 165F x 1830 x #2 MTG	630	Gallery	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X	<input type="checkbox"/>
1	Weatherstrip	By Aluminum Door Supplier	628				<input type="checkbox"/>
1	Door Sweep	By Aluminum Door Supplier	628				<input type="checkbox"/>
1	Threshold	By Aluminum Door Supplier	628				<input type="checkbox"/>

By Automatics Supplier – PACKAGE #1A – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW250i – Push Side Mount - RH	628		X		<input type="checkbox"/>
1	Push Button	CM60/4-WT	630	Camden	X		<input type="checkbox"/>
1	Surface Mount Box	CM-79	630	Camden	X		<input type="checkbox"/>
1	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X		<input type="checkbox"/>
1	Surface Mount Box	CM-43CBLA	630	Camden	X		<input type="checkbox"/>
1	Logic Relay	CX-33		Camden	X		<input type="checkbox"/>

By Security Supplier

1	Card Reader	To Suit Building System (12V)	BLK				<input type="checkbox"/>
1	Door Contact	To Suit Building System					<input type="checkbox"/>



1	Rex Sensor	To Suit Building System							
1	Access Controller	To Suit Building System							
1	Power Supply	Located in nearest IT Closet – By Security Provider							
By Locksmith									
2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Push Button/Card Reader to Simultaneously Open Door 102
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths – Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 2

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	ALD	Frame Material:	ALF	Fire Rating	None

1 Total Openings

1	Door#	N-102	Location:	Vestibule N-102 from Hallway 103	Handing:	LHR
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By Hardware Supplier

1	Continuous Hinge	112XY x 2108	628	Ives	X	X			
1	Door Pull	GSH 165F x 610 x #5MTG (Back to Back)	630	Gallery	X				
1	Overhead Stop	105S	630	Glynn Johnson	X	X			
1	Door Sweep	By Aluminum Door Supplier	628						

By Automatics Supplier – PACKAGE #1A – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW250i – Push Side Mount - RH	628		X				
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X				



2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- During installation, centreline of Door Pulls must Be at 46-1/2" AFF.
- Wave Button to Simultaneously Open Door 102A

-----End of Heading-----



Heading# 3

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-112A	Location:	Hallway 103 to B/F Universal WR N-112	Handing:	RH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 1/2" x 4"	630	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC x 06B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
2	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>
1	Floor Stop	GSH 209	626	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5500	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #5 – PUSH TO LOCK KIT UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X			<input type="checkbox"/>
1	Wave to Lock Kit	CX-WC16	630	Camden	X	X		<input type="checkbox"/>
1	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		<input type="checkbox"/>



By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths – Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

END OF SCHEDULE

DOOR HARDWARE

08 71 00

PROJECT:

**CITY OF TORONTO ACCESSIBILITY UPGRADES**

Fire Hall #143

1009 Sheppard Ave West, Toronto, Ontario

ARCHITECT:

**IBI GROUP**

175 Galaxy Blvd, Unit 100

Toronto, Ontario

Prepared By: Alex Bekmansourov

Date: May 13th, 2021Revised: July 22nd, 2021

Revised: October 5, 2021



Architectural Hardware Finishes

Steel	Stainless Steel	Brass/Bronze	Aluminum	Painted/Powder Coat	US/CAN#
Clear Anodized / Painted Aluminum					
			628	689	US28
Satin Nickel					
646		619	670		US15
Polished Nickel					
645		618	669		US14
Satin Stainless Steel					
	630				US32D
Polished Stainless Steel					
	629				US32
Satin Chrome					
652		626	702		US26D
Polished Chrome					
651		625	672		US26
Satin Brass					
633		606	667	678	US4
Polished Brass					
632		605	666	677	US5
Satin Bronze					
639		612	668	680	US10
Oil Rubbed Bronze					
640		613	703	695	US10B
Flat Black / Anodized Black					
631		622	671	693	US19



Door Types & Handing

Abbreviations

RH – Right Hand

LH – Left Hand

RHR – Right Hand Reverse

LHR – Left Hand Reverse

RHRA – Right Hand Reverse Active

LHRA – Left Hand Reverse Active

RHA – Right Hand Active

LHA – Left Hand Active

RHRA/LHRA – Right & Left Hand Reverse Active

RHA/LHA – Right & Left Hand Active

DA- Double Acting

DE – Double Egress

SS- Single Slider

BP – Bi-Parting Slider

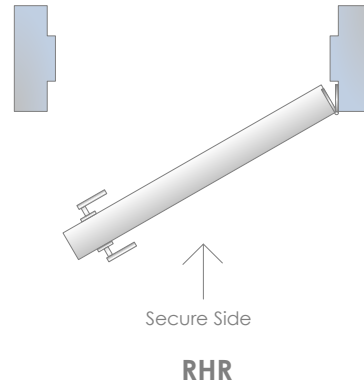
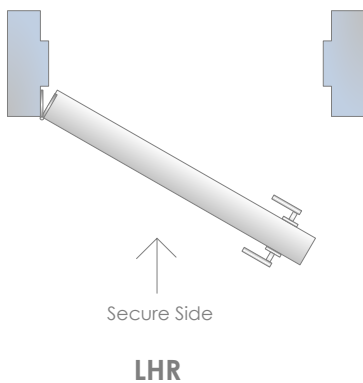
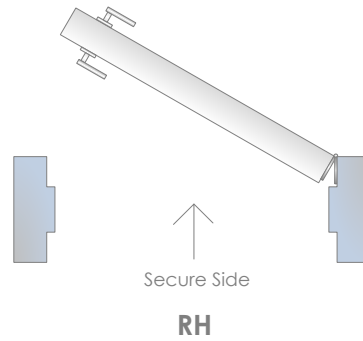
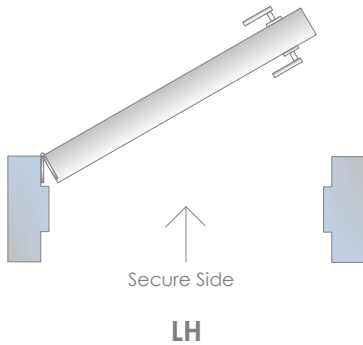
BP – Bi-Passing Slider

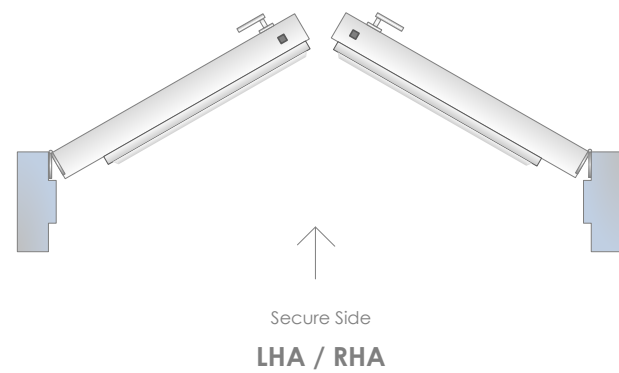
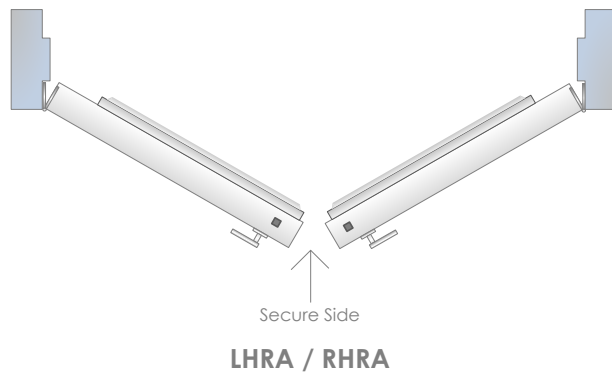
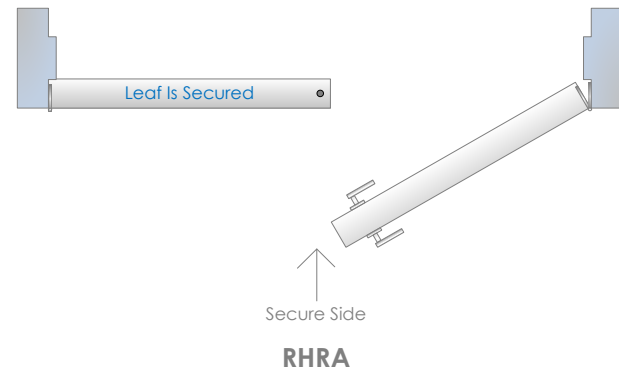
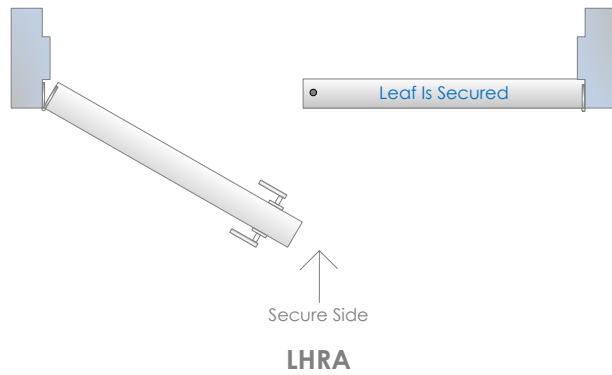
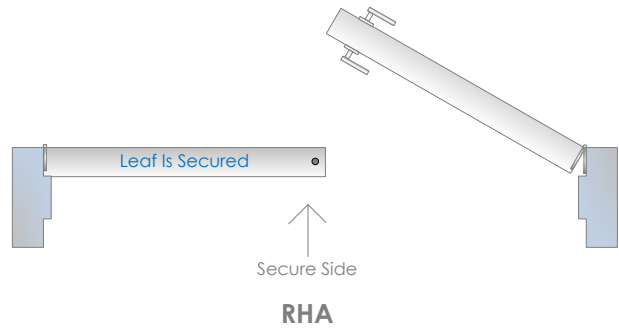
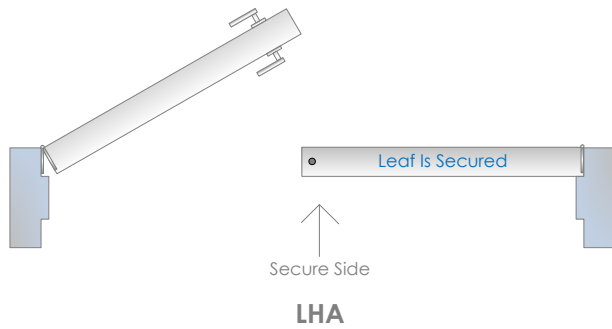
BF – Bi-Folding Slider

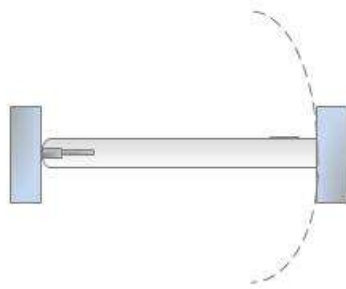
TS – Telescopic Slider

PKT – Pocket Slider

Note: The handing on a swing door is determined by placing yourself on the secure side or keyed side of the door.



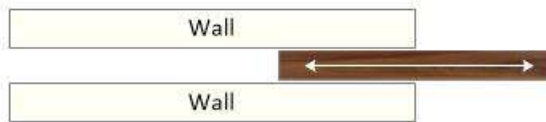




DA-DOUBLE
ACTING



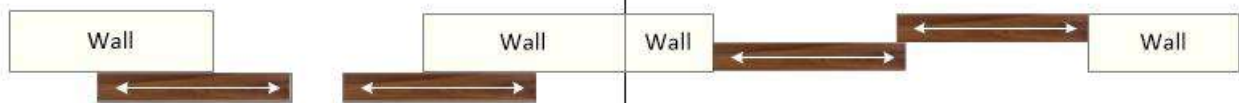
DE-DOUBLE
EGRESS



PKT - POCKET SLIDER



SS - SINGLE SLIDER or
BARN SLIDER



BP - BI-PARTING



BPS - BI-PASSING

Symbols



- Door has a fire rating and all associated hardware must have a fire label to suit. Must comply with local requirements.



- Door is automatic and is equipped with an auto operator. Door must meet local barrier free codes



- Door has an electrical requirement and requires power to be brought to the appropriate location above the door or to the latch, for either security or barrier free applications. Refer to security & electrical drawings for further information.



- Door requires security card access. Refer to security / electrical drawings for further information.

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ALD = Aluminum Door
SCWD = Solid Core Wood Door
HCWD = Hollow Core Wood Door
FGD = Frameless Glass Door
FRP = Fiberglass Reinforced Plastic Door

Frame:

HMF = Hollow Metal Frame
ALF = Aluminum Frame
Cased Open HMF = Cased Open Hollow Metal Frame
WDF = Wood Frame
Cased Open WDF = Cased Open Wood Frame
Cased Open Drywall = Cased Open Drywall

Fire Ratings:

0 HR – Zero Hour Fire Rating / Smoke Barrier
20 MIN – 20 Minute Fire Rating
¾ HR – 45 Minute Fire rating
1 ½ HR – 90 Minute Fire Rating
2 HR – 120 Minute Fire Rating
3 HR – 180 Minute Fire Rating

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HARDWARE SCHEDULE

Heading# 1

Opening Information					
Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

3 Total Openings							Web Link	Install Instructions	Site Verified
1	Door#	NE-B02	Location:	Workroom B02 from Mechanical Room B01	Handing:	LHR			
1	Door#	NE-104	Location:	Garage 102 to Radio Room 104	Handing:	RH			
1	Door#	NE-109	Location:	Lobby 109 from Stairs	Handing:	LHR			
By Hardware Supplier									
3	Classroom Lockset	ND70BDC x RHO x 626				626	Schlage	X	
By Locksmith									
3	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.				626	Medeco		<input type="checkbox"/>

*BALANCE OF EXITING HARDWARE TO REMAIN.

Notes:

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths – Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 2

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1 Total Openings

1	Door#	N-101	Location:	Garage to B/F Universal WR N-101	Handing:	LH
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Web Link
Install Instructions
Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	630	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	X			
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
2	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>
1	Floor Stop	GSH 209	626	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5500	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #5 – PUSH TO LOCK KIT UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - LH	628		X			<input type="checkbox"/>
1	Wave to Lock Kit	CX-WC16	630	Camden	X	X		<input type="checkbox"/>
1	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.



- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

Heading# 3

Opening Information

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	NE-104	Location:	Garage 102 to Gym 106	Handing:	LH
1	Door#	NE-207	Location:	Corridor 207 to Stairs	Handing:	RH

Web Link

Install Instructions

Site Verified

By Hardware Supplier

2	Passage Latchset	ND10S x RHO x 626	626	Schlage	X		
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*BALANCE OF EXITING HARDWARE TO REMAIN.

-----End of Heading-----



Heading# 4

Opening Information

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	NE-105	Location:	Lobby 109 to Office 105	Handing:	LH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

1	Office Lockset	ND50BDC x RHO x 626	626	Schlage	X			
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By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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*BALANCE OF EXITING HARDWARE TO REMAIN.

Notes:

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths – Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

END OF SCHEDULE

DOOR HARDWARE

08 71 00

PROJECT:

**CITY OF TORONTO ACCESSIBILITY UPGRADES**

Finch Yard BLD B

1026 Finch Ave W, Toronto, Ontario

ARCHITECT:

**IBI GROUP**

175 Galaxy Blvd, Unit 100

Toronto, Ontario

Prepared By: Alex Bekmansourov

Date: May 13th, 2021Revised: July 22nd, 2021

Revised: October 5, 2021



Architectural Hardware Finishes

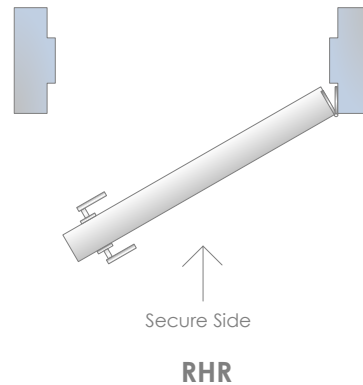
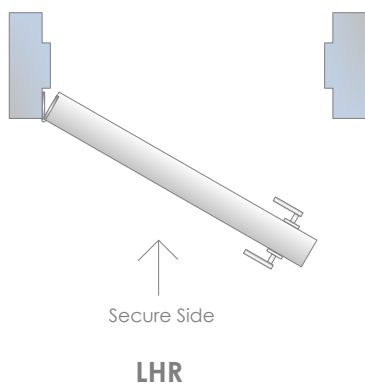
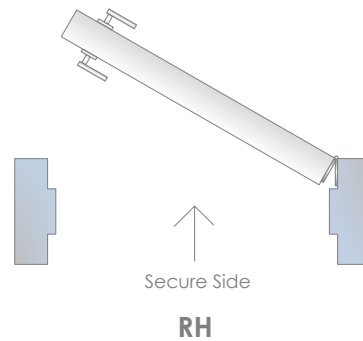
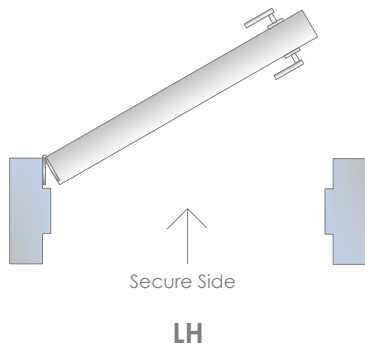
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Polished Nickel					
645		618	669		US14
Satin Stainless Steel					
	630				US32D
Polished Stainless Steel					
	629				US32
Satin Chrome					
652		626	702		US26D
Polished Chrome					
651		625	672		US26
Satin Brass					
633		606	667	678	US4
Polished Brass					
632		605	666	677	US5
Satin Bronze					
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Oil Rubbed Bronze					
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Flat Black / Anodized Black					
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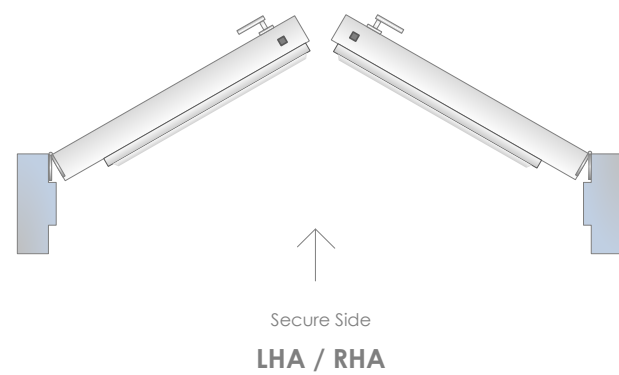
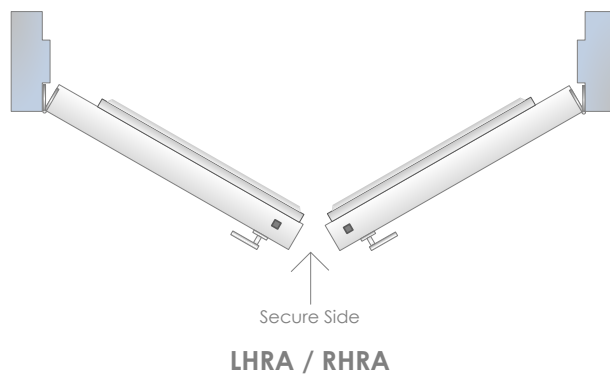
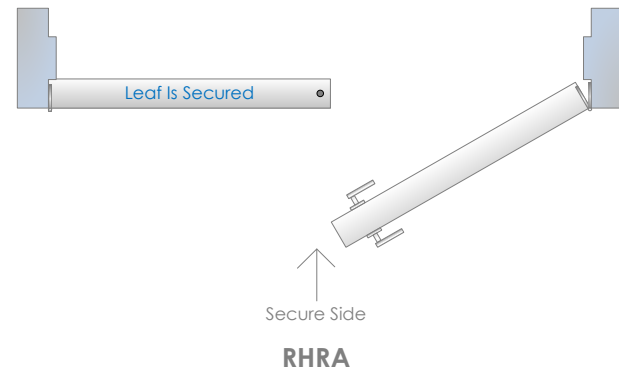
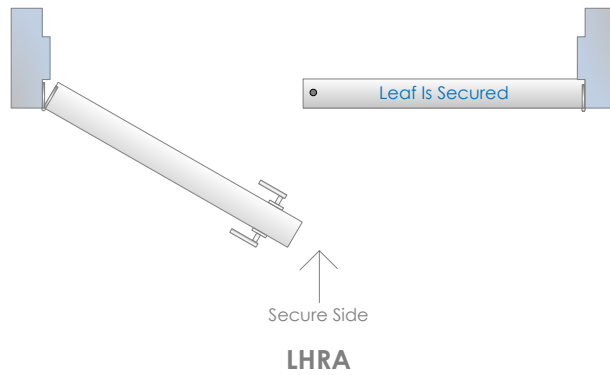
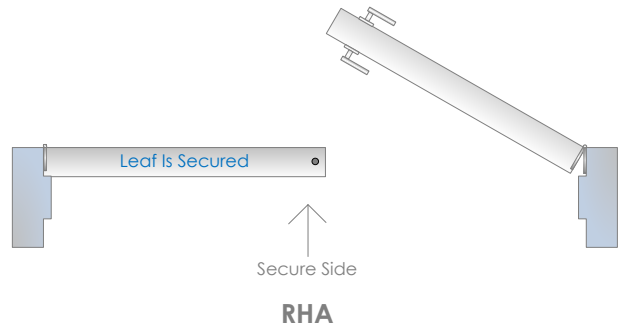
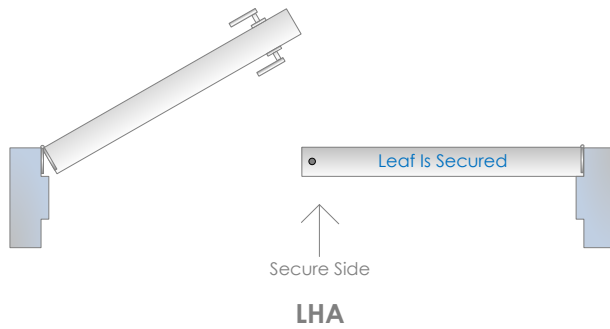
Door Types & Handing

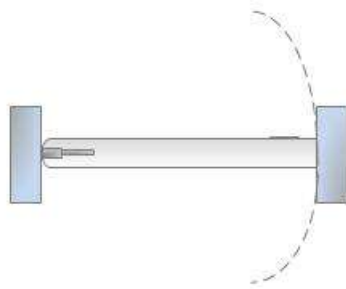
Abbreviations

RH – Right Hand	RHA – Right Hand Active	SS- Single Slider
LH – Left Hand	LHA – Left Hand Active	BP – Bi-Parting Slider
RHR – Right Hand Reverse	RHRA/LHRA – Right & Left Hand Reverse Active	BP – Bi-Passing Slider
LHR – Left Hand Reverse	RHA/LHA – Right & Left Hand Active	BF – Bi-Folding Slider
RHRA – Right Hand Reverse Active	DA- Double Acting	TS – Telescopic Slider
LHRA – Left Hand Reverse Active	DE – Double Egress	PKT – Pocket Slider

Note: The handing on a swing door is determined by placing yourself on the secure side or keyed side of the door.







DA-DOUBLE
ACTING



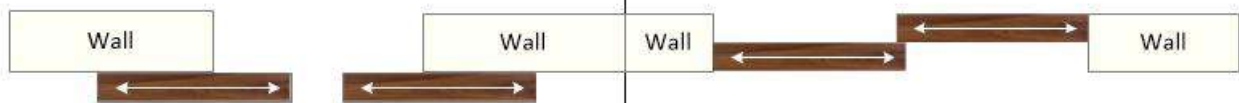
DE-DOUBLE
EGRESS



PKT – POCKET SLIDER



SS – SINGLE SLIDER or
BARN SLIDER



BP – BI-PARTING



BPS – BI-PASSING

Symbols



- Door has a fire rating and all associated hardware must have a fire label to suit. Must comply with local requirements.



- Door is automatic and is equipped with an auto operator. Door must meet local barrier free codes



- Door has an electrical requirement and requires power to be brought to the appropriate location above the door or to the latch, for either security or barrier free applications. Refer to security & electrical drawings for further information.



- Door requires security card access. Refer to security / electrical drawings for further information.

Abbreviations

Door:

HMD = Hollow Metal Door
IHMD = Insulated Hollow Metal Door
ALD = Aluminum Door
SCWD = Solid Core Wood Door
HCWD = Hollow Core Wood Door
FGD = Frameless Glass Door
FRP = Fiberglass Reinforced Plastic Door

Frame:

HMF = Hollow Metal Frame
ALF = Aluminum Frame
Cased Open HMF = Cased Open Hollow Metal Frame
WDF = Wood Frame
Cased Open WDF = Cased Open Wood Frame
Cased Open Drywall = Cased Open Drywall

Fire Ratings:

0 HR – Zero Hour Fire Rating / Smoke Barrier
20 MIN – 20 Minute Fire Rating
¾ HR – 45 Minute Fire rating
1 ½ HR – 90 Minute Fire Rating
2 HR – 120 Minute Fire Rating
3 HR – 180 Minute Fire Rating

Disclaimer

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Weblinks:

Weblinks do change from time to time as manufacturers move around their websites, please inform us if you have a none functioning weblink.



HARDWARE SCHEDULE



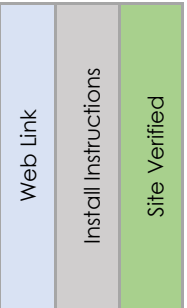
Heading# 1

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1 Total Openings

1	Door#	N-101	Location:	Garage 5 to Lobby 101	Handing:	LH
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By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 1/2" x 4" NRP	652	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	X			
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100i – Pull Side Mount	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
1	Logic Relay	CX-33		Camden	X			<input type="checkbox"/>

By Security Supplier

1	Card Reader/Keypad	To Suit Building System (12V)	BLK					<input type="checkbox"/>
1	Door Contact	To Suit Building System						<input type="checkbox"/>
1	Rex Sensor	To Suit Building System						<input type="checkbox"/>
1	Access Controller	To Suit Building System						<input type="checkbox"/>
1	Power Supply	Located in nearest IT Closet – By Security Provider						<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

Heading# 2

Opening Information

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	NE-102	Location:	Lobby 101 to Storage 102	Handing:	RH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

1	Classroom Lockset	ND70BDC x RHO x 626	626	Schlage	<input checked="" type="checkbox"/>			
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By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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***BALANCE OF EXISTING HARDWARE TO REMAIN**

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

**Heading# 3****Opening Information**

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	NE-103	Location:	Storage 102 to Office Area 103	Handing:	LH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

1	Office Lockset	ND50BDC x RHO x 626	626	Schlage	X			
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By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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***BALANCE OF EXISTING HARDWARE TO REMAIN**

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

.....End of Heading.....

END OF SCHEDULE

DOOR HARDWARE

08 71 00

PROJECT:

**CITY OF TORONTO ACCESSIBILITY UPGRADES**

Finch Yard BLD D

1026 Finch Ave W, Toronto, Ontario

ARCHITECT:

**IBI GROUP**

175 Galaxy Blvd, Unit 100

Toronto, Ontario

Prepared By: Alex Bekmansourov

Date: May 12th, 2021Revised: May 20th, 2021Revised: July 22nd, 2021Revised: August 10th, 2021

Revised: October 5, 2021





Architectural Hardware Finishes

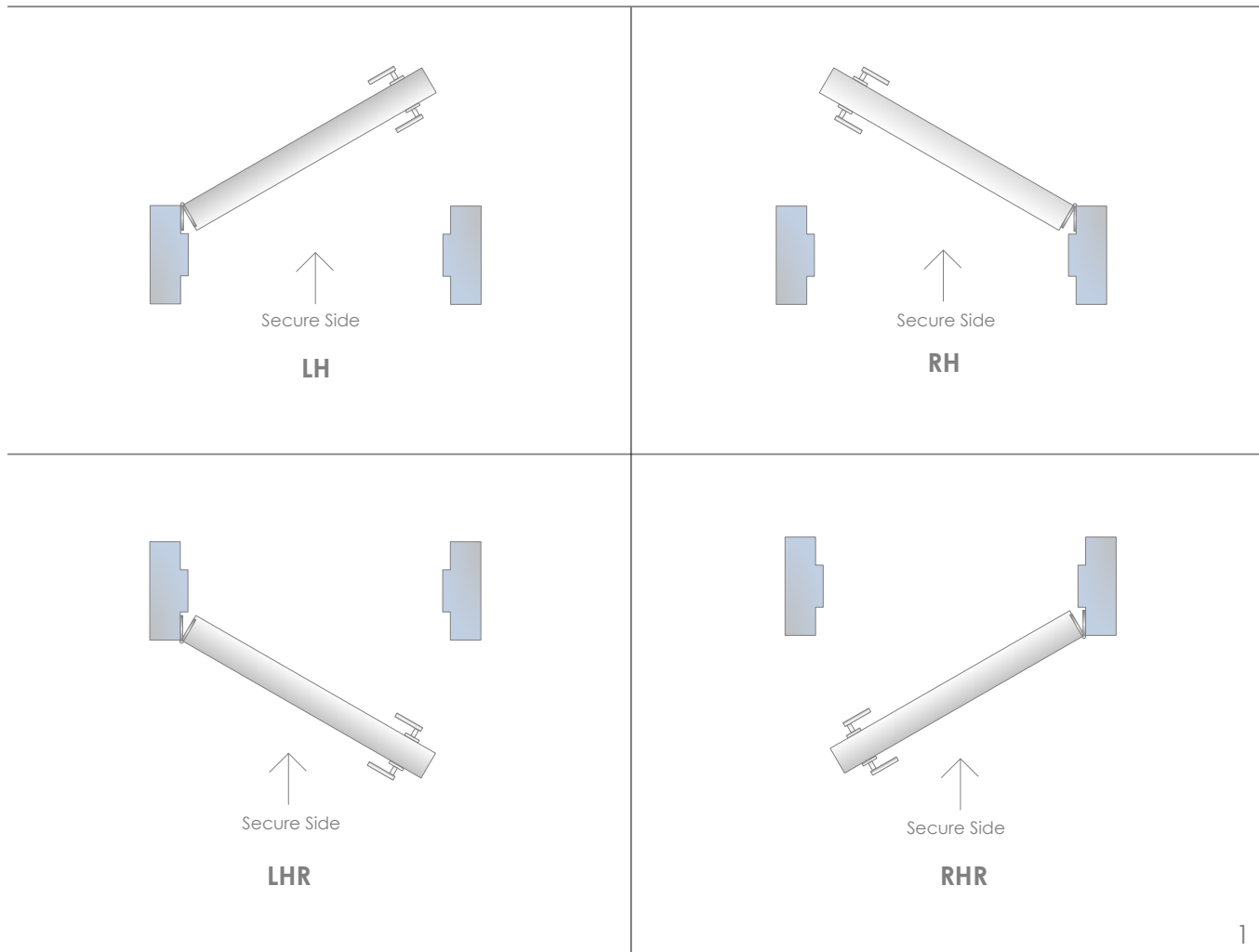
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Satin Nickel					
646		619	670		US15
Polished Nickel					
645		618	669		US14
Satin Stainless Steel					
	630				US32D
Polished Stainless Steel					
	629				US32
Satin Chrome					
652		626	702		US26D
Polished Chrome					
651		625	672		US26
Satin Brass					
633		606	667	678	US4
Polished Brass					
632		605	666	677	US5
Satin Bronze					
639		612	668	680	US10
Oil Rubbed Bronze					
640		613	703	695	US10B
Flat Black / Anodized Black					
631		622	671	693	US19

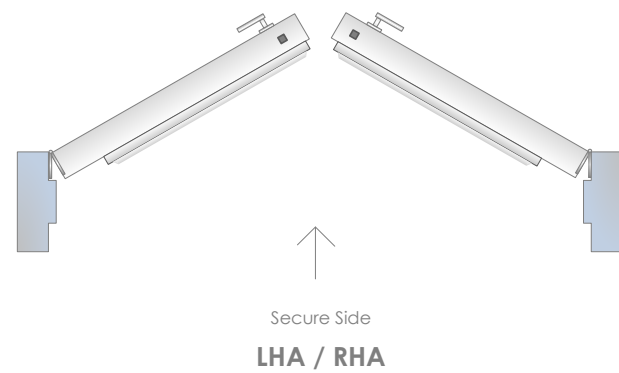
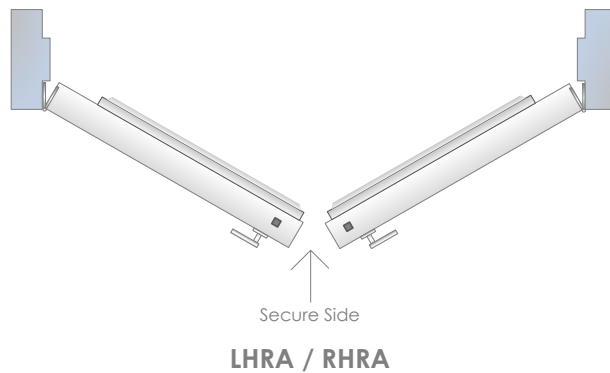
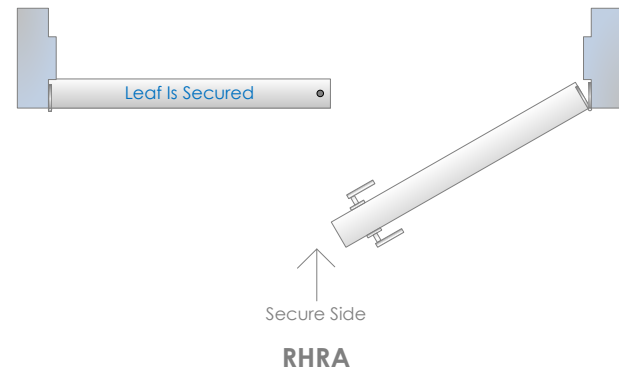
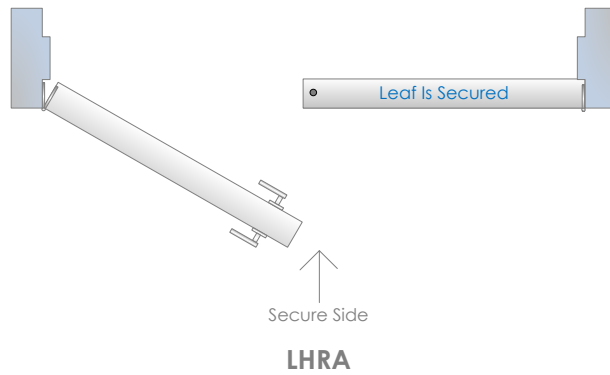
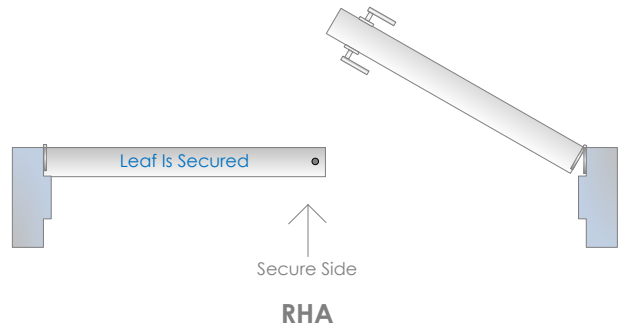
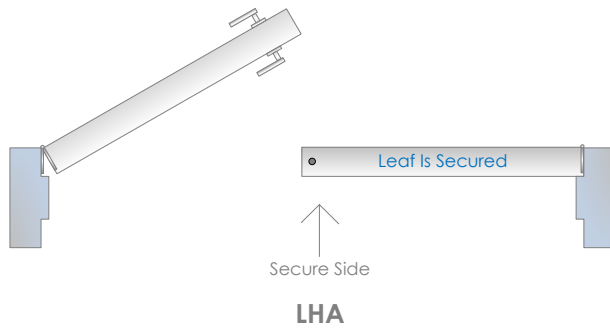
Door Types & Handing

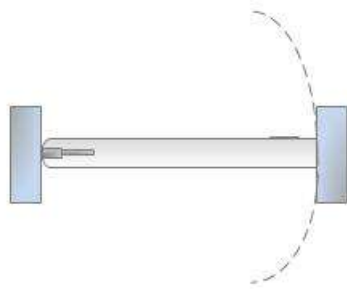
Abbreviations

RH – Right Hand	RHA – Right Hand Active	SS- Single Slider
LH – Left Hand	LHA – Left Hand Active	BP – Bi-Parting Slider
RHR – Right Hand Reverse	RHRA/LHRA – Right & Left Hand Reverse Active	BP – Bi-Passing Slider
LHR – Left Hand Reverse	RHA/LHA – Right & Left Hand Active	BF – Bi-Folding Slider
RHRA – Right Hand Reverse Active	DA- Double Acting	TS – Telescopic Slider
LHRA – Left Hand Reverse Active	DE – Double Egress	PKT – Pocket Slider

Note: The handing on a swing door is determined by placing yourself on the secure side or keyed side of the door.







DA-DOUBLE
ACTING



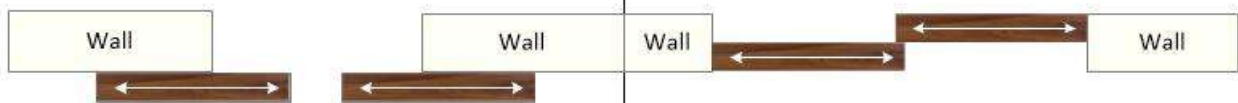
DE-DOUBLE
EGRESS



PKT – POCKET SLIDER



SS – SINGLE SLIDER or
BARN SLIDER



BP – BI-PARTING



BPS – BI-PASSING

Symbols



- Door has a fire rating and all associated hardware must have a fire label to suit. Must comply with local requirements.



- Door is automatic and is equipped with an auto operator. Door must meet local barrier free codes



- Door has an electrical requirement and requires power to be brought to the appropriate location above the door or to the latch, for either security or barrier free applications. Refer to security & electrical drawings for further information.



- Door requires security card access. Refer to security / electrical drawings for further information.

Abbreviations

Door:

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IHMD = Insulated Hollow Metal Door
ALD = Aluminum Door
SCWD = Solid Core Wood Door
HCWD = Hollow Core Wood Door
FGD = Frameless Glass Door
FRP = Fiberglass Reinforced Plastic Door

Frame:

HMF = Hollow Metal Frame
ALF = Aluminum Frame
Cased Open HMF = Cased Open Hollow Metal Frame
WDF = Wood Frame
Cased Open WDF = Cased Open Wood Frame
Cased Open Drywall = Cased Open Drywall

Fire Ratings:

0 HR – Zero Hour Fire Rating / Smoke Barrier
20 MIN – 20 Minute Fire Rating
¾ HR – 45 Minute Fire rating
1 ½ HR – 90 Minute Fire Rating
2 HR – 120 Minute Fire Rating
3 HR – 180 Minute Fire Rating

Disclaimer

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Weblinks:

Weblinks do change from time to time as manufacturers move around their websites, please inform us if you have a none functioning weblink.

HARDWARE SCHEDULE



Heading# 1

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2350 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

3 Total Openings

1	Door#	N-114A	Location:	Corridor 131 to Men's Change Room 114	Handing:	RH
1	Door#	N-114B	Location:	Male Locker Room 127 to Men's Change Room 114	Handing:	RH
1	Door#	N-116	Location:	Corridor 131 to Women's Change Room 116	Handing:	RH

Web Link

Install Instructions

Site Verified

By Hardware Supplier

12	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	630	Hager	X			<input type="checkbox"/>
3	Door Pull Set	GSH 167F x 167F x 915 x #5MTG (Back to Back)	630	Gallery	X			<input type="checkbox"/>
6	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
3	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
3	Smoke / Sound Seal	W-66 x 5900	BLK	KN Crowder	X			<input type="checkbox"/>
3	Door Sweep	W-24S x 1067	CA	KN Crowder	X			<input type="checkbox"/>

By Automatics Supplier – PACKAGE #4 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

3	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X			<input type="checkbox"/>
6	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
6	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
4	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Option to Manually Turn-Off Auto Operators and have Rooms locked during non-work hours using Deadbolt.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.



- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 2A

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2310 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

3 Total Openings

1	Door#	N-117	Location:	Corridor 131 to Office Area 117	Handing:	RH
1	Door#	N-118B	Location:	Corridor 131 to Office 118	Handing:	LH
1	Door#	N-122	Location:	Office Area/Lunch Room 120 to Office Area 122	Handing:	LH

Web Link

Install Instructions

Site Verified

By Hardware Supplier

12	Heavy Weight Hinge	BB1168 – 4 1/2" x 4"	652	Hager	X			<input type="checkbox"/>
3	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	X			
3	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Closer	4011-RH (LCN/ST 1544)	689	LCN	X	X		<input type="checkbox"/>
2	Closer	4011-LH (LCN/ST 1544)	689	LCN	X	X		<input type="checkbox"/>
3	Drop Plate	4020-18	689	LCN				<input type="checkbox"/>
3	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
6	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
3	Smoke / Sound Seal	W-66 x 5800	BLK	KN Crowder	X			<input type="checkbox"/>
3	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Security Supplier

3	Card Reader/Keypad	To Suit Building System (12V)	BLK					<input type="checkbox"/>
3	Door Contact	To Suit Building System						<input type="checkbox"/>
3	Rex Sensor	To Suit Building System						<input type="checkbox"/>
3	Access Controller	To Suit Building System						<input type="checkbox"/>
3	Power Supply	Located in nearest IT Closet – By Security Provider						<input type="checkbox"/>

By Locksmith

3	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 2B

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2340 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-211	Location:	Vestibule to Office Area 211	Handing:	LH
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Web Link	Install Instructions	Site Verified
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By Hardware Supplier

4	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	X			
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Closer	4011-LH (LCN/ST 1544)	689	LCN	X	X		<input type="checkbox"/>
1	Closer	4011-RH (LCN/ST 1544)	689	LCN	X	X		<input type="checkbox"/>
1	Drop Plate	4020-18	689	LCN				<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5800	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Security Supplier

1	Card Reader/Keypad	To Suit Building System (12V)	BLK					<input type="checkbox"/>
1	Door Contact	To Suit Building System						<input type="checkbox"/>



1	Rex Sensor	To Suit Building System							<input type="checkbox"/>
1	Access Controller	To Suit Building System							<input type="checkbox"/>
1	Power Supply	Located in nearest IT Closet – By Security Provider							<input type="checkbox"/>
By Locksmith									
1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					<input type="checkbox"/>

Notes:

- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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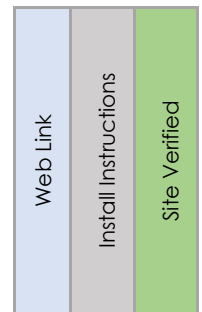
Heading# 3

Opening Information

Opening Type:	Single	Opening Size:	1156 x 2135 x 45	STC Rating	None
Door Material:	ALD	Frame Material:	ALF	Fire Rating	None

1 Total Openings

1	Door#	N-118A	Location:	Office Area 117 to Office 118	Handing:	SS
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*All Sliding Doors & Hardware provided by Sliding Door System Provider, Teknion, PC350 or Approved Equal.

*New Sliding Doors to have Locking Hardware on both Sides.

*Verify all Sizes Prior to Ordering.

-----End of Heading-----



Heading# 4A

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2130 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-123	Location:	Office Area 122 to Office 123	Handing:	LH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Office Lockset	ND50BDC x RHO x 626	626	Schlage	X			
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- Refer to STC rating of the wall in Architectural layout G1002
- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

.....End of Heading.....



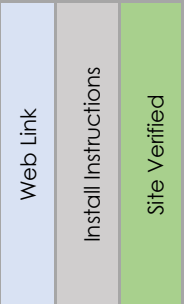
Heading# 4B

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1 Total Openings

1	Door#	N-129	Location:	Vestibule 129 from Corridor 131	Handing:	LHR
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By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X				<input type="checkbox"/>
1	Exit Device	98L-BE-F x 996L-BE-R/V x 06 x 626/630 x 4'0	630	Von Duprin	X	X			<input type="checkbox"/>
1	Electric Strike	6300 x 12/24VCD	630	Von Duprin	X	X			<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X			<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X				<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X				<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X			<input type="checkbox"/>

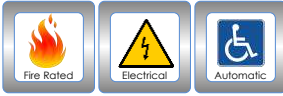
By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X				<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X				<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X				<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.

-----End of Heading-----


Heading# 5A

Opening Information

Opening Type:	Pair	Opening Size:	1 x 1067 x 2300 x 45 – 1 x 713 x 2300 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1 Total Openings

1	Door#	NE-113A	Location:	Vestibule 113 from Corridor 131	Handing:	RHRA
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

8	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Door Loop	798C-18	652	Schlage	X			<input type="checkbox"/>
1	Exit Device	RX-QEL-9847L-BE-F-LBR x 996L-BE-R/V x 06 x 4'0 x RHR	626	Von Duprin	X	X	X	<input type="checkbox"/>
1	Exit Device	9847L-BE-F x 996L-BE-R/V-LBR x 06 x 3'0 x LHR	626	Von Duprin	X	X	X	<input type="checkbox"/>
1	Closer	4011-RH (LCN/ST 1544)	689	LCN	X	X		<input type="checkbox"/>
1	Drop Plate	4020-18	689	LCN				<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Overhead Stop	103S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 6500	BLK	KN Crowder	X			<input type="checkbox"/>
1	Door Sweep	W-24S x 1067	CA	KN Crowder	X			<input type="checkbox"/>
1	Door Sweep	W-24S x 713	CA	KN Crowder	X			<input type="checkbox"/>
1	Astragal	W-25 x 2300	CA	KN Crowder	X			<input type="checkbox"/>
1	Power Supply	PS-904-4RS	689	Von Duprin	X			<input type="checkbox"/>

By Automatics Supplier – PACKAGE #1A – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW200I – Pull Side Mount – LH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
1	Logic Relay	CX-33		Camden	X			<input type="checkbox"/>

By Security Supplier

1	Power Supply	Located in nearest IT Closet – By Security Provider						<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Confirm Exact Hinge Size Prior to Ordering.

-----End of Heading-----



Heading# 5B

Opening Information

Opening Type:	Pair	Opening Size:	2 x 890 x 2300 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1 Total Openings

1 **Door#** NE-113C **Location:** Vestibule 113 from Corridor 131 **Handing:** RHRA

Web Link

Install Instructions

Site Verified

By Hardware Supplier

8	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
2	Exit Device	9847L-BE-F x 996L-BE-R/V-LBR x 06 x 3'0 x LHR	626	Von Duprin	X	X	X	<input type="checkbox"/>
1	Closer	4011-RH (LCN/ST 1544)	689	LCN	X	X		<input type="checkbox"/>
1	Closer	4011-LH (LCN/ST 1544)	689	LCN	X	X		<input type="checkbox"/>
2	Drop Plate	4020-18	689	LCN				<input type="checkbox"/>
2	Overhead Stop	104S	630	Glynn Johnson	X	X		<input type="checkbox"/>
2	Smoke / Sound Seal	W-66 x 6500	BLK	KN Crowder	X			<input type="checkbox"/>
2	Door Sweep	W-24S x 915	CA	KN Crowder	X			<input type="checkbox"/>
1	Astragal	W-25 x 2300	CA	KN Crowder	X			<input type="checkbox"/>

Notes:



- Confirm Exact Hinge Size Prior to Ordering.
- Existing frame to remain

-----End of Heading-----



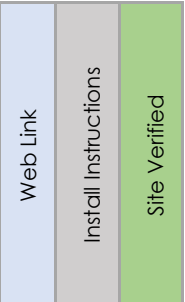
Heading# 6

Opening Information

Opening Type:	Pair	Opening Size:	2 - Existing Doors x Existing Frame	STC Rating	None
Door Material:	ALD	Frame Material:	ALF	Fire Rating	None

2 Total Openings

1	Door#	NE-113B	Location:	Exterior from Vestibule 113	Handing:	LHRA/RHRA
1	Door#	NE-129A	Location:	Exterior from Vestibule 129	Handing:	LHRA/RHRA



By Hardware Supplier

EXISTING HARDWARE TO REMAIN

By Automatics Supplier – PACKAGE #1C – INTERIOR PUSHBUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

2	Auto Operator (PAIR)	BESAM SW200i – Double Door - Push Side Mount – RH/LH	628		X			<input type="checkbox"/>
2	Push Button	CM60/4-WT	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-79	630	Camden	X			<input type="checkbox"/>
2	Wave Button	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
2	Logic Relay	CX-33		Camden	X			<input type="checkbox"/>

By Security Supplier

2	Power Supply	Located in nearest IT Closet – By Security Provider						<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Auto Operator Push Buttons to be integrated with Existing Card-Readers

-----End of Heading-----



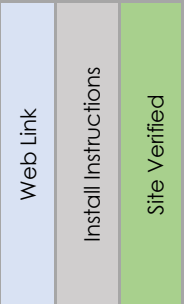
Heading# 7

Opening Information

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	NE-115	Location:	Corridor 131 from Elev.Machine Room 115	Handing:	RHR
1	Door#	NE-207	Location:	Office Area 202 to Electrical Room 207	Handing:	LH



By Hardware Supplier

2	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	<input checked="" type="checkbox"/>		
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By Locksmith

2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco			<input type="checkbox"/>
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*BALANCE OF EXISTING HARDWARE TO REMAIN

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



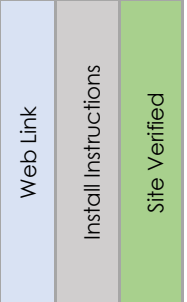
Heading# 8

Opening Information

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	NE-121	Location:	Office Area/Lunch Room 120 from First Aid Room 121	Handing:	LHR
1	Door#	NE-127	Location:	Corridor 131 to Male Locker Room 127	Handing:	LH



By Hardware Supplier

2	Passage Latchset	ND10S x RHO x 626	626	Schlage	<input checked="" type="checkbox"/>			
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*BALANCE OF EXISTING HARDWARE TO REMAIN

-----End of Heading-----

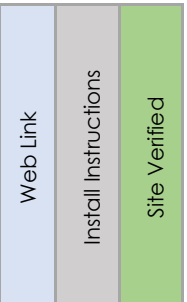
Heading# 9A

Opening Information

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

3 Total Openings

1	Door#	NE-125	Location:	Corridor 131 to Janitor Room 125	Handing:	LH
1	Door#	NE-126	Location:	Corridor 131 to Boiler Room 126	Handing:	LH
1	Door#	NE-201	Location:	Stair A 201 from Office Area 202	Handing:	LHR



By Hardware Supplier

3	Classroom Lockset	ND70BDC x RHO x 626	626	Schlage	<input checked="" type="checkbox"/>			
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By Locksmith

3	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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***BALANCE OF EXISTING HARDWARE TO REMAIN**

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

**Heading# 9B****Opening Information**

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	NE-214	Location:	Stair B 214 from Vestibule	Handing:	RHR
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

1	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

By Security Supplier

1	Card Reader/Keypad	To Suit Building System (12V)	BLK		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Door Contact	To Suit Building System			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Rex Sensor	To Suit Building System			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Access Controller	To Suit Building System			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Power Supply	Located in nearest IT Closet – By Security Provider			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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***BALANCE OF EXISTING HARDWARE TO REMAIN**

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)



- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 10

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2311 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	WDF	Fire Rating	None

1 Total Openings

1	Door#	N-203	Location:	Office Area 202 to Meeting Room 203	Handing:	RH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

4	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Classroom Lockset	ND70BDC x RHO x 626	626	Schlage	X			
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Floor Stop	GSH 209	626	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Option to Manually Turn-Off Auto Operators and have Rooms locked during non-work hours using Classroom Function Lockset
- During installation, centreline of Door Pulls must Be at 46-1/2" AFF.
- Refer to STC rating of the wall in Architectural layout G1002



- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.
-

-----End of Heading-----

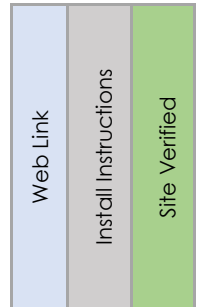
Heading# 11

Opening Information

Opening Type:	Single	Opening Size:	1156 x 2135 x 45	STC Rating	None
Door Material:	ALD	Frame Material:	ALF	Fire Rating	None

1 Total Openings

1	Door#	N-208	Location:	Vestibule to Kitchen 208	Handing:	SS
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*All Sliding Doors & Hardware provided by Sliding Door System Provider, Teknion, PC350 or Approved Equal.

*Verify all Sizes prior to ordering.

-----End of Heading-----



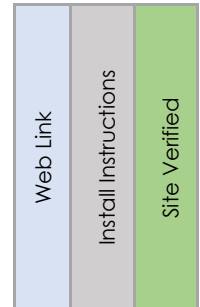
Heading# 12

Opening Information

Opening Type:	Single	Opening Size:	Glass Door Panels	STC Rating	None
Door Material:	FGD	Frame Material:	Existing	Fire Rating	None

1 Total Openings

1	Door#	N-222	Location:	Office Area 202 to Office 222	Handing:	LH
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*ALL EXISTING GLASS DOOR HARDWARE TO BE REUSED ON NEW GLASS DOOR PANELS.

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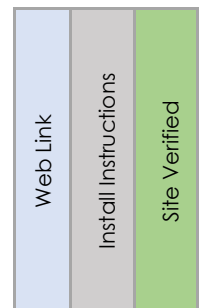
Heading# 13

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	N-223	Location:	Office Area 202 to OBC Washroom 223	Handing:	LH
1	Door#	N-224	Location:	Office Area 202 to B/F Female Washroom 1 224	Handing:	LH



By Hardware Supplier

6	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	630	Hager	X			<input type="checkbox"/>
2	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	X			
2	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
4	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
4	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>



2	Floor Stop	GSH 209	626	Gallery	X			<input type="checkbox"/>
2	Smoke / Sound Seal	W-66 x 5500	BLK	KN Crowder	X			<input type="checkbox"/>
2	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>
By Automatics Supplier – PACKAGE #5 – PUSH TO LOCK KIT UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)								
2	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - LH	628		X			<input type="checkbox"/>
2	Wave to Lock Kit	CX-WC16	630	Camden	X	X		<input type="checkbox"/>
2	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		<input type="checkbox"/>
By Locksmith								
2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 14

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-225	Location:	Office Area 202 to B/F Female Washroom 2 225	Handing:	RH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	630	Hager	X		<input type="checkbox"/>
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1	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	X			
1	Electric Strike	1500C	630	HES	X	X		
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			
2	Coat Hook	GSH 390	626	Gallery	X			
1	Overhead Stop	105S	630	Glynn Johnson	X	X		
1	Smoke / Sound Seal	W-66 x 5500	BLK	KN Crowder	X			
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		
By Automatics Supplier – PACKAGE #5 – PUSH TO LOCK KIT UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)								
1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X			
1	Wave to Lock Kit	CX-WC16	630	Camden	X	X		
1	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		
By Locksmith								
1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 15

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-119	Location:	Corridor 131 to Office Area 119	Handing:	RH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	X			
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Closer	4011-RH (LCN/ST 1544)	689	LCN	X	X		<input type="checkbox"/>
1	Drop Plate	4020-18	689	LCN				<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Security Supplier

1	Card Reader/Keypad	To Suit Building System (12V)	BLK					<input type="checkbox"/>
1	Door Contact	To Suit Building System						<input type="checkbox"/>
1	Rex Sensor	To Suit Building System						<input type="checkbox"/>
1	Access Controller	To Suit Building System						<input type="checkbox"/>
1	Power Supply	Located in nearest IT Closet – By Security Provider						<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002



- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

**Heading# 16**

Opening Information

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	NE-206	Location:	Office Area 202 to Male Washroom 206	Handing:	RH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

EXISTING HARDWARE TO REMAIN

By Automatics Supplier – **PACKAGE #3 PUSHBUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)**

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount	628		X			<input type="checkbox"/>
2	Wave Button	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
1	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.

-----End of Heading-----

END OF SCHEDULE

DOOR HARDWARE

08 71 00

PROJECT:

**CITY OF TORONTO ACCESSIBILITY UPGRADES**

Toronto Animal Services

1300 Sheppard Ave W, Toronto, Ontario

ARCHITECT:

**IBI GROUP**

175 Galaxy Blvd, Unit 100

Toronto, Ontario

Prepared By: Alex Bekmansourov

Date: May 11th, 2021Revised: July 23rd, 2021Revised: October 5th, 2021



Architectural Hardware Finishes

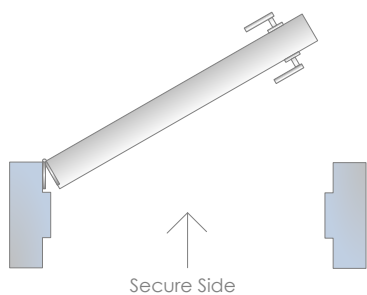
Steel	Stainless Steel	Brass/Bronze	Aluminum	Painted/Powder Coat	US/CAN#
Clear Anodized / Painted Aluminum					
			628	689	US28
Satin Nickel					
646		619	670		US15
Polished Nickel					
645		618	669		US14
Satin Stainless Steel					
	630				US32D
Polished Stainless Steel					
	629				US32
Satin Chrome					
652		626	702		US26D
Polished Chrome					
651		625	672		US26
Satin Brass					
633		606	667	678	US4
Polished Brass					
632		605	666	677	US5
Satin Bronze					
639		612	668	680	US10
Oil Rubbed Bronze					
640		613	703	695	US10B
Flat Black / Anodized Black					
631		622	671	693	US19

Door Types & Handing

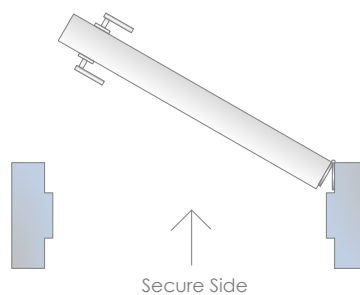
Abbreviations

RH – Right Hand	RHA – Right Hand Active	SS- Single Slider
LH – Left Hand	LHA – Left Hand Active	BP – Bi-Parting Slider
RHR – Right Hand Reverse	RHRA/LHRA – Right & Left Hand Reverse Active	BP – Bi-Passing Slider
LHR – Left Hand Reverse	RHA/LHA – Right & Left Hand Active	BF – Bi-Folding Slider
RHRA – Right Hand Reverse Active	DA- Double Acting	TS – Telescopic Slider
LHRA – Left Hand Reverse Active	DE – Double Egress	PKT – Pocket Slider

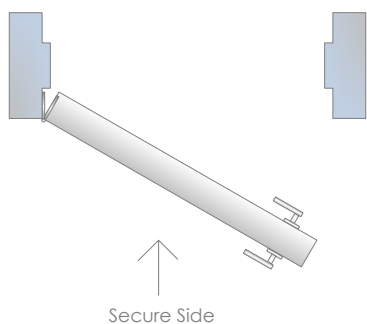
Note: The handing on a swing door is determined by placing yourself on the secure side or keyed side of the door.



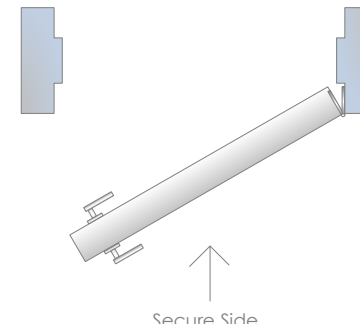
LH



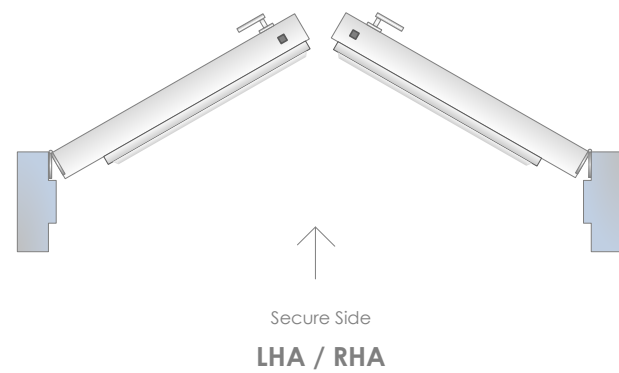
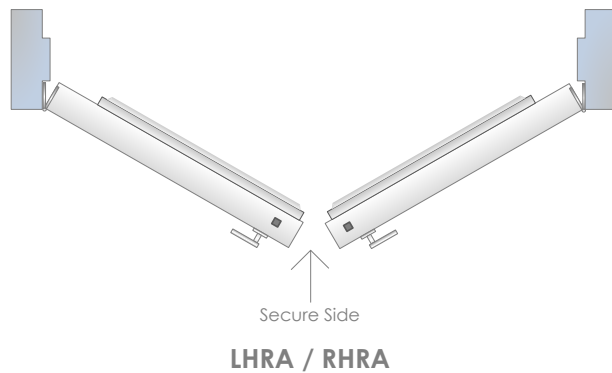
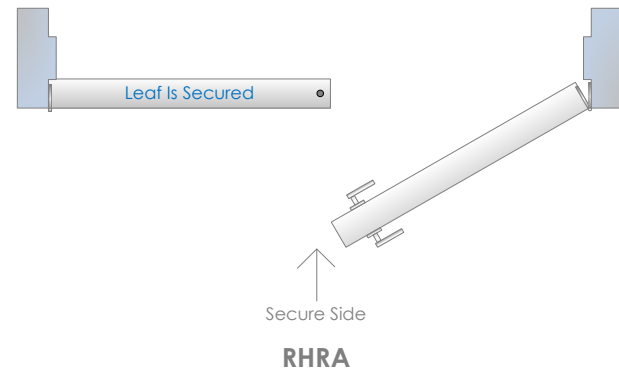
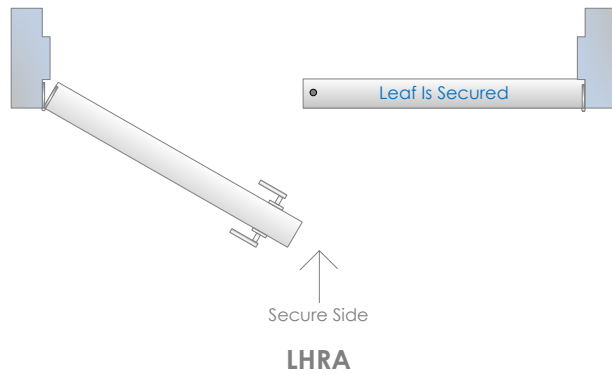
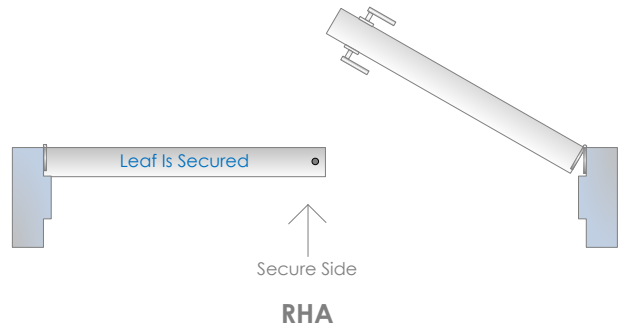
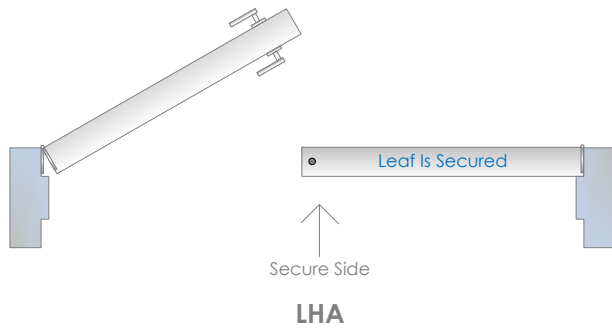
RH

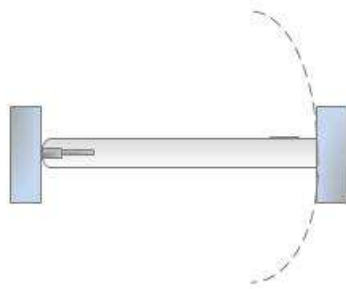


LHR



RHR

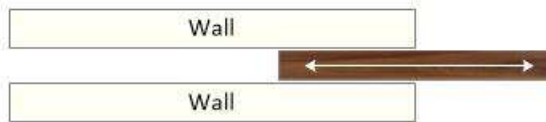




DA-DOUBLE
ACTING



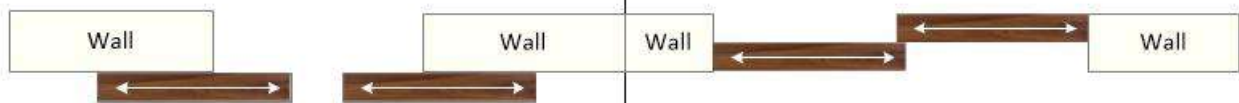
DE-DOUBLE
EGRESS



PKT - POCKET SLIDER



SS - SINGLE SLIDER or
BARN SLIDER



BP - BI-PARTING



BPS - BI-PASSING

Symbols



- Door has a fire rating and all associated hardware must have a fire label to suit. Must comply with local requirements.



- Door is automatic and is equipped with an auto operator. Door must meet local barrier free codes



- Door has an electrical requirement and requires power to be brought to the appropriate location above the door or to the latch, for either security or barrier free applications. Refer to security & electrical drawings for further information.



- Door requires security card access. Refer to security / electrical drawings for further information.

Abbreviations

Door:

HMD = Hollow Metal Door
IHMD = Insulated Hollow Metal Door
ALD = Aluminum Door
SCWD = Solid Core Wood Door
HCWD = Hollow Core Wood Door
FGD = Frameless Glass Door
FRP = Fiberglass Reinforced Plastic Door

Frame:

HMF = Hollow Metal Frame
ALF = Aluminum Frame
Cased Open HMF = Cased Open Hollow Metal Frame
WDF = Wood Frame
Cased Open WDF = Cased Open Wood Frame
Cased Open Drywall = Cased Open Drywall

Fire Ratings:

0 HR – Zero Hour Fire Rating / Smoke Barrier
20 MIN – 20 Minute Fire Rating
¾ HR – 45 Minute Fire rating
1 ½ HR – 90 Minute Fire Rating
2 HR – 120 Minute Fire Rating
3 HR – 180 Minute Fire Rating

Disclaimer

Installation Instructions:

Installation instructions have been provided for convenience only. Although we do our best to ensure these documents are accurate and up to date, it is ultimately the responsibility of the installer to ensure they are using the correct instructions for the product they are installing. Use of the installation instructions provided is done so at one's own risk and Spyder SC takes no responsibility to their accuracy.

Weblinks:

Weblinks do change from time to time as manufacturers move around their websites, please inform us if you have a none functioning weblink.

HARDWARE SCHEDULE



Opening Information

Opening Type:	Single	Opening Size:	1067 x 2400 x 45	STC Rating	None
Door Material:	ALD	Frame Material:	ALF	Fire Rating	None

1 Total Openings

1	Door#	N-100A	Location:	Exterior from Vestibule 100	Handing:	LHR
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Web Link
Install Instructions
Site Verified

By Hardware Supplier

1	Continuous Hinge	112XY x 2375	628	Ives	X	X		<input type="checkbox"/>
1	Exit Device	CD-35A-NL-OP x 388NL x 4'0	626	Von Duprin	X	X		<input type="checkbox"/>
1	Rim Cylinder	80-116	626	Schlage				<input type="checkbox"/>
1	Mortise Cylinder	80-110	626	Schlage	X			<input type="checkbox"/>
1	Electric Strike	6300 x 12/24VCD	630	Von Duprin	X	X		<input type="checkbox"/>
1	Door Pull	GSH 165F x 2095 x #2 MTG	630	Gallery	X			<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Weatherstrip	By Aluminum Door Supplier	628					<input type="checkbox"/>
1	Door Sweep	By Aluminum Door Supplier	628					<input type="checkbox"/>
1	Threshold	By Aluminum Door Supplier	628					<input type="checkbox"/>

By Automatics Supplier – PACKAGE #1A – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW200i – Push Side Mount - RH	628		X			<input type="checkbox"/>
1	Push Button	CM60/4-WT	630	Camden	X			<input type="checkbox"/>
1	Surface Mount Box	CM-79	630	Camden	X			<input type="checkbox"/>
1	Wave Button	CM-333/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
1	Transmitter	CM-TX-99	630	Camden	X			<input type="checkbox"/>
1	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
1	Logic Relay	CX-33		Camden	X			<input type="checkbox"/>

By Security Supplier

1	Card Reader	To Suit Building System (12V)	BLK					<input type="checkbox"/>
1	Door Contact	To Suit Building System						<input type="checkbox"/>



1	Rex Sensor	To Suit Building System							
1	Access Controller	To Suit Building System							
1	Power Supply	Located in nearest IT Closet – By Security Provider							
1	Bollard/Mounting Post	To Suit Building System.							
By Locksmith									
2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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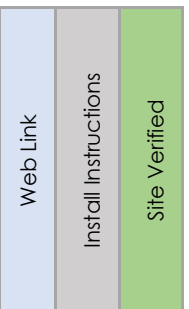
Heading# 2

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2400 x 45	STC Rating	None
Door Material:	ALD	Frame Material:	ALF	Fire Rating	None

1 Total Openings

1	Door#	N-100B	Location:	Vestibule 100 from Entrance Link 132	Handing:	LHR
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By Hardware Supplier

1	Continuous Hinges	112XY x 2375	628	Ives	X	X			
1	Deadlock	MS1850S	628	Adams Rite	X				
1	Mortise Cylinder	80-111	626	Schlage					
1	Thumb Turn	M-100-A-TA-26D	626	Canaropa	X				
1	Door Pull Set	GSH 165F x 165F x 2095 x #5MTG (Back to Back)	630	Gallery	X				
1	Overhead Stop	105S	630	Glynn Johnson	X	X			



1	Door Sweep	By Aluminum Door Supplier	628					<input type="checkbox"/>
By Automatics Supplier – PACKAGE #1A – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)								
1	Auto Operator (SNG)	BESAM SW200i – Push Side Mount - RH	628		<input checked="" type="checkbox"/>			<input type="checkbox"/>
1	Wave Button	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	<input checked="" type="checkbox"/>			<input type="checkbox"/>
1	Wave Button	CM-333/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	<input checked="" type="checkbox"/>			<input type="checkbox"/>
1	Transmitter	CM-TX-99	630	Camden	<input checked="" type="checkbox"/>			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	<input checked="" type="checkbox"/>			<input type="checkbox"/>
By Locksmith								
2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Auto Operator must be Manually Turned of Before Locking Doors with Deadbolt.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 3

Opening Information

Opening Type:	Single	Opening Size:	915 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1 Total Openings

1	Door#	N-110	Location:	Lunch Room 110 from Storage Room 155	Handing:	RHR
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	<input checked="" type="checkbox"/>			<input type="checkbox"/>
1	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	<input checked="" type="checkbox"/>			
1	Closer	1461 x Rw/PA	689	LCN	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
1	Overhead Stop	104S	630	Glynn Johnson	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 876 (Rounded Corners) – HM Door Screws	630	Gallery	<input checked="" type="checkbox"/>			<input type="checkbox"/>



1	Smoke / Sound Seal	W-66 x 5200	BLK	KN Crowder	X			<input type="checkbox"/>
1	Door Sweep	W-24S x 915	CA	KN Crowder	X			<input type="checkbox"/>
By Locksmith								
1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>

Notes:

- Refer to STC rating of the wall in Architectural layout G1002
- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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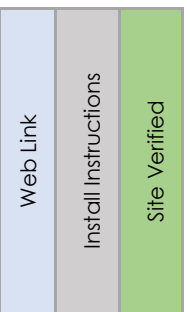
Heading# 4

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2120 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-111	Location:	Corridor 104 to B/F Universal WR 111	Handing:	RH
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By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	630	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	X			
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
2	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>
1	Floor Stop	GSH 209	626	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5500	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #5 – PUSH TO LOCK KIT UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X			<input type="checkbox"/>
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1	Wave to Lock Kit	CX-WC16	630	Camden	X	X		<input type="checkbox"/>
1	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		<input type="checkbox"/>
By Locksmith								
1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

Heading# 5

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2100 x 45	STC Rating	None
Door Material:	ALD	Frame Material:	ALF	Fire Rating	None

1 Total Openings

1	Door#	N-115	Location:	Corridor 104 to Office 109	Handing:	LH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

1	Continuous Hinge	112XY x 2075	628	Ives	X	X		<input type="checkbox"/>
1	Deadlock	MS1850S	628	Adams Rite	X			<input type="checkbox"/>
1	Mortise Cylinder	80-111	626	Schlage				<input type="checkbox"/>
1	Thumb Turn	M-100-A-TA-26D	626	Canaropa	X			<input type="checkbox"/>
1	Door Pull Set	GSH 165F x 165F x 1800 x #5MTG (Back to Back)	630	Gallery	X			<input type="checkbox"/>
1	Closer	4021-RH	628	LCN	X	X		<input type="checkbox"/>



1	Drop Plate	4020-18G	628	LCN	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Door Sweep	By Aluminum Door Supplier	628					<input type="checkbox"/>
By Locksmith								
1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>

Notes:

- Refer to STC rating of the wall in Architectural layout G1002
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.
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-----End of Heading-----



Heading# 6

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	ALD	Frame Material:	ALF	Fire Rating	None

1 Total Openings

1 **Door#** N-132 **Location:** Exterior from Hallway 101 **Handing:** LHR



By Hardware Supplier

1	Continuous Hinge	112XY x 2108	628	Ives	X	X		<input type="checkbox"/>
1	Deadlatch	4512-2-5-1-01-628 (Confirm backset, radius & bevel with door provider)	628	Adams Rite	X	X		<input type="checkbox"/>
1	Mortise Cylinder Housing	80-111	626	Schlage	X			<input type="checkbox"/>
1	Deadlatch Handle	4600-03-5-1-2-32D	628	Adams Rite	X			<input type="checkbox"/>
1	Electric Strike	7400	628	Adams Rite	X	X		<input type="checkbox"/>
1	Door Pull Set	GSH 165F x 1830 x #2 MTG	630	Gallery	X			<input type="checkbox"/>
1	Closer	4021-RH	628	LCN	X	X		<input type="checkbox"/>
1	Drop Plate	4020-18G	628	LCN	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Weatherstrip	By Aluminum Door Supplier	628					<input type="checkbox"/>
1	Door Sweep	By Aluminum Door Supplier	628					<input type="checkbox"/>
1	Threshold	By Aluminum Door Supplier	628					<input type="checkbox"/>

By Security Supplier



1	Card Reader	To Suit Building System (12V)	BLK						<input type="checkbox"/>
1	Door Contact	To Suit Building System							<input type="checkbox"/>
1	Rex Sensor	To Suit Building System							<input type="checkbox"/>
1	Access Controller	To Suit Building System							<input type="checkbox"/>
1	Power Supply	Located in nearest IT Closet – By Security Provider							<input type="checkbox"/>
By Locksmith									
1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					<input type="checkbox"/>

Notes:

- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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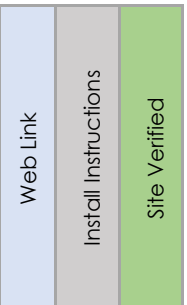
Heading# 7

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2450 x 45	STC Rating	None
Door Material:	ALD	Frame Material:	ALF	Fire Rating	None

1 Total Openings

1	Door#	N-141A	Location:	Exterior from Vestibule 141	Handing:	RHR
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By Hardware Supplier

1	Continuous Hinge	112XY x 2425	628	Ives	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
1	Exit Device	CD-35A-NL-OP x 388NL x 4'0	626	Von Duprin	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
1	Rim Cylinder	80-116	626	Schlage				<input type="checkbox"/>
1	Mortise Cylinder	80-110	626	Schlage	<input checked="" type="checkbox"/>			<input type="checkbox"/>
1	Electric Strike	6300 x 12/24VCD	630	Von Duprin	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
1	Door Pull	GSH 165F x 2145 x #2 MTG	630	Gallery	<input checked="" type="checkbox"/>			<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
1	Weatherstrip	By Aluminum Door Supplier	628					<input type="checkbox"/>
1	Door Sweep	By Aluminum Door Supplier	628					<input type="checkbox"/>



1	Threshold	By Aluminum Door Supplier	628						
By Automatics Supplier – PACKAGE #1A – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)									
1	Auto Operator (SNG)	BESAM SW200i – Push Side Mount - LH	628			X			
1	Push Button	CM60/4-WT	630	Camden		X			
1	Surface Mount Box	CM-79	630	Camden		X			
1	Wave Button	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden		X			
1	Surface Mount Box	CM-43CBLA	630	Camden		X			
1	Logic Relay	CX-33		Camden		X			
By Security Supplier									
1	Door Contact	To Suit Building System							
By Locksmith									
2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 8

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2450 x 45	STC Rating	None
Door Material:	ALD	Frame Material:	ALF	Fire Rating	None

1 Total Openings

1	Door#	N-141B	Location:	Vestibule 141 from Reception 142	Handing:	LHR
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Web Link
Install Instructions
Site Verified

By Hardware Supplier



1	Continuous Hinges	112XY x 2425	628	Ives	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Door Pull Set	GSH 165F x 165F x 2145 x #5MTG (Back to Back)	630	Gallery	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Door Sweep	By Aluminum Door Supplier	628		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
By Automatics Supplier – PACKAGE #1A – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)								
1	Auto Operator (SNG)	BESAM SW200i – Pull Side Mount - LH	628		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Wave Button	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.

-----End of Heading-----

Heading# 9

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2100 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-143	Location:	Reception 142 to Office 143	Handing:	RH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Office Lockset	ND50BDC x RHO x 626	626	Schlage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Coat Hook	GSH 390	626	Gallery	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Notes:

- Refer to STC rating of the wall in Architectural layout G1002
- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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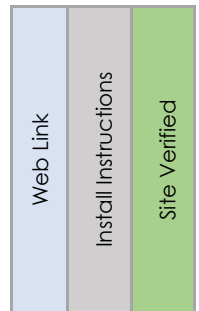
Heading# 10

Opening Information

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

7 Total Openings

1	Door#	NE-101	Location:	Waiting Area 101 from Corridor 135	Handing:	RHR
1	Door#	NE-117	Location:	Corridor 112 from Stray Dogs 117	Handing:	RHR
1	Door#	NE-122	Location:	Corridor 118 to Freezer 122	Handing:	RH
1	Door#	NE-136	Location:	Corridor to Cat Adoption 136	Handing:	LH
1	Door#	NE-139	Location:	Corridor 135 to Washroom 139	Handing:	LH
1	Door#	NE-140	Location:	Washroom 139 from Lockers 140	Handing:	RHR
1	Door#	NE-149	Location:	Waiting Area 101 from Corridor 135	Handing:	RHR



By Hardware Supplier

7	Passage Latchset	ND10S x RHO x 626	626	Schlage	X			
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***BALANCE OF EXISTING HARDWARE TO REMAIN**

-----End of Heading-----



Heading# 11

Opening Information

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	NE-107	Location:	Corridor 104 to Office 107	Handing:	LH
1	Door#	NE-109	Location:	Corridor 104 to Office 109	Handing:	LH

Web Link

Install Instructions

Site Verified

By Hardware Supplier

2	Office Lockset	ND50BDC x RHO x 626	626	Schlage	X			
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By Locksmith

2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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*BALANCE OF EXISTING HARDWARE TO REMAIN

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

.....End of Heading.....



Heading# 12

Opening Information				
Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating: None
Door Material:	HMD	Frame Material:	HMF	Fire Rating: None

1 Total Openings							Web Link	Install Instructions	Site Verified
1	Door#	NE-114	Location:	Corridor 112 to Men's Washroom 114	Handing:	LH			
By Hardware Supplier									
1	Privacy Latchset	ND40S x RHO x 626				626	Schlage	X	

*BALANCE OF EXISTING HARDWARE TO REMAIN

-----End of Heading-----



Heading# 13

Opening Information

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	NE-156	Location:	Corridor 112 to Locker Room 156	Handing:	RH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

1	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	X			
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By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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*BALANCE OF EXISTING HARDWARE TO REMAIN

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

END OF SCHEDULE

DOOR HARDWARE

08 71 00

PROJECT:



CITY OF TORONTO ACCESSIBILITY UPGRADES

Fire Hall #141

4100 Keele Street, Toronto, Ontario

ARCHITECT:



IBI GROUP

175 Galaxy Blvd, Unit 100

Toronto, Ontario

Prepared By: Alex Bekmansourov

Date: May 13th, 2021

Revised: October 5, 2021



Architectural Hardware Finishes

Steel	Stainless Steel	Brass/Bronze	Aluminum	Painted/Powder Coat	US/CAN#
Clear Anodized / Painted Aluminum					
			628	689	US28
Satin Nickel					
646		619	670		US15
Polished Nickel					
645		618	669		US14
Satin Stainless Steel					
	630				US32D
Polished Stainless Steel					
	629				US32
Satin Chrome					
652		626	702		US26D
Polished Chrome					
651		625	672		US26
Satin Brass					
633		606	667	678	US4
Polished Brass					
632		605	666	677	US5
Satin Bronze					
639		612	668	680	US10
Oil Rubbed Bronze					
640		613	703	695	US10B
Flat Black / Anodized Black					
631		622	671	693	US19

Door Types & Handing

Abbreviations

RH – Right Hand

LH – Left Hand

RHR – Right Hand Reverse

LHR – Left Hand Reverse

RHRA – Right Hand Reverse Active

LHRA – Left Hand Reverse Active

RHA – Right Hand Active

LHA – Left Hand Active

RHRA/LHRA – Right & Left Hand Reverse Active

RHA/LHA – Right & Left Hand Active

DA- Double Acting

DE – Double Egress

SS- Single Slider

BP – Bi-Parting Slider

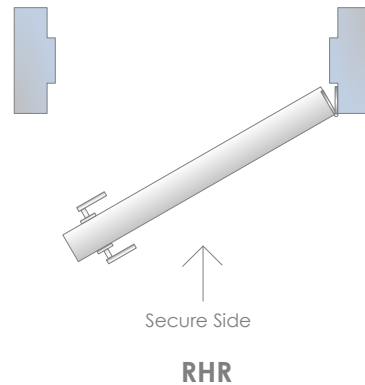
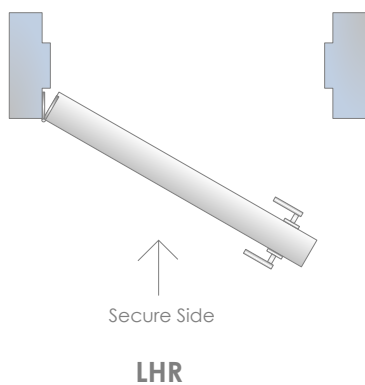
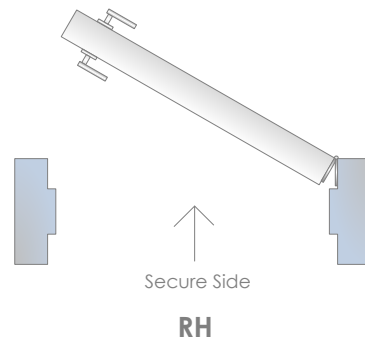
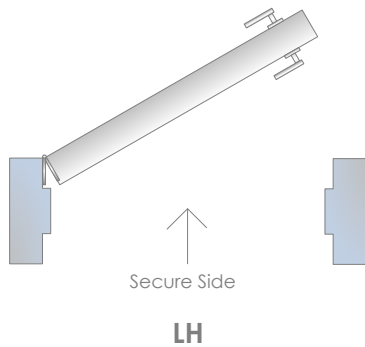
BP – Bi-Passing Slider

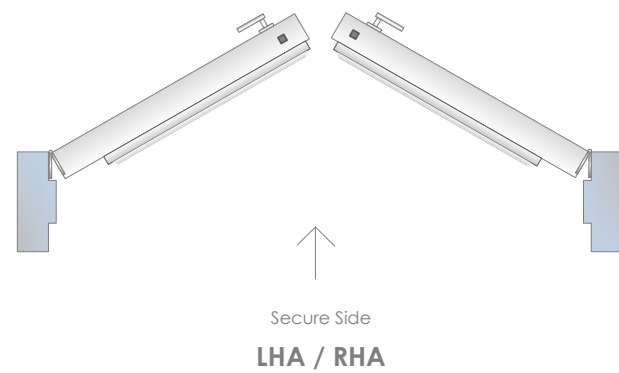
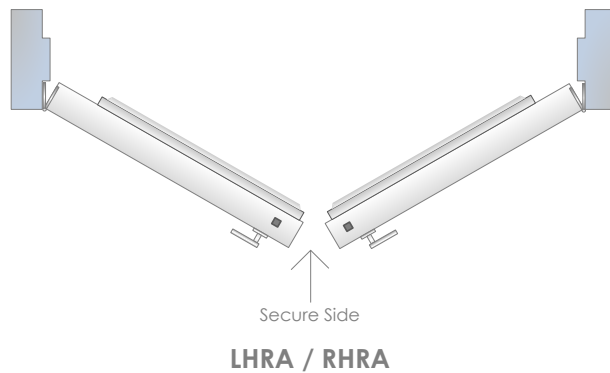
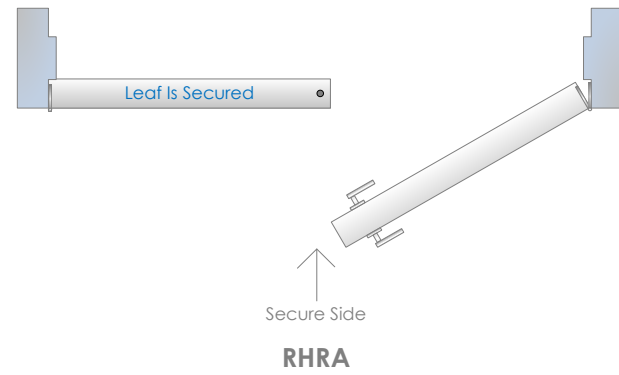
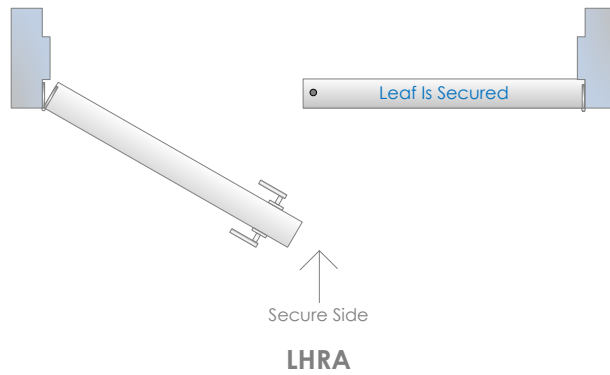
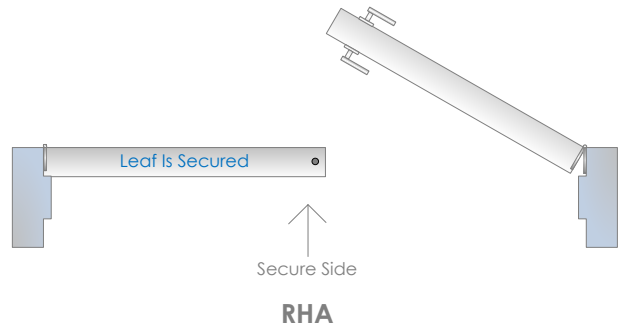
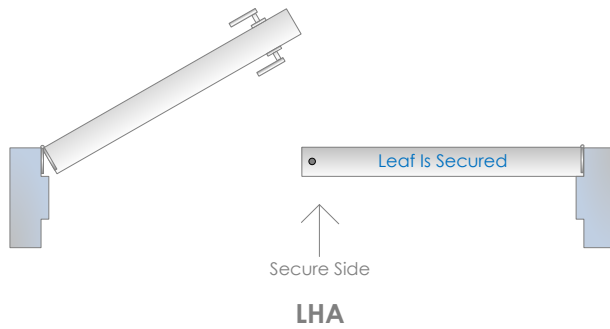
BF – Bi-Folding Slider

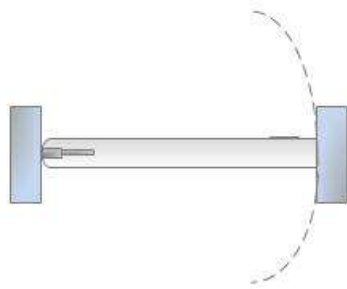
TS – Telescopic Slider

PKT – Pocket Slider

Note: The handing on a swing door is determined by placing yourself on the secure side or keyed side of the door.







DA-DOUBLE
ACTING



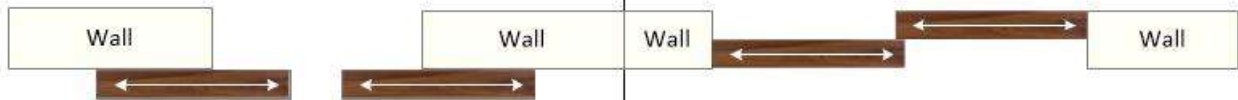
DE-DOUBLE
EGRESS



PKT - POCKET SLIDER



SS - SINGLE SLIDER or
BARN SLIDER



BP - BI-PARTING



BPS - BI-PASSING

Symbols



- Door has a fire rating and all associated hardware must have a fire label to suit. Must comply with local requirements.



- Door is automatic and is equipped with an auto operator. Door must meet local barrier free codes



- Door has an electrical requirement and requires power to be brought to the appropriate location above the door or to the latch, for either security or barrier free applications. Refer to security & electrical drawings for further information.



- Door requires security card access. Refer to security / electrical drawings for further information.

Abbreviations

Door:

HMD = Hollow Metal Door
IHMD = Insulated Hollow Metal Door
ALD = Aluminum Door
SCWD = Solid Core Wood Door
HCWD = Hollow Core Wood Door
FGD = Frameless Glass Door
FRP = Fiberglass Reinforced Plastic Door

Frame:

HMF = Hollow Metal Frame
ALF = Aluminum Frame
Cased Open HMF = Cased Open Hollow Metal Frame
WDF = Wood Frame
Cased Open WDF = Cased Open Wood Frame
Cased Open Drywall = Cased Open Drywall

Fire Ratings:

0 HR – Zero Hour Fire Rating / Smoke Barrier
20 MIN – 20 Minute Fire Rating
¾ HR – 45 Minute Fire rating
1 ½ HR – 90 Minute Fire Rating
2 HR – 120 Minute Fire Rating
3 HR – 180 Minute Fire Rating

Disclaimer

Installation Instructions:

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Weblinks:

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HARDWARE SCHEDULE



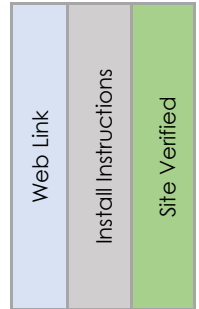
Heading# 1

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	N-105	Location:	Fire-Prevention Offices 106 to B/F Universal WR N-105	Handing:	RH
1	Door#	N-121	Location:	Corridor to to B/F Universal WR N-121	Handing:	RH



By Hardware Supplier

6	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	630	Hager	X			<input type="checkbox"/>
2	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	X			
2	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
4	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
4	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>
2	Floor Stop	GSH 209	626	Gallery	X			<input type="checkbox"/>
2	Smoke / Sound Seal	W-66 x 5500	BLK	KN Crowder	X			<input type="checkbox"/>
2	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #5 – PUSH TO LOCK KIT UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

2	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X			<input type="checkbox"/>
2	Wave to Lock Kit	CX-WC16	630	Camden	X	X		<input type="checkbox"/>
2	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		<input type="checkbox"/>

By Locksmith

2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.

- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



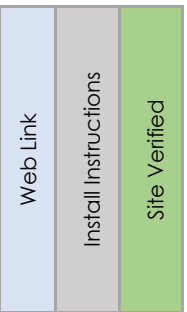
Heading# 2

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1 Total Openings

1	Door#	N-106	Location:	Corridor from Fire-Prevention Offices 106	Handing:	LHR
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By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Passage Latchset	ND10S x RHO x 626	626	Schlage	X			
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Push Side Mount - RH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.



End of Heading

**Heading# 3**

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	ALD	Frame Material:	ALF	Fire Rating	None

2 Total Openings

1	Door#	N-116A	Location:	Exterior from Vestibule N-116	Handing:	RHR
1	Door#	N-124A	Location:	Exterior from Vestibule N-124	Handing:	RHR

Web Link

Install Instructions

Site Verified

By Hardware Supplier

2	Continuous Hinge	112XY x 2108	628	Ives	X	X		<input type="checkbox"/>
2	Exit Device	CD-35A-NL-OP x 388NL x 4'0	626	Von Duprin	X	X		<input type="checkbox"/>
2	Rim Cylinder	80-116	626	Schlage				<input type="checkbox"/>
2	Mortise Cylinder	80-110	626	Schlage	X			<input type="checkbox"/>
2	Electric Strike	6300 x 12/24VCD	630	Von Duprin	X	X		<input type="checkbox"/>
2	Door Pull	GSH 165F x 1830 x #2 MTG	630	Gallery	X			<input type="checkbox"/>
2	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
2	Weatherstrip	By Aluminum Door Supplier	628					<input type="checkbox"/>
2	Door Sweep	By Aluminum Door Supplier	628					<input type="checkbox"/>
2	Threshold	By Aluminum Door Supplier	628					<input type="checkbox"/>

By Automatics Supplier – **PACKAGE #1A – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)**

2	Auto Operator (SNG)	BESAM SW250i – Push Side Mount - LH	628		X			<input type="checkbox"/>
2	Push Button	CM60/4-WT	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-79	630	Camden	X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
2	Logic Relay	CX-33		Camden	X			<input type="checkbox"/>

By Security Supplier

2	Card Reader	To Suit Building System (12V)	BLK					<input type="checkbox"/>
2	Door Contact	To Suit Building System						<input type="checkbox"/>
2	Rex Sensor	To Suit Building System						<input type="checkbox"/>
2	Access Controller	To Suit Building System						<input type="checkbox"/>



2	Power Supply	Located in nearest IT Closet – By Security Provider						
By Locksmith								
4	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

**Heading# 4**

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	ALD	Frame Material:	ALF	Fire Rating	None

2 Total Openings

1	Door#	N-116B	Location:	Vestibule N-116 from Corridor 115	Handing:	RHR
1	Door#	N-124B	Location:	Vestibule N-124 from Corridor	Handing:	RHR

Web Link

Install Instructions

Site Verified

By Hardware Supplier

2	Continuous Hinges	112XY x 2108	628	Ives	X	X		
2	Door Pull Set	GSH 165F x 165F x 1830 x #5MTG (Back to Back)	630	Gallery	X			
2	Overhead Stop	105S	630	Glynn Johnson	X	X		
2	Door Sweep	By Aluminum Door Supplier	628					

By Automatics Supplier – **PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)**

2	Auto Operator (SNG)	BESAM SW100 – Push Side Mount - LH	628		X			
4	Wave Button	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			
4	Surface Mount Box	CM-43CBLA	630	Camden	X			

Notes:



-
- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
 - Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.

-----End of Heading-----

END OF SCHEDULE

DOOR HARDWARE

08 71 00

PROJECT:

**CITY OF TORONTO ACCESSIBILITY UPGRADES**

FIRE/EMS HQ & EMS Station 53
4330 Dufferin St, Toronto, Ontario

ARCHITECT:

**IBI GROUP**

175 Galaxy Blvd, Unit 100
Toronto, Ontario

Prepared By: Alex Bekmansourov

Date: April 30th, 2021Revised: May 20th, 2021Revised: July 6th, 2021Revised: July 22nd, 2021

Revised: October 5, 2021



Architectural Hardware Finishes

Steel	Stainless Steel	Brass/Bronze	Aluminum	Painted/Powder Coat	US/CAN#
Clear Anodized / Painted Aluminum					
			628	689	US28
Satin Nickel					
646		619	670		US15
Polished Nickel					
645		618	669		US14
Satin Stainless Steel					
	630				US32D
Polished Stainless Steel					
	629				US32
Satin Chrome					
652		626	702		US26D
Polished Chrome					
651		625	672		US26
Satin Brass					
633		606	667	678	US4
Polished Brass					
632		605	666	677	US5
Satin Bronze					
639		612	668	680	US10
Oil Rubbed Bronze					
640		613	703	695	US10B
Flat Black / Anodized Black					
631		622	671	693	US19

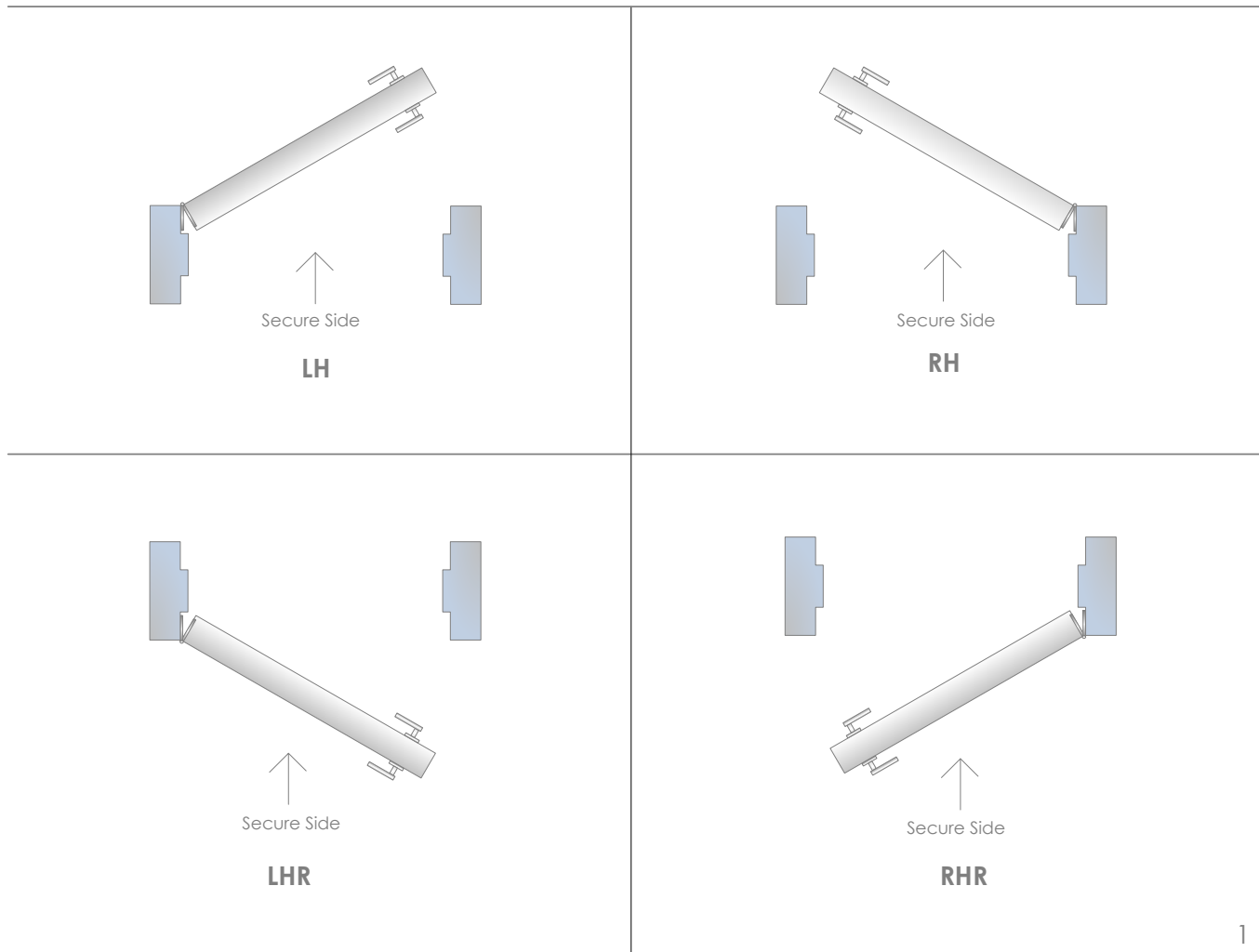


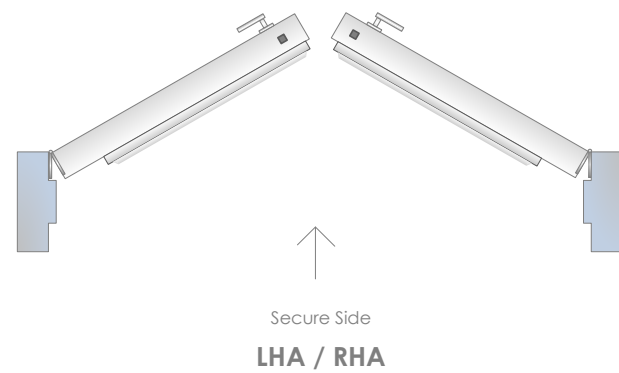
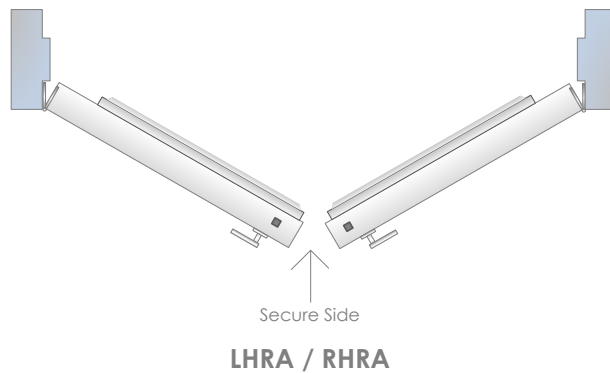
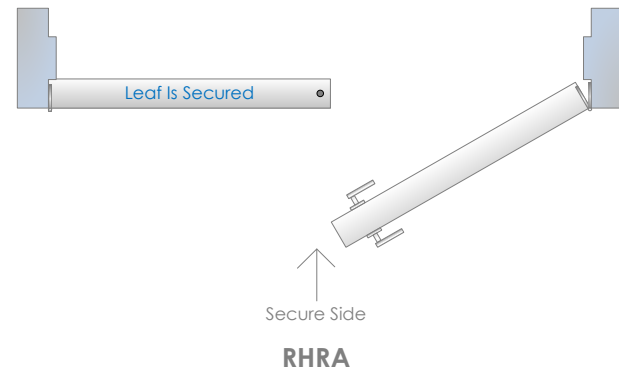
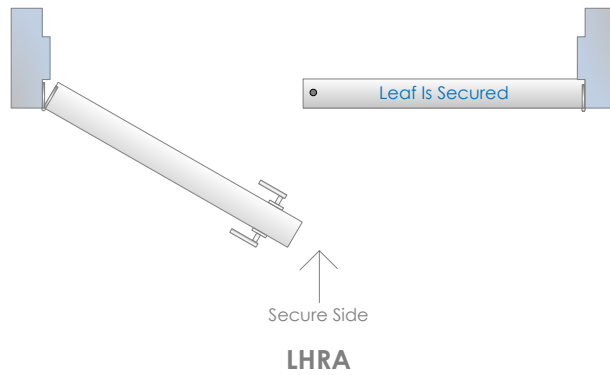
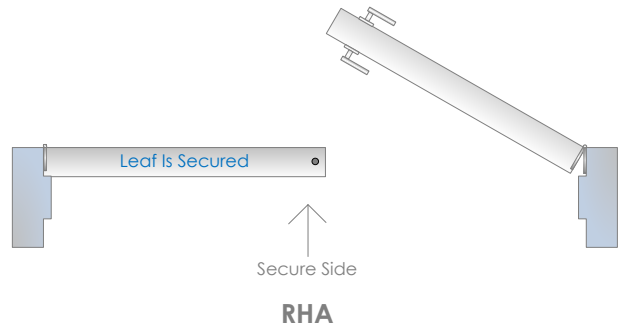
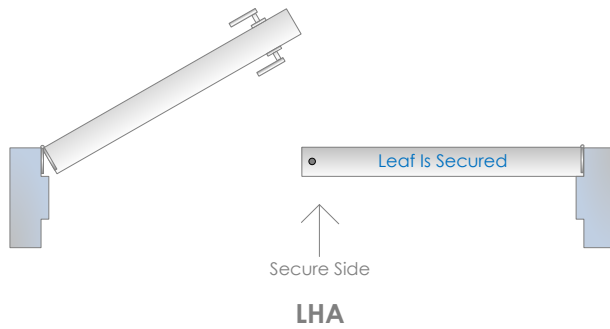
Door Types & Handing

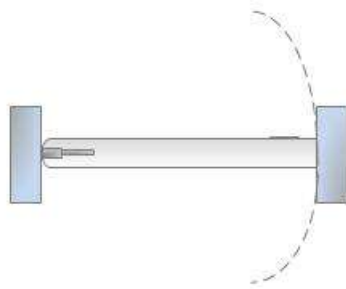
Abbreviations

RH – Right Hand	RHA – Right Hand Active	SS- Single Slider
LH – Left Hand	LHA – Left Hand Active	BP – Bi-Parting Slider
RHR – Right Hand Reverse	RHRA/LHRA – Right & Left Hand Reverse Active	BP – Bi-Passing Slider
LHR – Left Hand Reverse	RHA/LHA – Right & Left Hand Active	BF – Bi-Folding Slider
RHRA – Right Hand Reverse Active	DA- Double Acting	TS – Telescopic Slider
LHRA – Left Hand Reverse Active	DE – Double Egress	PKT – Pocket Slider

Note: The handing on a swing door is determined by placing yourself on the secure side or keyed side of the door.



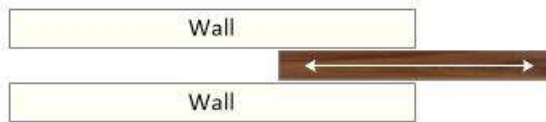




DA-DOUBLE
ACTING



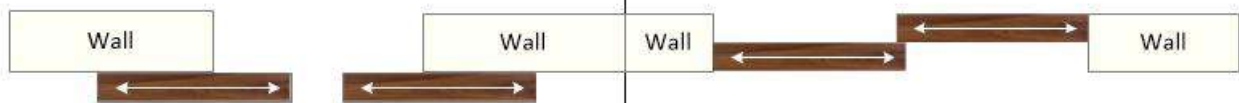
DE-DOUBLE
EGRESS



PKT - POCKET SLIDER



SS - SINGLE SLIDER or
BARN SLIDER



BP - BI-PARTING



BPS - BI-PASSING

Symbols



- Door has a fire rating and all associated hardware must have a fire label to suit. Must comply with local requirements.



- Door is automatic and is equipped with an auto operator. Door must meet local barrier free codes



- Door has an electrical requirement and requires power to be brought to the appropriate location above the door or to the latch, for either security or barrier free applications. Refer to security & electrical drawings for further information.



- Door requires security card access. Refer to security / electrical drawings for further information.

Abbreviations

Door:

HMD = Hollow Metal Door
IHMD = Insulated Hollow Metal Door
ALD = Aluminum Door
SCWD = Solid Core Wood Door
HCWD = Hollow Core Wood Door
FGD = Frameless Glass Door
FRP = Fiberglass Reinforced Plastic Door

Frame:

HMF = Hollow Metal Frame
ALF = Aluminum Frame
Cased Open HMF = Cased Open Hollow Metal Frame
WDF = Wood Frame
Cased Open WDF = Cased Open Wood Frame
Cased Open Drywall = Cased Open Drywall

Fire Ratings:

0 HR – Zero Hour Fire Rating / Smoke Barrier
20 MIN – 20 Minute Fire Rating
¾ HR – 45 Minute Fire rating
1 ½ HR – 90 Minute Fire Rating
2 HR – 120 Minute Fire Rating
3 HR – 180 Minute Fire Rating

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HARDWARE SCHEDULE



Heading# 1

Opening Information				
Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating: None
Door Material:	HMD	Frame Material:	HMF	Fire Rating: 3/4 HR

1 Total Openings					Web Link	Install Instructions	Site Verified
1	Door#	N-000	Location:	Stair 2/B 002 from Corridor	Handing:	LHR	

By Hardware Supplier									
3	Heavy Weight Hinge	BB1168 – 4 1/2" x 4"	652	Hager	X				<input type="checkbox"/>
1	Exit Device	98L-BE-F x 996L-BE-R/V x 03 x 626/630 x 4'0	630	Von Duprin	X	X			<input type="checkbox"/>
1	Electric Strike	6300 x 12/24VCD	630	Von Duprin	X	X			<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X			<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X				<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X				<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X			<input type="checkbox"/>
By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)									
1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X				<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X				<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X				<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.

-----End of Heading-----



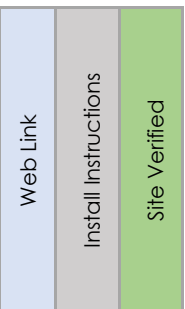
Heading# 2

Opening Information

Opening Type:	Pair	Opening Size:	2-1067 x 2135 x 45	STC Rating	None
Door Material:	ALD	Frame Material:	ALF	Fire Rating	None

1 Total Openings

1	Door#	N-102B	Location:	Exterior from Stair 3/C 103 Vestibule	Handing:	RHRA
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By Hardware Supplier

2	Continuous Hinges	112XY x 2108	628	Ives	X	X	<input type="checkbox"/>
1	Exit Device	CD-LBR-3547A-NL-OP x 388NL x 4'0 x RHR	626	Von Duprin	X	X	<input type="checkbox"/>
1	Exit Device	CD-LBR-3547A-EO x 4'0 x LHR	626	Von Duprin	X	X	<input type="checkbox"/>
1	Rim Cylinder	80-116	626	Schlage			<input type="checkbox"/>
2	Mortise Cylinder	80-110	626	Schlage	X		<input type="checkbox"/>
2	Door Pull	GSH 165F x 1830 x #2 MTG	630	Gallery	X		<input type="checkbox"/>
2	Overhead Stop	105S	630	Glynn Johnson	X	X	<input type="checkbox"/>
1	Weatherstrip	By Aluminum Door Supplier	628				<input type="checkbox"/>
2	Door Sweep	By Aluminum Door Supplier	628				<input type="checkbox"/>
1	Threshold	By Aluminum Door Supplier	628				<input type="checkbox"/>

By Automatics Supplier – PACKAGE #1A – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW250i – Push Side Mount - LH	628		X		<input type="checkbox"/>
1	Push Button	CM60/4-WT	630	Camden	X		<input type="checkbox"/>
1	Surface Mount Box	CM-79	630	Camden	X		<input type="checkbox"/>
1	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X		<input type="checkbox"/>
1	Surface Mount Box	CM-43CBLA	630	Camden	X		<input type="checkbox"/>
1	Logic Relay	CX-33		Camden	X		<input type="checkbox"/>

By Security Supplier

2	Door Contact	To Suit Building System					<input type="checkbox"/>
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By Locksmith

3	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Exit Devices to be Manually Dogged Down during day hours for free Public entry, During Lockdown Hours operators are to be turned off and exit devices Un-Dogged. (Only Manual Key Entry Allowed)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 3

Opening Information

Opening Type:	Pair	Opening Size:	Existing	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	NE-102A	Location:	Stair 3/C 103 Vestibule from Corridor	Handing:	LHRA/RHRA
1	Door#	NE-B106A	Location:	EMS CACC to Kitchen/Lunch Room B106A	Handing:	LHA/RHA

Web Link

Install Instructions

Site Verified

By Hardware Supplier

EXISTING HARDWARE TO REMAIN.

By Automatics Supplier – PACKAGE #1C – PUSHBUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

2	Auto Operator (PAIR)	BESAM SW250i – Double Door - Push Side Mount – RH/LH	628		X				<input type="checkbox"/>
4	Wave Button	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X				<input type="checkbox"/>
4	Surface Mount Box	CM-43CBLA	630	Camden	X				<input type="checkbox"/>

*BALANCE OF EXISTING HARDWARE TO REMAIN.

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.



- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.

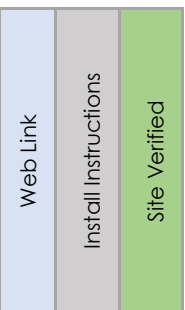
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**Heading# 4A****Opening Information**

Opening Type:	Single	Opening Size:	965 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1 **Door#** N-B100.1 **Location:** Lobby B100 from Reception/Security **Handing:** LHR

**By Hardware Supplier**

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC x 06B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Closer	4111-RH (LCN / ST 2779)	689	LCN	X	X		<input type="checkbox"/>
1	Overhead Stop	104S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 965	MIL	Pemko	X	X		<input type="checkbox"/>

By Security Supplier

1	Card Reader/Keypad	To Suit Building System (12V)	BLK					<input type="checkbox"/>
1	Door Contact	To Suit Building System						<input type="checkbox"/>
1	Rex Sensor	To Suit Building System						<input type="checkbox"/>
1	Access Controller	To Suit Building System						<input type="checkbox"/>
1	Power Supply	Located in nearest IT Closet – By Security Provider						<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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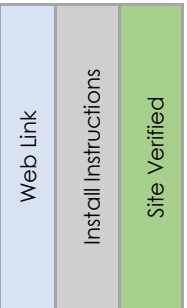
Heading# 4B

Opening Information

Opening Type:	Single	Opening Size:	965 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1 Door# N-B100.2 Location: Lobby B100 from Reception/Security Handing: RHR



By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC x 06B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Closer	4111-LH (LCN / ST 2779)	689	LCN	X	X		<input type="checkbox"/>
1	Overhead Stop	104S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 965	MIL	Pemko	X	X		<input type="checkbox"/>

By Security Supplier

1	Door Contact	To Suit Building System						<input type="checkbox"/>
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By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- Refer to STC rating of the wall in Architectural layout G1002
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider



- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 5

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1 **Door#** N-B100B **Location:** Corridor B108 to B/F Universal WR N-B100B **Handing:** LH

Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	630	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
2	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>
1	Floor Stop	GSH 209	626	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5500	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – **PACKAGE #5 – PUSH TO LOCK KIT UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)**

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X			<input type="checkbox"/>
1	Wave to Lock Kit	CX-WC16	630	Camden	X	X		<input type="checkbox"/>
1	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Refer to STC rating of the wall in Architectural layout G1002



- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

**Heading# 6**

Opening Information

Opening Type:	Single	Opening Size:	915 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1 **Door#** N-B100C **Location:** Corridor to Mail Room B108C **Handing:** RH

Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC x 06B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Closer	4011-LH	689	LCN	X	X		<input type="checkbox"/>
1	Floor Stop	GSH 209	626	Gallery	X			<input type="checkbox"/>
2	Kickplate	GSH 80A – 203 x 876 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 915	MIL	Pemko	X	X		<input type="checkbox"/>

By Security Supplier

1	Card Reader/Keypad	To Suit Building System (12V)	BLK					<input type="checkbox"/>
1	Door Contact	To Suit Building System						<input type="checkbox"/>
1	Rex Sensor	To Suit Building System						<input type="checkbox"/>
1	Access Controller	To Suit Building System						<input type="checkbox"/>
1	Power Supply	Located in nearest IT Closet – By Security Provider						<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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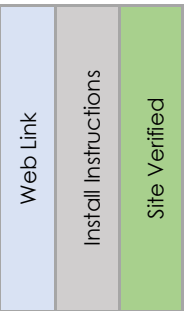
Heading# 7

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1 **Door#** N-B102 **Location:** Corridor from EMS Office Corridor **Handing:** RHR



By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Push Side Mount - LH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
1	Logic Relay	CX-33		Camden	X			<input type="checkbox"/>

By Security Supplier



1	Card Reader/Keypad	To Suit Building System (12V)	BLK						
1	Door Contact	To Suit Building System							
1	Rex Sensor	To Suit Building System							
1	Access Controller	To Suit Building System							
1	Power Supply	Located in nearest IT Closet – By Security Provider							
By Locksmith									
1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

Heading# 8

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

6 Total Openings

1	Door#	N-B102C	Location:	EMS Office Corridor to EMS Office B102C	Handing:	LH
1	Door#	N-C211	Location:	Corridor to Office C211	Handing:	RH
1	Door#	N-C238C	Location:	Open Office C238E to Office C238C	Handing:	RH
1	Door#	N-C238J	Location:	Open Office C238I to Office C238J	Handing:	LH
1	Door#	N-C238T	Location:	Open Office C238R to Office C238T	Handing:	RH
1	Door#	N-C239B	Location:	Human Resources C239A to HR Office C239B	Handing:	RH

Web Link	Install Instructions	Site Verified
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By Hardware Supplier

18	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X				
6	Office Lockset	L9050BDC x 03B x 630	630	Schlage	X	X			
12	Coat Hook	GSH 390	626	Gallery	X				



6	Floor Stop	GSH 209	626	Gallery	X			<input type="checkbox"/>
6	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
6	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>
By Locksmith								
6	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>

Notes:

- Refer to STC rating of the wall in Architectural layout G1002
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 9

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-C239G	Location:	Corridor C239 to B/F Universal WR C239G	Handing:	RH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	630	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
2	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>
1	Floor Stop	GSH 209	626	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5500	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #5 – PUSH TO LOCK KIT UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X			<input type="checkbox"/>
1	Wave to Lock Kit	CX-WC16	630	Camden	X	X		<input type="checkbox"/>
1	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		<input type="checkbox"/>



By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operator on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

End of Heading



Heading# 10

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-B102K	Location:	EMS Office Corridor to EMS Office B102C	Handing:	RH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 1/2" x 4"	652	Hager	X				<input type="checkbox"/>
1	Classroom Lockset	L9070BDC x 03B x 630	630	Schlage	X	X			<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X			<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X				<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X			<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount	628		X				<input type="checkbox"/>
4	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X				<input type="checkbox"/>



4	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
By Locksmith								
1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.

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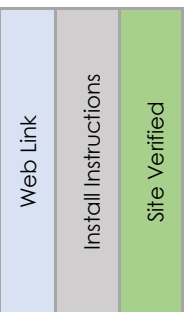
Heading# 11

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

2 Total Openings

1	Door#	N-B103.1	Location:	Corridor B103 from EMS Office Corridor	Handing:	LHR
1	Door#	N-B103.2	Location:	Corridor B103 from Corridor B104	Handing:	RHR



By Hardware Supplier

6	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			<input type="checkbox"/>
2	Exit Device	98L-NL-F x 996L-NL-R/V x 03 x 626/630 - 4'0	630	Von Duprin	X	X		<input type="checkbox"/>
2	Rim Cylinder Housing	80-116	626	Schlage	X			<input type="checkbox"/>
2	Electric Strike	6300 x 12/24VCD	630	Von Duprin	X	X		<input type="checkbox"/>
1	Closer	4111-RH (LCN / ST 2779)	689	LCN	X	X		<input type="checkbox"/>
1	Closer	4111-LH (LCN / ST 2779)	689	LCN	X	X		<input type="checkbox"/>
2	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
2	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
2	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>



By Security Supplier							
2	Card Reader	To Suit Building System (12V)	BLK				<input type="checkbox"/>
2	Door Contact	To Suit Building System					<input type="checkbox"/>
2	Rex Sensor	To Suit Building System					<input type="checkbox"/>
2	Access Controller	To Suit Building System					<input type="checkbox"/>
2	Power Supply	Located in nearest IT Closet – By Security Provider					<input type="checkbox"/>
By Locksmith							
2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco			<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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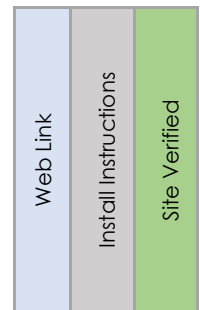
Heading# 12

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

6 Total Openings

1	Door#	N-B103B	Location:	Corridor B103 to Female W/C B103B	Handing:	LH
1	Door#	N-B103C	Location:	Corridor B103 to Male W/C B103C	Handing:	RH
1	Door#	N-B108D	Location:	Corridor to Female W/C B108D	Handing:	RH
1	Door#	N-B108E	Location:	Corridor to Male W/C B108E	Handing:	RH
1	Door#	N-C208	Location:	Corridor to Male W/C C208	Handing:	RH
1	Door#	N-C210	Location:	Corridor to Female W/C C210	Handing:	LH



By Hardware Supplier							
18	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	630	Hager	<input checked="" type="checkbox"/>		<input type="checkbox"/>
6	Door Pull Set	GSH 167F x 167F x 610 x #5MTG (Back to Back)	630	Gallery	<input checked="" type="checkbox"/>		<input type="checkbox"/>
12	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	<input checked="" type="checkbox"/>		<input type="checkbox"/>
6	Overhead Stop	105S	630	Glynn Johnson	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>



6	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
6	Door Sweep	W-13S x 1067	CA	KN Crowder	X			<input type="checkbox"/>
By Automatics Supplier – PACKAGE #4 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)								
2	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - LH	628		X			<input type="checkbox"/>
4	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X			<input type="checkbox"/>
12	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
12	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
6	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- During installation, centreline of Door Pulls must be at 46-1/2" AFF.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.

-----End of Heading-----



Heading# 13

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

3 Total Openings

1	Door#	N-B104	Location:	Corridor from Corridor B104	Handing:	LHR
1	Door#	N-B105B	Location:	Corridor B104 to Corridor	Handing:	LH
1	Door#	N-B111A	Location:	Corridor B108 from Corridor B111A	Handing:	LHR

Web Link

Install Instructions

Site Verified

By Hardware Supplier

9	Heavy Weight Hinge	BB1168 – 4 1/2" x 4" NRP	652	Hager	X			<input type="checkbox"/>
3	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
3	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>

3	Overhead Stop	105S	630	Glynn Johnson	X	X			
6	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X				
3	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X				
3	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X			
By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)									
1	Auto Operator (SNG)	BESAM SW100 – Push Side Mount – RH (N-B111A)	628		X				
1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount – LH (N-B105B)	628		X				
1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount – RH (N-B104)	628		X				
6	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X				
6	Surface Mount Box	CM-43CBLA	630	Camden	X				
3	Logic Relay	CX-33		Camden	X				
By Security Supplier									
3	Card Reader/Keypad	To Suit Building System (12V)	BLK						
3	Door Contact	To Suit Building System							
3	Rex Sensor	To Suit Building System							
3	Access Controller	To Suit Building System							
3	Power Supply	Located in nearest IT Closet – By Security Provider							
By Locksmith									
3	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 14

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1 **Door#** N-B105C **Location:** EMS CACC B105 to EMS Office B105C **Handing:** RH

Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Closer	4011-RH (LCN/ST 1544)	689	LCN	X	X		<input type="checkbox"/>
1	Drop Plate	4020-18	689	LCN				<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Security Supplier

1	Card Reader/Keypad	To Suit Building System (12V)	BLK					<input type="checkbox"/>
1	Door Contact	To Suit Building System						<input type="checkbox"/>
1	Rex Sensor	To Suit Building System						<input type="checkbox"/>
1	Access Controller	To Suit Building System						<input type="checkbox"/>
1	Power Supply	Located in nearest IT Closet – By Security Provider						<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002

- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



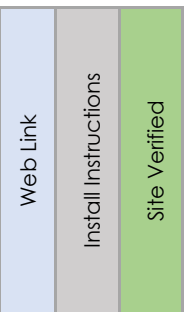
Heading# 15

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	1 1/2 HR

1 Total Openings

1 **Door#** N-B107A **Location:** Corridor to Corridor B107 **Handing:** LH



By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 1/2" x 4"	652	Hager	X			<input type="checkbox"/>
1	Classroom Lockset	L9070BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – **PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)**

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - LH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Option to have Operators manually turned off and closed during non working hours using classroom function of lockset.
- Refer to STC rating of the wall in Architectural layout G1002



- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 16

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	1 1/2 HR

1 Total Openings

1 **Door#** N-B107B **Location:** Corridor B107 from Corridor **Handing:** LHR

Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			<input type="checkbox"/>
1	Exit Device	98L-NL-F x 996L-NL-R/V x 03 x 626/630 - 4'0	630	Von Duprin	X	X		<input type="checkbox"/>
1	Rim Cylinder Housing	80-116	626	Schlage	X			<input type="checkbox"/>
1	Electric Strike	6300 x 12/24VCD	630	Von Duprin	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

2	Auto Operator (SNG)	BESAM SW100 – Push Side Mount - RH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
1	Logic Relay	CX-33		Camden	X			<input type="checkbox"/>

By Security Supplier

1	Card Reader	To Suit Building System (12V)	BLK					<input type="checkbox"/>
1	Door Contact	To Suit Building System						<input type="checkbox"/>
1	Rex Sensor	To Suit Building System						<input type="checkbox"/>



1	Access Controller	To Suit Building System						
1	Power Supply	Located in nearest IT Closet – By Security Provider						
By Locksmith								
1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 17

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	N-B109	Location:	Corridor B108 to Open Office B109E	Handing:	RH
1	Door#	N-B111D	Location:	Corridor B111B from Meeting Room B111D	Handing:	RHR

Web Link

Install Instructions

Site Verified

By Hardware Supplier

6	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			
2	Classroom Lockset	L9070BDC x 03B x 630	630	Schlage	X	X		
2	Electric Strike	1500C	630	HES	X	X		
2	Overhead Stop	105S	630	Glynn Johnson	X	X		
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			



2	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
2	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>
By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)								
1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount – RH (N-B109)	628		X			<input type="checkbox"/>
1	Auto Operator (SNG)	BESAM SW100 – Push Side Mount – LH (N-B111D)	628		X			<input type="checkbox"/>
4	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
4	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
By Locksmith								
2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Option to have Operators manually turned off and room closed during non working hours using classroom function of lockset.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

.....End of Heading.....



Heading# 18

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

3 Total Openings

1	Door#	N-B111B	Location:	Corridor B111A from Corridor B111B	Handing:	RHR
1	Door#	N-B113	Location:	Corridor to Open Office B113	Handing:	RH
1	Door#	N-B114B	Location:	Corridor B112 to Fire Services B114	Handing:	RH

Web Link

Install Instructions

Site Verified

By Hardware Supplier

9	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			<input type="checkbox"/>
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3	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	X	X			
3	Electric Strike	1500C	630	HES	X	X			
3	Overhead Stop	105S	630	Glynn Johnson	X	X			
6	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X				
3	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X				
3	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X			
By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)									
1	Auto Operator (SNG)	BESAM SW100 – Push Side Mount – LH (N-B111B)	628		X				
2	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount – RH (N-B113, N-B114B)	628		X				
6	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X				
6	Surface Mount Box	CM-43CBLA	630	Camden	X				
3	Logic Relay	CX-33		Camden	X				
By Security Supplier									
3	Card Reader/Keypad	To Suit Building System (12V)	BLK						
3	Door Contact	To Suit Building System							
3	Rex Sensor	To Suit Building System							
3	Access Controller	To Suit Building System							
3	Power Supply	Located in nearest IT Closet – By Security Provider							
By Locksmith									
3	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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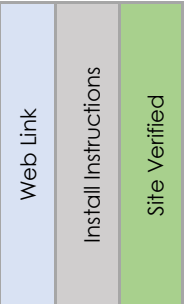
Heading# 19

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-B112	Location:	Corridor B108 to Corridor	Handing:	RH
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By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			<input type="checkbox"/>
1	Classroom Lockset	L9070BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount – RH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Option to have Operators manually turned off and room closed during non working hours using classroom function of lockset.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.



- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

Heading# 20**Opening Information**

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1 **Door#** N-B113B **Location:** Open Office B113 to Office B113B **Handing:** RH

Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Office Lockset	L9050BDC x 06B x 630	630	Schlage	X	X		<input type="checkbox"/>
2	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>
1	Floor Stop	GSH 209	626	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- Refer to STC rating of the wall in Architectural layout G1002
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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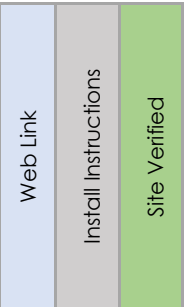
Heading# 21

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-B114A	Location:	Open Office B113 to Fire Services B114	Handing:	LH
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By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 1/2" x 4"	652	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Closer	4011-LH (LCN/ST 1544)	689	LCN	X	X		<input type="checkbox"/>
1	Drop Plate	4020-18	689	LCN				<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Security Supplier

1	Card Reader/Keypad	To Suit Building System (12V)	BLK					<input type="checkbox"/>
1	Door Contact	To Suit Building System						<input type="checkbox"/>
1	Rex Sensor	To Suit Building System						<input type="checkbox"/>
1	Access Controller	To Suit Building System						<input type="checkbox"/>
1	Power Supply	Located in nearest IT Closet – By Security Provider						<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002



- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

**Heading# 22**

Opening Information

Opening Type:	Single	Opening Size:	Existing	STC Rating	None
Door Material:	Existing	Frame Material:	Existing	Fire Rating	None

1 Total Openings

1	Door#	NE-B112C	Location:	Corridor B112 to Fire Services B112C	Handing:	LH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

1	Electric Strike	1500C	630	HES	X	X	<input type="checkbox"/>
By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)							
1	Auto Operator (SNG)	BESAM SW100 - Pull Side Mount – LH	628		X		<input type="checkbox"/>
2	Wave Button	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X		<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X		<input type="checkbox"/>

***BALANCE OF EXISTING HARDWARE TO REMAIN.**

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Existing Frame Must Be Site Modified for New Electric Strike.
- Operator Must be Manually Turned Off prior to locking room.

-----End of Heading-----



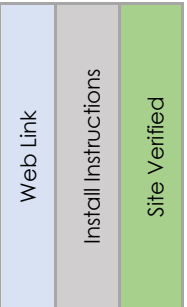
Heading# 23

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	1 1/2 HR

1 Total Openings

1	Door#	N-C200	Location:	Corridor C200 from Corridor	Handing:	RHR
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By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 1/2" x 4" NRP	652	Hager	X			<input type="checkbox"/>
1	Exit Device	98L-NL-F x 996L-NL-R/V x 03 x 626/630 - 4'0	630	Von Duprin	X	X		<input type="checkbox"/>
1	Rim Cylinder Housing	80-116	626	Schlage	X			<input type="checkbox"/>
1	Electric Strike	6300 x 12/24VCD	630	Von Duprin	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

2	Auto Operator (SNG)	BESAM SW100 – Push Side Mount - LH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
1	Logic Relay	CX-33		Camden	X			<input type="checkbox"/>

By Security Supplier

1	Card Reader	To Suit Building System (12V)	BLK					<input type="checkbox"/>
1	Door Contact	To Suit Building System						<input type="checkbox"/>
1	Rex Sensor	To Suit Building System						<input type="checkbox"/>
1	Access Controller	To Suit Building System						<input type="checkbox"/>
1	Power Supply	Located in nearest IT Closet – By Security Provider						<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 24

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1 **Door#** N-C207 **Location:** Corridor to Kitchen C207 **Handing:** RH

Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Passage Set	L9010 x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Overhead Stop	105F (With Hold Open)	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.

-----End of Heading-----



Heading# 25

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1 Total Openings

1	Door#	N-C231C	Location:	Open Office C231to Meeting Room/Waiting Area C231C	Handing:	LH
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Web Link	Install Instructions	Site Verified
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By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			<input type="checkbox"/>
1	Classroom Lockset	L9070BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount – LH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Option to have Operators manually turned off and room closed during non working hours using classroom function of lockset.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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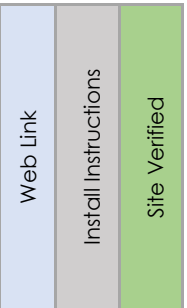
Heading# 26

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	N-C231D	Location:	Open Office C231 to Meeting Room C231D	Handing:	LH
1	Door#	N-C231K	Location:	Open Office C231 to Served C231K	Handing:	LH



By Hardware Supplier

6	Heavy Weight Hinge	BB1168 - 4 1/2" x 4"	652	Hager	X			<input type="checkbox"/>
2	Classroom Lockset	L9070BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
2	Closer	4011-LH (LCN/ST 1544)	689	LCN	X	X		<input type="checkbox"/>
2	Drop Plate	4020-18	689	LCN				<input type="checkbox"/>
2	Overhead Stop	105F (With Hold Open)	630	Glynn Johnson	X	X		<input type="checkbox"/>
2	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
2	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Locksmith

2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- Refer to STC rating of the wall in Architectural layout G1002
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.



End of Heading



Heading# 27

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	N-C232	Location:	Corridor C237 to Open Office C232	Handing:	RH
1	Door#	N-C235	Location:	Corridor to Corridor	Handing:	LH

Web Link

Install Instructions

Site Verified

By Hardware Supplier

6	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
2	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
2	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
2	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
4	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
2	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
2	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Push Side Mount – RH	628		X			<input type="checkbox"/>
1	Auto Operator (SNG)	BESAM SW100 – Push Side Mount – LH	628		X			<input type="checkbox"/>
4	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
4	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
2	Logic Relay	CX-33		Camden	X			<input type="checkbox"/>

By Security Supplier

2	Card Reader/Keypad	To Suit Building System (12V)	BLK					<input type="checkbox"/>
2	Door Contact	To Suit Building System						<input type="checkbox"/>
2	Rex Sensor	To Suit Building System						<input type="checkbox"/>
2	Access Controller	To Suit Building System						<input type="checkbox"/>
2	Power Supply	Located in nearest IT Closet – By Security Provider						<input type="checkbox"/>

By Locksmith

2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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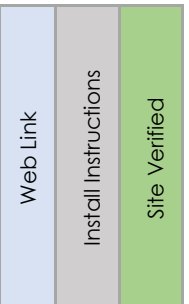
Heading# 28

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1 **Door#** N-C234 **Location:** Corridor to EMS Planning C234 **Handing:** LH



By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Closer	4011-LH (LCN/ST 1544)	689	LCN	X	X		<input type="checkbox"/>
1	Drop Plate	4020-18	689	LCN				<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Security Supplier



1	Card Reader/Keypad	To Suit Building System (12V)	BLK						<input type="checkbox"/>
1	Door Contact	To Suit Building System							<input type="checkbox"/>
1	Rex Sensor	To Suit Building System							<input type="checkbox"/>
1	Access Controller	To Suit Building System							<input type="checkbox"/>
1	Power Supply	Located in nearest IT Closet – By Security Provider							<input type="checkbox"/>
By Locksmith									
1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					<input type="checkbox"/>

Notes:

- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.
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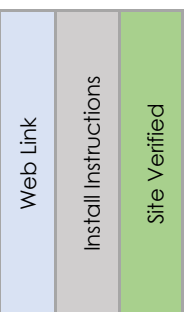
Heading# 29

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-C237	Location:	Corridor to Corridor C238	Handing:	RH
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By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 1/2" x 4"	652	Hager	X				<input type="checkbox"/>
1	Passage Set	L9010 x 03B x 630	630	Schlage	X	X			<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X			<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X			<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X				<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X				<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X			<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)



1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.

-----End of Heading-----



Heading# 30

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1 **Door#** N-C237B **Location:** Corridor C238 to Meeting Room C237b **Handing:** RH

Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 1/2" x 4"	630	Hager	X			<input type="checkbox"/>
1	Deadbolt	L460BDC x 1-3/4 x 09-509 x L583-363	626	Schlage	X	X		<input type="checkbox"/>
1	Door Pull Set	GSH 1675 x 165F x 914 x #5MTG (Back to Back)	630	Gallery	X			<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
1	Overhead Stop	105F (With Hold Open)	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #4 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

2	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - LH	628		X			<input type="checkbox"/>
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4	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
4	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
2	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		<input type="checkbox"/>
By Locksmith								
2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Option to Manually Turn-Off Auto Operators and have Rooms locked during non-work hours using Deadbolt.
- Operators must be turned off during Hold Open function of Overhead Stop.
- During installation, Deadbolt to be mounted at 48" AFF.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 31A

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	N-C238E	Location:	Corridor C238 to Open Office C238E	Handing:	RH
1	Door#	N-C238I	Location:	Corridor C238 to Open Office C238I	Handing:	LH

Web Link
Install Instructions
Site Verified

By Hardware Supplier

6	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			<input type="checkbox"/>
2	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
2	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>



1	Closer	4011-LH (LCN/ST 1544)	689	LCN	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Closer	4011-RH (LCN/ST 1544)	689	LCN	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Drop Plate	4020-18	689	LCN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Overhead Stop	105S	630	Glynn Johnson	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Auto Door Bottom	434APKL x 1067	MIL	Pemko	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
By Security Supplier								
2	Card Reader/Keypad	To Suit Building System (12V)	BLK		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Door Contact	To Suit Building System			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Rex Sensor	To Suit Building System			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Access Controller	To Suit Building System			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Power Supply	Located in nearest IT Closet – By Security Provider			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
By Locksmith								
2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Notes:

- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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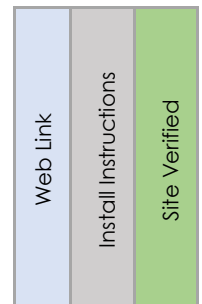
**Heading# 31B**

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	N-C238Q	Location:	Corridor C238 to Office C238Q	Handing:	RH
1	Door#	N-C238R	Location:	Corridor C238 to Office C238R	Handing:	LH



By Hardware Supplier									
6	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X				<input type="checkbox"/>
2	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	X	X			<input type="checkbox"/>
2	Electric Strike	1500C	630	HES	X	X			<input type="checkbox"/>
2	Overhead Stop	105S	630	Glynn Johnson	X	X			<input type="checkbox"/>
4	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X				<input type="checkbox"/>
2	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X				<input type="checkbox"/>
2	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X			<input type="checkbox"/>
By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)									
1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount – LH	628		X				<input type="checkbox"/>
1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount – RH	628		X				<input type="checkbox"/>
4	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X				<input type="checkbox"/>
4	Surface Mount Box	CM-43CBLA	630	Camden	X				<input type="checkbox"/>
2	Logic Relay	CX-33		Camden	X				<input type="checkbox"/>
By Security Supplier									
2	Card Reader/Keypad	To Suit Building System (12V)	BLK						<input type="checkbox"/>
2	Door Contact	To Suit Building System							<input type="checkbox"/>
2	Rex Sensor	To Suit Building System							<input type="checkbox"/>
2	Access Controller	To Suit Building System							<input type="checkbox"/>
2	Power Supply	Located in nearest IT Closet – By Security Provider							<input type="checkbox"/>
By Locksmith									
2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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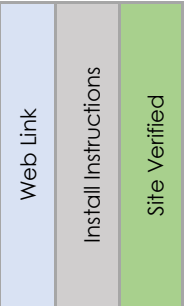

Heading# 32

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-C239	Location:	Corridor C239 from Human Resources C239A	Handing:	RHR
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By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Push Side Mount – LH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
1	Logic Relay	CX-33		Camden	X			<input type="checkbox"/>

By Security Supplier

1	Card Reader/Keypad	To Suit Building System (12V)	BLK					<input type="checkbox"/>
1	Door Contact	To Suit Building System						<input type="checkbox"/>
1	Rex Sensor	To Suit Building System						<input type="checkbox"/>
1	Access Controller	To Suit Building System						<input type="checkbox"/>
1	Power Supply	Located in nearest IT Closet – By Security Provider						<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 33

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1 **Door#** N-C240 **Location:** Corridor C240 from Corridor C239 **Handing:** RHR

Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

2	Auto Operator (SNG)	BESAM SW100 – Push Side Mount - LH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
1	Logic Relay	CX-33		Camden	X			<input type="checkbox"/>



By Security Supplier							
1	Card Reader	To Suit Building System (12V)	BLK				<input type="checkbox"/>
1	Door Contact	To Suit Building System					<input type="checkbox"/>
1	Rex Sensor	To Suit Building System					<input type="checkbox"/>
1	Access Controller	To Suit Building System					<input type="checkbox"/>
1	Power Supply	Located in nearest IT Closet – By Security Provider					<input type="checkbox"/>
By Locksmith							
1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco			<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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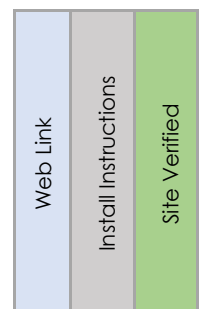
**Heading# 34**

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	N-C240A	Location:	Corridor C240 to Male Change Room C240A	Handing:	RH
1	Door#	N-C240G	Location:	Corridor from Female Change Room C240G	Handing:	RHR



By Hardware Supplier							
6	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	630	Hager	<input checked="" type="checkbox"/>		<input type="checkbox"/>
2	Door Pull Set	GSH 167F x 167F x 610 x #5MTG (Back to Back)	630	Gallery	<input checked="" type="checkbox"/>		<input type="checkbox"/>



2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
2	Overhead Stop	105F (With Hold Open)	630	Glynn Johnson	X	X		<input type="checkbox"/>
2	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
2	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>
By Automatics Supplier – PACKAGE #4 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)								
1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X			<input type="checkbox"/>
1	Auto Operator (SNG)	BESAM SW100 – Push Side Mount - LH	628		X			<input type="checkbox"/>
4	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
4	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
2	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Operators must be turned off during Hold Open function of Overhead Stop.
- During installation, centreline of Door Pulls must Be at 46-1/2" AFF.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.

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Heading# 35

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-C240C1	Location:	Corridor C240 to TPS Call Centre C240C	Handing:	LH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 1/2" x 4"	652	Hager	X		<input type="checkbox"/>
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1	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Closer	4011-LH (LCN/ST 1544)	689	LCN	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Drop Plate	4020-18	689	LCN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
By Security Supplier								
1	Card Reader/Keypad	To Suit Building System (12V)	BLK		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Door Contact	To Suit Building System			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Rex Sensor	To Suit Building System			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Access Controller	To Suit Building System			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Power Supply	Located in nearest IT Closet – By Security Provider			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
By Locksmith								
1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Notes:

- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.
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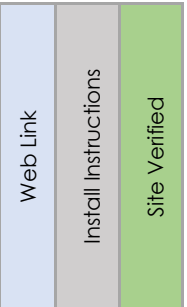
Heading# 36

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-C240C2	Location:	Corridor C240 to TPS Call Centre C240C	Handing:	LH
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By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Keypad Lockset	LL1021-B-26D-41	626	Dormakaba	X			<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Closer	4011-LH (LCN/ST 1544)	689	LCN	X	X		<input type="checkbox"/>
1	Drop Plate	4020-18	689	LCN				<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Security Supplier

1	Card Reader/Keypad	To Suit Building System (12V)	BLK					<input type="checkbox"/>
1	Door Contact	To Suit Building System						<input type="checkbox"/>
1	Rex Sensor	To Suit Building System						<input type="checkbox"/>
1	Access Controller	To Suit Building System						<input type="checkbox"/>
1	Power Supply	Located in nearest IT Closet – By Security Provider						<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002



- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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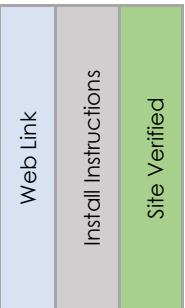
**Heading# 37**

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1 Total Openings

1 **Door#** N-C241 **Location:** Waiting Area C241 from Corridor **Handing:** LHR



By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			<input type="checkbox"/>
1	Classroom Lockset	L9070BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – **PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)**

1	Auto Operator (SNG)	BESAM SW100 – Push Side Mount – RH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider



- Option to have Operators manually turned off and room closed during non working hours using classroom function of lockset.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

**Heading# 38**

Opening Information

Opening Type:	Pair	Opening Size:	Existing	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	NE-C201	Location:	Corridor C200 from Corridor	Handing:	LHRA/RHRA
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

EXISTING HARDWARE TO REMAIN.					
1	Auto Flush Bolt Set	FB31P	630	Ives	<input checked="" type="checkbox"/>
1	Dust Proof Strike	DP2	626	Ives	<input checked="" type="checkbox"/>
1	Co-Ordinator	COR52 x FL20 (Confirm existing pair width before ordering)	689	Ives	<input checked="" type="checkbox"/>

By Automatics Supplier – **PACKAGE #1C – PUSHBUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)**

2	Auto Operator (PAIR)	BESAM SW250i – Double Door - Push Side Mount – RH/LH	628		<input checked="" type="checkbox"/>
4	Wave Button	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	<input checked="" type="checkbox"/>
4	Surface Mount Box	CM-43CBLA	630	Camden	<input checked="" type="checkbox"/>

***BALANCE OF EXISTING HARDWARE TO REMAIN.**

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.



- In-Active leaf may require to be re-prepped or replaced to accommodate Auto Flush Bolts.

-----End of Heading-----

**Heading# 39****Opening Information**

Opening Type:	Pair	Opening Size:	Existing	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1 **Door#** NE-C229 **Location:** Corridor C200 to Meeting Room C229 **Handing:** LHA/RHA

Web Link

Install Instructions

Site Verified

By Automatics Supplier – CUSTOM CONCEALED OPERATOR SETUP - PUSHBUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (PAIR)	OA-100-CH x DUAL - CH-AM	628	Omega	X			<input type="checkbox"/>
4	Wave Button	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
4	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
2	Top Pivot Set Adapter	To Accommodate Existing Site Conditions						

BALANCE OF EXISTING HARDWARE TO REMAIN.*Notes:**

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- New Operator to be concealed in ceiling and work with existing pivot doors. (New Top Pivots might be required)

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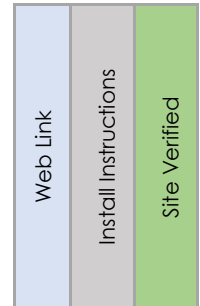
Heading# 40A

Opening Information

Opening Type:	Single	Opening Size:	Existing	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

7 Total Openings

1	Door#	NE-C231A	Location:	Open Office 231 to Office C231A	Handing:	RH
1	Door#	NE-C231B	Location:	Open Office 231 to Office C231B	Handing:	LH
1	Door#	NE-C231E	Location:	Open Office 231 to Office C231E	Handing:	RH
1	Door#	NE-C231F	Location:	Open Office 231 to Office C231F	Handing:	LH
1	Door#	NE-C231G	Location:	Open Office 231 to Office C231G	Handing:	RH
1	Door#	NE-C231H	Location:	Open Office 231 to Office C231H	Handing:	LH
1	Door#	NE-C231I	Location:	Open Office 231 to Room C231I	Handing:	RH



By Hardware Supplier

		BALANCE OF EXISTING HARDWARE TO REMAIN.					
7	Office Lockset	ND50BDC x TLR x 626	626	Schlage	X		
By Locksmith							
7	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco			<input type="checkbox"/>

*BALANCE OF EXISTING HARDWARE TO REMAIN.

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

.....End of Heading.....



Heading# 40B

Opening Information

Opening Type:	Single	Opening Size:	Existing	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

3 Total Openings

1	Door#	NE-C233A	Location:	Corridor C233A from Generator Room C233E	Handing:	LHR
1	Door#	NE-C233C	Location:	Corridor C233B to Mech Room C233C	Handing:	RH
1	Door#	NE-C233D	Location:	Corridor C233A to Mech/Elec Room C233D	Handing:	LH

Web Link

Install Instructions

Site Verified

By Hardware Supplier

		BALANCE OF EXISTING HARDWARE TO REMAIN.					
3	Storeroom Lockset	ND80BDC x TLR x 626	626	Schlage	X		

By Locksmith

3	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco			<input type="checkbox"/>
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*BALANCE OF EXISTING HARDWARE TO REMAIN.

*CONFIRM EXISTING LOCK TYPE AND FUNCTION PRIOR TO ORDERING.

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 40C

Opening Information

Opening Type:	Single	Opening Size:	Existing	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	NE-C233B	Location:	Corridor C233A from Corridor C233B	Handing:	RHR
1	Door#	NE-B109	Location:	Corridor to Open Office B109	Handing:	RHR

Web Link

Install Instructions

Site Verified

By Hardware Supplier

		BALANCE OF EXISTING HARDWARE TO REMAIN.					
2	Classroom Lockset	ND70BDC x TLR x 626	626	Schlage	X		

By Locksmith

2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco			<input type="checkbox"/>
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BALANCE OF EXISTING HARDWARE TO REMAIN.**CONFIRM EXISTING LOCK TYPE AND FUNCTION PRIOR TO ORDERING.**

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

.....End of Heading.....



Heading# 40D

Opening Information

Opening Type:	Pair	Opening Size:	Existing	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

3 Total Openings

1	Door#	NE-C233E	Location:	Corridor from Closet	Handing:
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

		BALANCE OF EXISTING HARDWARE TO REMAIN.					
1	Classroom Lockset	ND70BDC x TLR x 626 x 14-042	626	Schlage	X		
2	Single Dummy	ND170 x 626	626	Schlage	X		
By Locksmith							
1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco			<input type="checkbox"/>

*BALANCE OF EXISTING HARDWARE TO REMAIN.

*CONFIRM EXISTING LOCK TYPE AND FUNCTION PRIOR TO ORDERING.

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

.....End of Heading.....



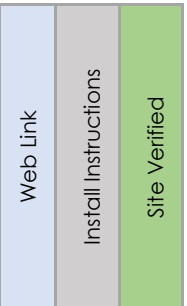
Heading# 41

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

3 Total Openings

1	Door#	N-D204A	Location:	Corridor D200 from Fire Services D204	Handing:	LHR
1	Door#	N-D204B	Location:	Corridor D200 to Fire Services D204	Handing:	RH
1	Door#	N-D204C	Location:	Corridor D200 from Fire Services D204	Handing:	LHR



By Hardware Supplier

9	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			<input type="checkbox"/>
3	Classroom Lockset	L9070BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
3	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
3	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
3	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
3	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
3	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

2	Auto Operator (SNG)	BESAM SW100 – Push Side Mount - RH	628		X			<input type="checkbox"/>
1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount – RH (N-D204B)	628		X			<input type="checkbox"/>
6	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
6	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>

By Locksmith

3	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Option to have Operators manually turned off and closed during non working hours using classroom function of lockset.
- Refer to STC rating of the wall in Architectural layout G1002



- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

Heading# 42A

Opening Information					
Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1 Door# N-D205 Location: Corridor D200 to Office D205 Handing: RH

Web Link	Install Instructions	Site Verified
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By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Office Lockset	L9050BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
2	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>
1	Floor Stop	GSH 209	626	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- Refer to STC rating of the wall in Architectural layout G1002
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 42B

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1 Door# N-C231H Location: Open Office C231 to Office C231H Handing: LH

Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Office Lockset	ND50BDC x TLR x 626	626	Schlage	X			
2	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>
1	Floor Stop	GSH 209	626	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- Refer to STC rating of the wall in Architectural layout G1002
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----





Heading# 43

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	SCWD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-D214	Location:	Corridor D200 from B/F Universal WR D214	Handing:	LHR
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	630	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
2	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5500	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #5 – PUSH TO LOCK KIT UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Push Side Mount - RH	628		X			<input type="checkbox"/>
1	Wave to Lock Kit	CX-WC16	630	Camden	X	X		<input type="checkbox"/>
1	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		<input type="checkbox"/>

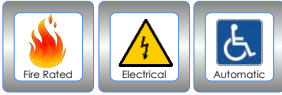
By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.
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.....End of Heading.....



Heading# 44

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1 Total Openings

1	Door#	N-D219	Location:	Waiting Area D219 from Corridor D200	Handing:	LHR
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Exit Device	98L-BE-F x 996L-BE-R/V x 03 x 626/630 x 4'0	630	Von Duprin	X	X		<input type="checkbox"/>
1	Electric Strike	6300 x 12/24VCD	630	Von Duprin	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.



End of Heading



Heading# 45

Opening Information

Opening Type:	Pair	Opening Size:	2 x 1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1 Total Openings

1 **Door#** N-D300 **Location:** Waiting Area D300 from Waiting Room D301 **Handing:** RHRA

Web Link

Install Instructions

Site Verified

By Hardware Supplier

6	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			<input type="checkbox"/>
1	Power Transfer	EPT-10	689	Von Duprin	X	X		<input type="checkbox"/>
1	Classroom Lockset	L9070BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Semi Auto Flush Bolts	FB51P	630	Ives	X			<input type="checkbox"/>
1	Dust Proof Strike	DP2	626	Ives	X			<input type="checkbox"/>
1	Closer	4040XP x Rw/PA	689	LCN	X	X		<input type="checkbox"/>
1	Co-Ordinator	COR60 x FL32	689	Ives	X	X		<input type="checkbox"/>
2	Mounting Bracket	MB2	630	Ives	X	X		<input type="checkbox"/>
2	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 6500	BLK	KN Crowder	X			<input type="checkbox"/>
2	Door Sweep	W-24S x 1029	CA	KN Crowder	X			<input type="checkbox"/>
1	Astragal	By HM Door Supplier						<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Push Side Mount - LH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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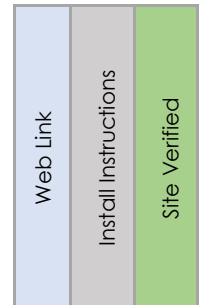
Heading# 46

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	N-D301	Location:	Waiting Room D301 to Corridor D302	Handing:	LH
1	Door#	N-D328	Location:	Waiting Room D301 from Filing D328	Handing:	RHR



By Hardware Supplier

6	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	652	Hager	X			<input type="checkbox"/>
2	Storeroom Lockset	L9080BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
2	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
2	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
2	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
2	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - LH	628		X			<input type="checkbox"/>
1	Auto Operator (SNG)	BESAM SW100 – Push Side Mount - LH	628		X			<input type="checkbox"/>
4	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
4	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
2	Logic Relay	CX-33		Camden	X			<input type="checkbox"/>



By Security Supplier							
2	Card Reader/Keypad	To Suit Building System (12V)	BLK				<input type="checkbox"/>
2	Door Contact	To Suit Building System					<input type="checkbox"/>
2	Rex Sensor	To Suit Building System					<input type="checkbox"/>
2	Access Controller	To Suit Building System					<input type="checkbox"/>
2	Power Supply	Located in nearest IT Closet – By Security Provider					<input type="checkbox"/>
By Locksmith							
2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco			<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

.....End of Heading.....

Heading# 47

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-D306	Location:	Corridor D302 to Meeting Room D306	Handing:	RH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier							
3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X		<input type="checkbox"/>
1	Passage Latchset	L9010 x 03B x 630	630	Schlage	X	X	<input type="checkbox"/>
1	Floor Stop	GSH 209	626	Gallery	X		<input type="checkbox"/>



1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

Notes:

- Refer to STC rating of the wall in Architectural layout G1002

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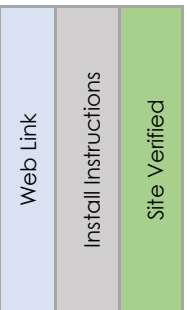
Heading# 48

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	N-D310	Location:	Corridor D302 to Office D310	Handing:	LH
1	Door#	N-D314	Location:	Open Office D303 to Office D314	Handing:	RH



By Hardware Supplier

6	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
2	Office Lockset	L9050BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
4	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>
2	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
2	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
2	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Locksmith

2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- Refer to STC rating of the wall in Architectural layout G1002
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 49

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-D329	Location:	Corridor to Kitchen D329	Handing:	LH
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Classroom Lockset	L9070BDC x 03B x 630	630	Schlage	X	X		<input type="checkbox"/>
1	Closer	4011-LH (LCN/ST 1544)	689	LCN	X	X		<input type="checkbox"/>
1	Drop Plate	4020-18	689	LCN				<input type="checkbox"/>
1	Overhead Stop	105F (With Hold Open)	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	434APKL x 1067	MIL	Pemko	X	X		<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- Refer to STC rating of the wall in Architectural layout G1002
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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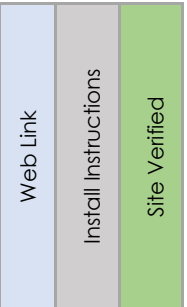
Heading# 50

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	N-D330	Location:	Corridor to Female W/C D330	Handing:	LH
1	Door#	N-D331	Location:	Corridor to Male W/C D331	Handing:	RH



By Hardware Supplier

6	Heavy Weight Hinge	BB1168 – 4 1/2" x 4"	630	Hager	X			<input type="checkbox"/>
2	Door Pull Set	GSH 167F x 167F x 610 x #5MTG (Back to Back)	630	Gallery	X			<input type="checkbox"/>
4	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – 3M Tape	630	Gallery	X			<input type="checkbox"/>
2	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
2	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
2	Door Sweep	W-13S x 1067	CA	KN Crowder	X			<input type="checkbox"/>

By Automatics Supplier – PACKAGE #4 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - LH	628		X			<input type="checkbox"/>
1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - RH	628		X			<input type="checkbox"/>
4	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
4	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
2	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		<input type="checkbox"/>

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- During installation, centreline of Door Pulls must be at 46-1/2" AFF.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side indicated above is based on a visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above, the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.



End of Heading

END OF SCHEDULE



DOOR HARDWARE

08 71 00

PROJECT:



CITY OF TORONTO ACCESSIBILITY UPGRADES

Fire Station 112 & EMS Station 16
5700 Bathurst St, Toronto, Ontario

ARCHITECT:



IBI GROUP

175 Galaxy Blvd, Unit 100
Toronto, Ontario

Prepared By: Alex Bekmansourov

Date: May 11th, 2021

Revised: May 20th, 2021

Revised: May 26th, 2021

Revised: July 23rd, 2021

Revised: October 5, 2021



Architectural Hardware Finishes

Steel	Stainless Steel	Brass/Bronze	Aluminum	Painted/Powder Coat	US/CAN#
Clear Anodized / Painted Aluminum					
			628	689	US28
Satin Nickel					
646		619	670		US15
Polished Nickel					
645		618	669		US14
Satin Stainless Steel					
	630				US32D
Polished Stainless Steel					
	629				US32
Satin Chrome					
652		626	702		US26D
Polished Chrome					
651		625	672		US26
Satin Brass					
633		606	667	678	US4
Polished Brass					
632		605	666	677	US5
Satin Bronze					
639		612	668	680	US10
Oil Rubbed Bronze					
640		613	703	695	US10B
Flat Black / Anodized Black					
631		622	671	693	US19

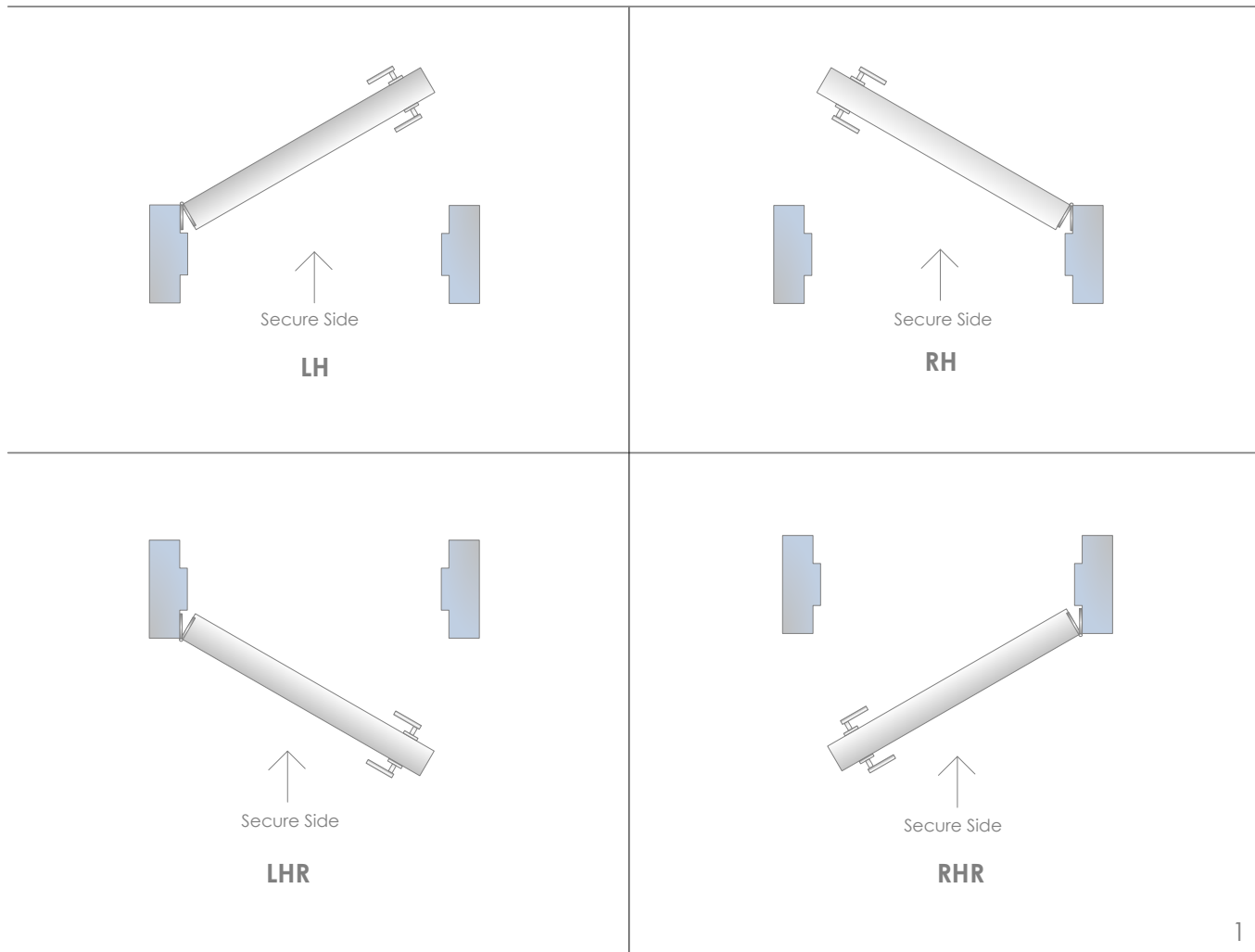


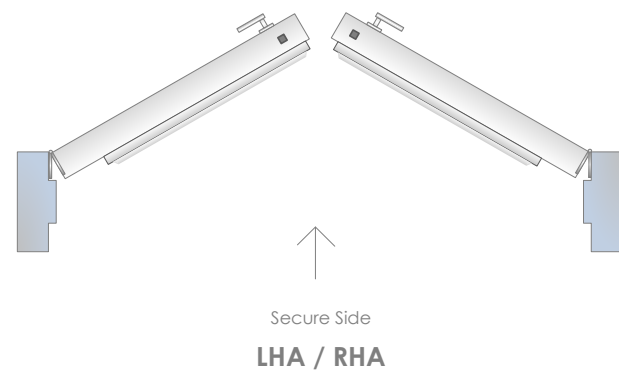
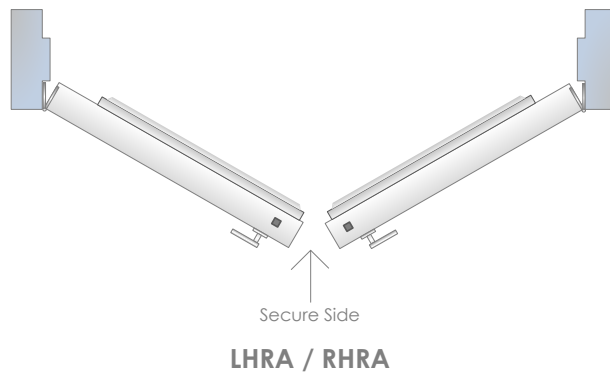
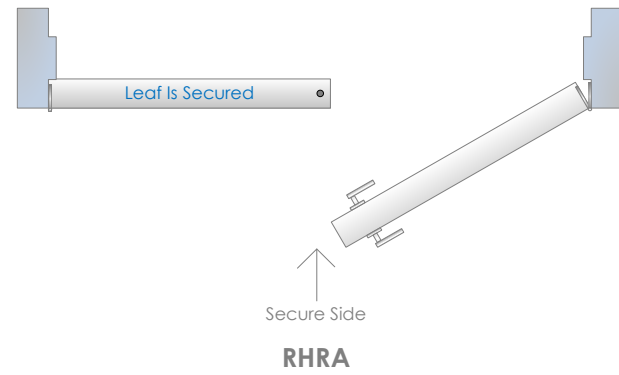
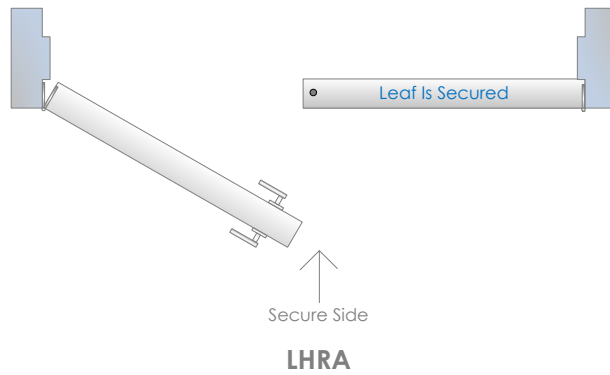
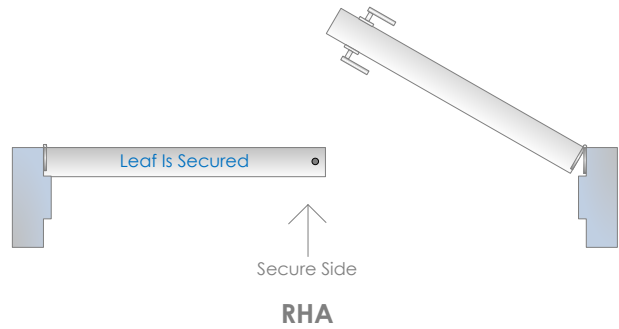
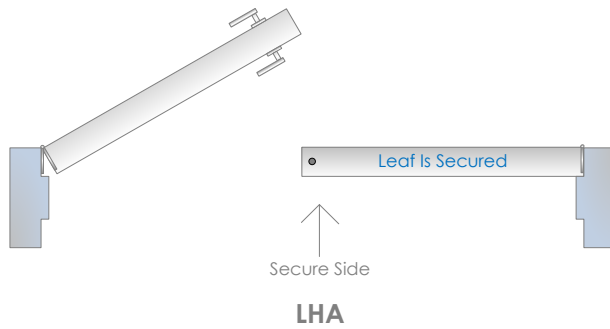
Door Types & Handing

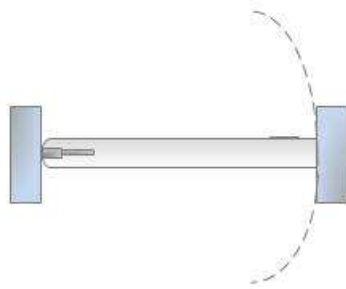
Abbreviations

RH – Right Hand	RHA – Right Hand Active	SS- Single Slider
LH – Left Hand	LHA – Left Hand Active	BP – Bi-Parting Slider
RHR – Right Hand Reverse	RHRA/LHRA – Right & Left Hand Reverse Active	BP – Bi-Passing Slider
LHR – Left Hand Reverse	RHA/LHA – Right & Left Hand Active	BF – Bi-Folding Slider
RHRA – Right Hand Reverse Active	DA- Double Acting	TS – Telescopic Slider
LHRA – Left Hand Reverse Active	DE – Double Egress	PKT – Pocket Slider

Note: The handing on a swing door is determined by placing yourself on the secure side or keyed side of the door.



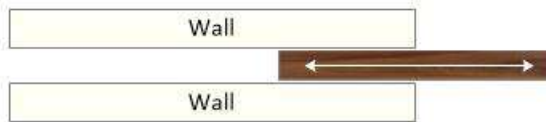




DA-DOUBLE
ACTING



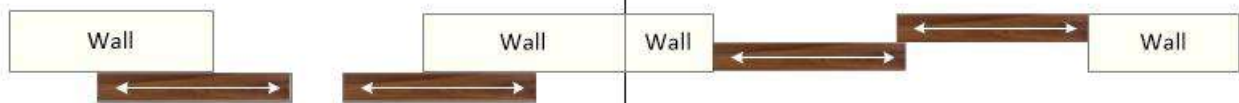
DE-DOUBLE
EGRESS



PKT - POCKET SLIDER



SS - SINGLE SLIDER or
BARN SLIDER



BP - BI-PARTING



BPS - BI-PASSING

Symbols



- Door has a fire rating and all associated hardware must have a fire label to suit. Must comply with local requirements.



- Door is automatic and is equipped with an auto operator. Door must meet local barrier free codes



- Door has an electrical requirement and requires power to be brought to the appropriate location above the door or to the latch, for either security or barrier free applications. Refer to security & electrical drawings for further information.



- Door requires security card access. Refer to security / electrical drawings for further information.

Abbreviations

Door:

HMD = Hollow Metal Door
IHMD = Insulated Hollow Metal Door
ALD = Aluminum Door
SCWD = Solid Core Wood Door
HCWD = Hollow Core Wood Door
FGD = Frameless Glass Door
FRP = Fiberglass Reinforced Plastic Door

Frame:

HMF = Hollow Metal Frame
ALF = Aluminum Frame
Cased Open HMF = Cased Open Hollow Metal Frame
WDF = Wood Frame
Cased Open WDF = Cased Open Wood Frame
Cased Open Drywall = Cased Open Drywall

Fire Ratings:

0 HR – Zero Hour Fire Rating / Smoke Barrier
20 MIN – 20 Minute Fire Rating
¾ HR – 45 Minute Fire rating
1 ½ HR – 90 Minute Fire Rating
2 HR – 120 Minute Fire Rating
3 HR – 180 Minute Fire Rating

Disclaimer

Installation Instructions:

Installation instructions have been provided for convenience only. Although we do our best to ensure these documents are accurate and up to date, it is ultimately the responsibility of the installer to ensure they are using the correct instructions for the product they are installing. Use of the installation instructions provided is done so at one's own risk and Spyder SC takes no responsibility to their accuracy.

Weblinks:

Weblinks do change from time to time as manufacturers move around their websites, please inform us if you have a none functioning weblink.

HARDWARE SCHEDULE



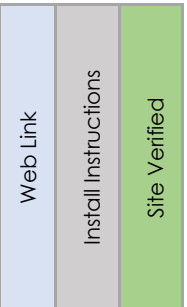
Heading# 1

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2110 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	N-104A	Location:	Exterior from Corridor 104	Handing:	LHR
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By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4" NRP	630	Hager	X			<input type="checkbox"/>
1	Exit Device	CD-98L-NL x 996L-NL-R/V x 06 x 626/630 – 4'0	630	Von Duprin	X	X		<input type="checkbox"/>
1	Rim Cylinder Housing	80-116	626	Schlage	X			<input type="checkbox"/>
1	Mortise Cylinder	80-110	626	Schlage	X			<input type="checkbox"/>
1	Electric Strike	6300 x 12/24VCD	630	Von Duprin	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
1	Weatherstrip	W-13 – 1 @ 1067 & 2 @ 2135	628	KN Crowder	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Door Sweep	W-13S x 1067	BLK	KN Crowder	X			<input type="checkbox"/>
1	Threshold	CT-10 x 1067	628	KN Crowder	X			<input type="checkbox"/>

By Automatics Supplier – PACKAGE #1 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW250i – Push Side Mount - RH	628		X			<input type="checkbox"/>
1	Push Button	CM60/4-WT	630	Camden	X			<input type="checkbox"/>
1	Surface Mount Box	CM-79	630	Camden	X			<input type="checkbox"/>
1	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
1	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>
1	Logic Relay	CX-33		Camden	X			<input type="checkbox"/>

By Security Supplier

1	Card Reader	To Suit Building System (24V)	BLK					<input type="checkbox"/>
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1	Door Contact	To Suit Building System							
1	Access Controller	To Suit Building System							
1	Motion REX	To Suit Building System							
By Locksmith									
2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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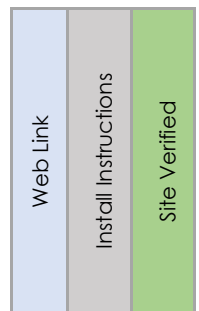
Heading# 2

Opening Information

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

6 Total Openings

1	Door#	NE-102	Location:	EMS Garage 101 from Storage 102	Handing:	RHR
1	Door#	NE-103	Location:	EMS Garage 101 to Storage 103	Handing:	LH
1	Door#	NE-105	Location:	EMS Garage 106 from Storage 105	Handing:	RHR
1	Door#	NE-114	Location:	Hallway 116 from Electrical Room 114	Handing:	LHR
1	Door#	NE-219	Location:	Corridor to Evidence Storage 219	Handing:	RH
1	Door#	NE-220	Location:	Corridor to Elevator Room 220	Handing:	LH



By Hardware Supplier

6	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	X				
By Locksmith									
6	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					

***BALANCE OF EXISTING HARDWARE TO REMAIN**

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)



- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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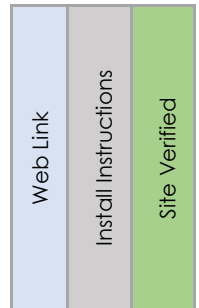
Heading# 3

Opening Information

Opening Type:	Pair	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

1 Total Openings

1	Door#	NE-104B	Location:	EMS Garage 101 to Corridor 104	Handing:	LHA
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By Hardware Supplier

1	Passage Latchset	ND10S x RHO x 626	626	Schlage	X			
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*BALANCE OF EXISTING HARDWARE TO REMAIN

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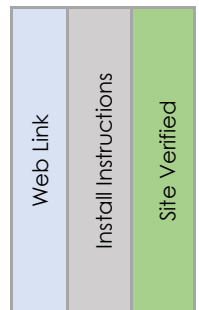
Heading# 4

Opening Information

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

6 Total Openings

1	Door#	NE-107	Location:	EMS Garage 106 to Beak Room 107	Handing:	RH
1	Door#	NE-110B	Location:	Bicycle Storage 110 to Washroom Corridor	Handing:	RH
1	Door#	NE-122	Location:	Corridor 120 to Radio Room 122	Handing:	LH
1	Door#	NE-218	Location:	Corridor to Corridor	Handing:	RH
1	Door#	NE-223	Location:	Corridor 225 to Bedroom 223	Handing:	RH
1	Door#	NE-227	Location:	Corridor 225 to Bedroom 227	Handing:	RH



By Hardware Supplier



6	Passage Latchset	ND10S x RHO x 626	626	Schlage	X			
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***BALANCE OF EXISTING HARDWARE TO REMAIN**

-----End of Heading-----

Heading# 5**Opening Information**

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

8 Total Openings

1	Door#	NE-108A	Location:	EMS Garage 106 to Office 108	Handing:	RH
1	Door#	NE-108B	Location:	Breakroom 107 to Office 108	Handing:	LH
1	Door#	NE-119	Location:	Corridor 120 to Office 119	Handing:	RH
1	Door#	NE-211	Location:	Corridor to Office 211	Handing:	RH
1	Door#	NE-212	Location:	Corridor to Office 212	Handing:	LH
1	Door#	NE-213	Location:	Corridor to Office 213	Handing:	LH
1	Door#	NE-214	Location:	Corridor to Office 214	Handing:	RH
1	Door#	NE-216	Location:	Corridor to Office 216	Handing:	RH

**By Hardware Supplier**

8	Office Lockset	ND50BDC x RHO x 626	626	Schlage	X			
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By Locksmith

8	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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***BALANCE OF EXISTING HARDWARE TO REMAIN**

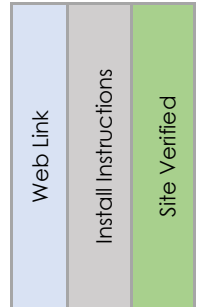
- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.
-

-----End of Heading-----



Heading# 6

Opening Information												
Opening Type:		Single		Opening Size:		Existing Door x Existing Frame		STC Rating		None		
Door Material:		HMD		Frame Material:		HMF		Fire Rating		None		
3 Total Openings										Web Link	Install Instructions	Site Verified
1	Door#	NE-109	Location:	Washroom Corridor from Washroom 109			Handing:	LHR				
1	Door#	NE-209	Location:	Corridor to Men's Washroom 209			Handing:	RH				
1	Door#	NE-210	Location:	Corridor to Women's Washroom 210			Handing:	RH				
By Hardware Supplier												
3	Privacy Latchset		ND40S x RHO x 626				626	Schlage	X			

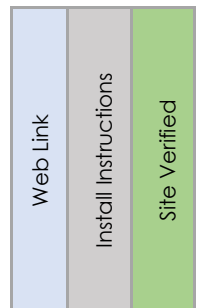


*BALANCE OF EXISTING HARDWARE TO REMAIN

-----End of Heading-----

Heading# 7

Opening Information											
Opening Type:		Single	Opening Size:		Existing Door x Existing Frame			STC Rating	None		
Door Material:		HMD	Frame Material:		HMF			Fire Rating	None		
1 Total Openings								Web Link	Install Instructions	Site Verified	
1	Door#	NE-111A	Location:		Exterior from Apparatus Bay 111		Handing:				RHR
By Hardware Supplier											
1	Keypad Lockset		LR1021B x 26D-41			626	Dormakaba	X			
By Locksmith											
1	Permanent Core/Cylinder		Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.			626	Medeco		<input type="checkbox"/>		



*BALANCE OF EXISTING HARDWARE TO REMAIN



- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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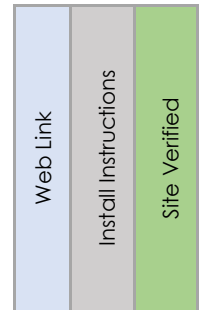
Heading# 8

Opening Information

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

6 Total Openings

1	Door#	NE-113A	Location:	Compressor Room 112 to Workshop 113	Handing:	RH
1	Door#	NE-115A	Location:	Hallway 116 to Bunker Room 115	Handing:	LH
1	Door#	NE-115B	Location:	Bunker Room 115 to Compressor Room 112	Handing:	RH
1	Door#	NE-204	Location:	Corridor to Janitor Closet 204	Handing:	LH
1	Door#	NE-205A	Location:	Corridor to Storage 231	Handing:	LH
1	Door#	NE-303A	Location:	Corridor from Corridor 303	Handing:	RHR
1	Door#	NE-222	Location:	Corridor to Locker Room 222	Handing:	RH



By Hardware Supplier

7	Classroom Lockset	ND70BDC x RHO x 626	626	Schlage	X			
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By Locksmith

7	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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*BALANCE OF EXISTING HARDWARE TO REMAIN

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

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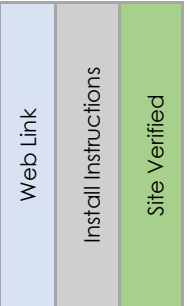
Heading# 9

Opening Information

Opening Type:	Pair	Opening Size:	Existing Doors x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

4 Total Openings

1	Door#	NE-113B	Location:	Workshop 113 from Closet	Handing:	RHRA/LHRA
1	Door#	NE-113C	Location:	Workshop 113 from Closet	Handing:	RHRA/LHRA
1	Door#	NE-113D	Location:	Workshop 113 from Closet	Handing:	RHRA/LHRA
1	Door#	NE-206	Location:	Corridor from Storage 206	Handing:	RHRA/LHRA



By Hardware Supplier

8	Single Dummy	ND170 x RHO x 626	626	Schlage	X		
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*BALANCE OF EXISTING HARDWARE TO REMAIN

.....End of Heading.....

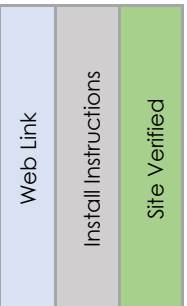
Heading# 10

Opening Information

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

0 Total Openings

1	Door#	NE-121B	Location:	Vestibule 121 from Corridor 120	Handing:	LHR
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*Door Removed from Scope

.....End of Heading.....



Heading# 11

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	1 1/2 HR

1 Total Openings

1	Door#	N-208	Location:	Corridor from Corridor	Handing:	LHR
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Web Link

Install Instructions

Site Verified

By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X			<input type="checkbox"/>
1	Keypad Lockset	LL1031B x 26D-41	626	Dormakaba	X			
1	Closer	4011-RH (LCN/ST 1544)	689	LCN	X	X		<input type="checkbox"/>
1	Drop Plate	4020-18	689	LCN				<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	CT-54 x 1067	MIL	KN Crowder	X	X		<input checked="" type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

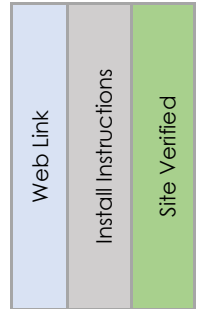
- Refer to STC rating of the wall in Architectural layout G1002
- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



Heading# 12

Opening Information														
Opening Type:		Single		Opening Size:		Existing Door x Existing Frame		STC Rating		None				
Door Material:		HMD		Frame Material:		HMF		Fire Rating		None				
1 Total Openings										Web Link	Install Instructions	Site Verified		
1	Door#	NE-217		Location:		Corridor to Storage 217		Handing:					RH	
By Hardware Supplier														
1	Keypad Lockset		LR1011 x 26D-41				626	Dormakaba		X				

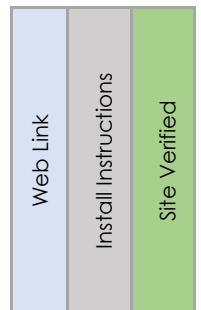


*BALANCE OF EXISTING HARDWARE TO REMAIN

-----End of Heading-----

Heading# 13

Opening Information											
Opening Type:		Single	Opening Size:		Existing Door x Existing Frame			STC Rating	None		
Door Material:		HMD	Frame Material:		HMF			Fire Rating	None		
2 Total Openings								Web Link	Install Instructions	Site Verified	
1	Door#	NE-224A	Location:		Corridor 224 from Corridor		Handing:				RHR
1	Door#	NE-224B	Location:		Corridor 224 from Corridor 225		Handing:				RHR
By Locksmith											
2	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.				626	Medeco			<input type="checkbox"/>	



*BALANCE OF EXISTING HARDWARE TO REMAIN

- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.



-----End of Heading-----

Heading# 14

Opening Information

Opening Type:	Single	Opening Size:	Existing Door x Existing Frame	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

2 Total Openings

1	Door#	NE-205B	Location:	Corridor to Corridor	Handing:	RH
1	Door#	NE-207	Location:	Corridor to Fire-Prevention Kitchen 207	Handing:	LH

Web Link

Install Instructions

Site Verified

By Hardware Supplier

1	Keypad Lockset	LR1031B x 26D-41	626	Dormakaba	X			
1	Keypad Lockset	LL1031B x 26D-41	626	Dormakaba	X			

***BALANCE OF EXISTING HARDWARE TO REMAIN**

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----

**Heading# 15**

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2135 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	None

Web Link

Install Instructions

Site Verified

**1 Total Openings**

1 **Door#** N-307 **Location:** Corridor 303 to Open Office Area 307 **Handing:** LH

By Hardware Supplier

4	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	652	Hager	X				
1	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	X				
1	Flush Bolts	FB458-UL	626	Ives	X				
1	Electric Strike	1500C	630	HES	X	X			
1	Closer	4011-LH (LCN/ST 1544)	689	LCN	X	X			
1	Drop Plate	4020-18	689	LCN					
1	Overhead Stop	105H (90 Degrees)	630	Glynn Johnson	X	X			
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X				
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X				
1	Auto Door Bottom	CT-54 x 1067	MIL	KN Crowder	X	X			

By Security Supplier

1	Card Reader/Keypad	To Suit Building System (12V)	BLK						
1	Door Contact	To Suit Building System							
1	Rex Sensor	To Suit Building System							
1	Access Controller	To Suit Building System							
1	Power Supply	Located in nearest IT Closet – By Security Provider							

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					
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Notes:

- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

.....End of Heading.....



Heading# 16

Opening Information

Opening Type:	Single	Opening Size:	1 x 1067 x 2110 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1 Total Openings

1	Door#	N-310	Location:	Elevator Lobby 310 to Corridor 303	Handing:	LH
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By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 1/2" x 4 1/2"	652	Hager	X			<input type="checkbox"/>
1	Classroom Lockset	ND70BDC x RHO x 626	626	Schlage	X			
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
1	Overhead Stop	105S	630	Glynn Johnson	X	X		<input type="checkbox"/>
1	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5400	BLK	KN Crowder	X			<input type="checkbox"/>
1	Door Sweep	W-24S x 1067	CA	KN Crowder	X			<input type="checkbox"/>
1	Astragal	By Door Supplier	628					<input type="checkbox"/>

By Automatics Supplier – PACKAGE #3 – PUSH BUTTONS UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Push Side Mount - LH	628		X			<input type="checkbox"/>
2	Wave Buttons	CM-331/42WS-SGLR, Double Gang, SS Face Plate with LED Ring	630	Camden	X			<input type="checkbox"/>
2	Surface Mount Box	CM-43CBLA	630	Camden	X			<input type="checkbox"/>

By Locksmith

1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco				<input type="checkbox"/>
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Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Final commissioning of all access control items, such as but not limited to electric strikes, Rex sensors, Door contacts, Electrified Panics, Relays & Maglocks is the responsibility of the security provider
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.

- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Option to have Operators manually turned off and room closed during non working hours using classroom function of lockset.
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

-----End of Heading-----



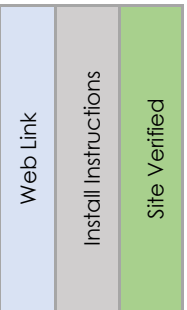
Heading# 17

Opening Information

Opening Type:	Single	Opening Size:	1067 x 2110 x 45	STC Rating	None
Door Material:	HMD	Frame Material:	HMF	Fire Rating	3/4 HR

1 Total Openings

1 **Door#** N-311 **Location:** Elevator Lobby 310 to B/F Universal Washroom 311 **Handing:** LH



By Hardware Supplier

3	Heavy Weight Hinge	BB1168 – 4 ½" x 4"	630	Hager	X			<input type="checkbox"/>
1	Storeroom Lockset	ND80BDC x RHO x 626	626	Schlage	X			
1	Electric Strike	1500C	630	HES	X	X		<input type="checkbox"/>
2	Kickplate	GSH 80A – 203 x 1029 (Rounded Corners) – HM Door Screws	630	Gallery	X			<input type="checkbox"/>
2	Coat Hook	GSH 390	626	Gallery	X			<input type="checkbox"/>
1	Floor Stop	GSH 209	626	Gallery	X			<input type="checkbox"/>
1	Smoke / Sound Seal	W-66 x 5500	BLK	KN Crowder	X			<input type="checkbox"/>
1	Auto Door Bottom	CT-54 x 1067	MIL	KN Crowder	X	X		<input type="checkbox"/>

By Automatics Supplier – PACKAGE #5 – PUSH TO LOCK KIT UPGRADED TO TOUCHLESS WAVE (UPGRADE EXTRA)

1	Auto Operator (SNG)	BESAM SW100 – Pull Side Mount - LH	628		X			<input type="checkbox"/>
1	Wave to Lock Kit	CX-WC16	630	Camden	X	X		<input type="checkbox"/>
1	Emergency Call Kit	CX-WEC10K2	630	Camden	X	X		<input type="checkbox"/>
1	Logic Relay	CX-33		Camden	X			<input type="checkbox"/>

By Security Supplier

1	Card Reader	To Suit Building System (12V)	BLK					<input type="checkbox"/>
1	Door Contact	To Suit Building System						<input type="checkbox"/>



1	Rex Sensor	To Suit Building System							
1	Access Controller	To Suit Building System							
1	Power Supply	Located in nearest IT Closet – By Security Provider							
By Locksmith									
1	Permanent Core/Cylinder	Permanent Medeco Core/Cylinder Provided by City Locksmith Listed Below.	626	Medeco					

Notes:

- 120VAC is required at the head of the door for all handicap door operators, 15A dedicated circuit. Wall/Frame must be reinforced for automatic operator mounting, all conduit and back boxes with pull cords are to be provided by the electrical contractor.
- Electrician to confirm wire locations with auto door operator supplier prior to pulling wires.
- Refer to STC rating of the wall in Architectural layout G1002
- Operators Push/Pull Side Location indicated above is based on visually preferred location, however if on-site conditions prevent the installation of the operators on the side indicated above the installer must mount the operator on the side which does not impede with the door opening at least 90 degrees.
- Electric Strike to be wired using Fail-Secure Option with CX-33 Relay.
- Lever Replacement Locks specified above all come with SFIC System with a plastic construction core for the facility/city locksmith to replace with permanent cores after construction. (Existing Key System should still be verified with facility prior to ordering Locks to ensure compatibility)
- Permanent Cores & Cylinders to be Provided by Approved City Locksmiths: Reillys Lock & Security Systems and/or ABC Security Access Systems.

.....End of Heading.....

END OF SCHEDULE

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section, including but not limited to the following:
 - .1 Receive and install hollow metal doors and plastic laminate doors (and transoms).
 - .2 Receive and install finish hardware in all doors listed in finish hardware schedule appended to Section 08 71 00. Receive templates from finish hardware Supplier.
 - .3 Final adjustment on door closers including closing speed, latching speed and backcheck.
- .2 Obtain up-to-date finish hardware schedule and keep a copy in a three-ring binder at the jobsite. Make schedule available to the Consultant upon request. Record any changes made to hardware schedule at the site.
- .3 Keep a copy of all reviewed catalogue cuts and samples, if any, and have same readily available to the Consultant upon request.

1.1 **REFERENCE**

- .1 Conform to the latest edition of the following:
 - .1 AODA - Accessibility for Ontarians with Disabilities Act

1.2 **QUALITY ASSURANCE**

- .1 The Subcontractor performing the Work of this section shall be a firm specializing in the installation of commercial doors and high quality building finish hardware, both electrified and non-electrified.
- .2 Give assistance at the place of the Works to organize hardware storeroom and supply qualified staff to correctly categorize, mark, and arrange each item in groups to enable efficient dispensing in specified hardware groups for each door to installation trades.
- .3 Provide qualified staff at the place of the Works promptly to assist installation trades subsequent to being requested and to ensure that hardware is being correctly installed.

1.3 **DELIVERY, STORAGE AND HANDLING**

- .1 Receive and store doors and finish hardware. It must be noted that hollow metal doors are in two types, namely standard hollow metal with stiffened/insulated core, and fire rated hollow metal. Likewise, solid core wood doors come in both standard and fire rated assemblies. Ensure that such units are identified accordingly to ensure installation at their intended points of usage.
- .2 Jointly make an inventory of finish hardware with the hardware Supplier.
- .3 Handle, store and protect doors and finish hardware in accordance with requirements specified in Section 08 13 00 and Section 08 14 10.

1.4 **PRE-INSTALLATION MEETING**

- .1 Prior to start of hardware installation, arrange for a Project site meeting of all parties associated with Work of this section. Presided by Consultant, meeting to include General Contractor, Hardware Consultant, Hardware Supplier, Hardware Installer and Security System Supplier/Installer.
- .2 In the meeting, review Specifications for Work included under this section and determine a complete understanding of requirements and responsibilities relative to Work included, storage and handling of materials, installation of materials, latest installation techniques, sequence and quality control, interfacing with Division 26, and other matters affecting the installation, so as to permit compliance with the intent of this section.

1.5 **WARRANTY AND MAINTENANCE DOCUMENTS**

- .1 Collect warranty and maintenance documents from finish hardware Supplier as specified in Section 08 71 00. Submit the foregoing documents upon Substantial Performance in accordance with Section 01 33 00.

2 Products

2.1 **MATERIALS**

- .1 (Not used)

3 Execution

3.1 **DOORS**

- .1 Install doors to swing shut with minimum clearances of 1.6 mm at heads, 2 mm at jambs and 6 mm over finished floor surfaces. Check with door schedule for conditions requiring greater clearance from floor for air movement.
- .2 Install doors to swing freely but not loosely on their hinges, to close tightly and evenly on their frames without binding or rattling in the latched position.
- .3 Do not install warped, twisted or other defective doors.
- .4 Field trimming or cutting of wood doors is not permitted. All cutouts for mortise hardware, grilles and glass, and all bevelling and prefitting shall have been done in the door manufacturer's plant.
- .5 Secure plastic laminate transoms with concealed pins at head and clips at bottom corners.

3.2 **FINISH HARDWARE**

- .1 Install building finish hardware in accordance with finish hardware schedule appended to Section 08 71 00. Carefully examine Section 08 71 00 for installation requirements specific to Section 08 71 05.
- .2 Consider hardware manufacturers recommended mounting heights as a general guide unless conditions such as intermediate rails, line of glass light, etc. dictate otherwise. Installer must carefully check manufacturers' installation instructions packed with hardware Products. In particular, the installation heights when using mullions and/or vertical rod devices may be predetermined by certain manufacturers.

- .3 Hardware Location:
 - .1 Hardware location dimension shall be as follows; measured from finish floor to centre line of hardware unless indicated otherwise:
 - .1 Locksets/latchsets centre line of strike: 1034 mm
 - .2 Deadlocks/mortise night latch: 1524 mm
 - .3 Exit devices (centre line of strike): 1000 mm
 - .4 Push plates: 1000 mm
 - .5 Door pulls: 1000 mm
 - .2 Hardware locations are to pre-determined standard industry recommendations. On custom doors, mount hardware across intermediate rail to meet architectural design considerations.
- .4 Protect installed hardware from damage.
- .5 Install kickplates on four sides with continuous pressure-sensitive two-sided adhesive tape supplied with hardware.
- .6 Thresholds: Site measure openings before cutting. Set thresholds on two continuous beads of sealant conforming to Section 07 92 00.
- .7 Door closers and holders: Install door closers in such a manner that door opening is unaffected and that maximum swing is permitted. Prior to installing closer to the door, it is the responsibility of the installer to:
 - .1 Index the arm attachment so as to properly position the arm to the closer.
 - .2 Adjust the back check positioning valve in order to maintain an effective backcheck range.
- .8 Weatherstripping of Doors
 - .1 Install weatherstripping effectively to tightly seal entire perimeter of doors. Secure in place with non-ferrous "Tec" screws, in accurate alignment.
 - .2 Maintain integrity of weatherseal at head of doors fitted with closers. Adapt weatherstripping as required to achieve specified performance and provide any necessary accessories.

3.3 **ELECTRIFIED HARDWARE**

- .1 Install electrified hardware and associated devices in accordance with manufacturers recommendations.
- .2 Provide interconnecting wiring to power operators and controls back to panel in door framing for power connection by electrical division.
- .3 All wiring will be supplied and installed by electrical division including conduit, boxes and other electrical appurtenances, including connections and terminations.
- .4 Be responsible for ensuring that all wiring work is done in accordance with the Suppliers wiring diagrams and directions.

- .5 Arrange for testing and commissioning of system by the distributor of the system.

3.4 **INSPECTION**

- .1 Coordinate with finish hardware Supplier who provides inspection service during hardware installation and upon completion.
- .2 Adjust or rectify finish hardware items found to be improperly installed. Remove defective materials and replace with new materials supplied by the finish hardware Supplier at no cost to the Owner.

3.5 **CLEANING**

- .1 Wipe clean doors and frames of dust created from the door and hardware installation process.
- .2 Clean and polish all items of hardware and leave free from disfigurement.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror
- .2 CAN/CGSB-12.1-M - Tempered or Laminated Safety Glass
- .3 CAN/CGSB-12.3-M - Flat, Clear Float Glass
- .4 CAN/CGSB-12.8-M - Insulating Glass Units
- .5 CAN/CGSB-12.11-M - Wired Safety Glass
- .6 CAN/CGSB-19.2-M - Glazing Compound, Non-Hardening, Modified Oil Type
- .7 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **SUBMITTALS**

- .1 Shop Drawings: Submit Shop Drawings in accordance with Section 01 33 00 Submittals, for fabrication and erection of glazing elements indicating materials, thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details and accessories.

.2 Samples:

- .1 Submit one 300 x 300 mm sample of each type of glass in accordance with Section 01 33 00.

.3 Certificates: Submit manufacturer's certification that glass and glazing materials are compatible.

- .1 Submit compatibility and adhesion test reports from sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed for adhesion.

- .2 Compatibility test report from manufacturer of insulating glass edge sealant, indicating that glass edge sealants were tested for compatibility with other glazing materials including sealants, setting blocks, edge blocks and any other material that contacts or can affect the edge seal.

1.4 **DELIVERY, HANDLING AND STORAGE**

- .1 Deliver materials to the site in original crates and containers with the maker's name and brand distinctly marked thereon and with glass labeled as to types. Do not remove labels on glass until after Work is accepted by the Consultant.

- .2 Store materials within the building, in a clean, dry location. Fully protect materials from damage until ready for use.

2 Products

2.1 **MATERIALS**

- .1 Wired glass: 6 mm thick, polished wired glass with wires straight and true vertically and horizontally conforming to CAN/CGSB-12.11-M, Type 1, Style 3.
- .2 Tempered safety glass: 6 mm thick, clear, conforming to CAN/CGSB-12.1-M, Type 2, Class B, free from roller and tong marks.
- .3 Laminated safety glass: 6 mm thick, conforming to CAN/CGSB-12.1-M, Type 1, Class B, with clear polyvinyl butyral interlayer. Conforming to CAN/CGSB-12.1-M, Type 1, Class B, Consisting of two layers 6 mm thick, with clear polyvinyl butyral interlayer, overall thickness 13 mm.
- .4 Fire rated glazing: Refer to Section 08 41 23 Fire Rated Glass and Framing Systems.
- .5 Float glass: 6 mm thick, conforming to CAN/CGSB-12.3-M, glazing quality, polished.
- .6 Sandblasted glass: 6 mm thick tempered glass conforming to CAN/CGSB-12.1-M.
- .7 Obscure glass: 6 mm thick frosted obscure tempered glass conforming to CAN/CGSB-12.1-M, Type 2, Class B (Moroccan Pinhead Obscure).
- .8 Translucent glass: 6 mm thick frosted by the acid-etching process to provide a satin finish with optimum light and complete privacy.
- .9 Plastic glazing: Clear "Lexan" by GE Canada, 6 mm thick.
- .10 Insulating glass: Factory sealed double glazed units conforming to CAN/CGSB-12.8-M as manufactured by PPG Canada Inc., AFG Glass Inc., Guardian Glass, Cardinal Glass, Versalux Glass or accepted equal. Both panes to consist of clear float glass conforming to CAN/CGSB-12.3-M. (Panels to be float glass conforming to CAN/CGSB-12.3-M; tinted (grey) (bronze) exterior and clear interior, both 6 mm thick). The insulating unit panes shall be joined with a metal edge spacer along all edges ensuring a dehydrated air space with argon gas, and hermetically sealed at the periphery with a factory applied continuous flexible sealer.
- .11 One way glass: 6 mm thick regular clear tempered glass with applied chrome alloy coating. Glass shall be transparent for one-way vision.
- .12 Sliding glass pass-throughs: 6 mm thick tempered plate glass with "Roll-Ezy" steel track assembly No. 992 by Knappe and Vogt, consisting of No. 993 upper channel, No. 995 shoe, No. 997 ballbearing carrier, No. 999 lower track, edge bumpers and Corbin lock No. 02289.
- .13 Desk Screens
 - .1 Laminated tempered glass: 5 mm clear monolithic annealed laminated tempered glass on interior and exterior panes and 1.5 mm polyvinyl butyral (PVB) interlayer, with 19 mm U-channel, clear anodized, no-draft speak through grilles and pass through, polished chromed T-shaped "sleeve over" glass clamp.

- .2 10 mm clear tempered glass (plexiglass when required), with 19 mm U-channel, clear anodized, no-draft speak through grilles and pass through, polished chromed T-shaped "sleeve over" glass clamp. Manufactured by Oxford or approved equivalent.
- .14 Speak-Through/Voice Port: 6" diameter stainless steel voice port complete with bullet resistant plate/cover, speaker face with threaded holes, 5" diameter mounting hole required. Glazing thickness: 3/4" -1-7/16".
 - .1 "TSS MK-1" by Total Security Solutions
 - .2 Or accepted equal.
- .15 Mirrors: Conforming to ASTM C1503, high humidity use 6 mm thick float glass with process deposit of five silver coats, three copper coats and final protective seal, and with ground and polished round edges:
 - .1 Cushion: PVC pressure sensitive foam tape, 6 mm thick with adhesive one side.
 - .2 Concealed clips: Type 302 stainless steel, vandal-proof.
 - .3 Adhesive: "Mirror Mastic" by Palmer Products Corporation
- .16 Glazing compound (fire doors): Putty.
- .17 Glazing tape: 440 polyisobutylene-butyl tape by Tremco Ltd.
- .18 Spacer shims and setting blocks: Neoprene, Shore "A" Durometer hardness 70-90, 100 mm long, wide enough to extend from fixed stop to opposite face of glass and of height suitable to provide adequate glazing "bite" for setting blocks. Neoprene, Shore "A" 40 to 50 Durometer hardness, of adequate thickness to provide correct glass to face clearance of at least 3 mm for spacer shims. For glass in fire rated doors (screens) use ULC approved fire resistant setting blocks and spacer shims.
- .19 Glazing channel (for interior glazing): Black extruded neoprene or PVC channel gaskets, of size to suit glazing.
- .20 Glazing compound: One-part clear silicone. GE Canada "Silpruf SCS 2000", Dow Corning "795" or Tremco "Spectrum 2".
- .21 Vision barrier stamps:
 - .1 Submit samples for Consultant review.
 - .2 50 mm wide, two stripes spaced 280 mm apart in colour as identified on the Drawings.
 - .3 Refer to Drawings for mounting height.
 - .4 Acceptable manufacturers: 3M
- .22 Frosted Window Film:
 - .1 Submit samples for Consultant review.
 - .2 Film to provide "Acid Etched/Frosted" appearance.
 - .3 Visible light transmittance: 60%

.4 Acceptable Products:

- .1 "Fasara Regular - Glace" by 3M
- .2 "Etchmark" by Avery Dennison
- .3 "Fasara - Transparent Frosted Glass" by 3M

3 Execution

3.1 **INSPECTION OF JOB CONDITIONS**

- .1 Inspect openings and frames prepared by other trades into which glass is to be installed. Notify the Consultant in writing, of any conditions which will preclude proper installation. Do not glaze unsatisfactory locations until such conditions have been made good. Commencement of Work implies acceptance of existing conditions.
- .2 Obtain glass dimensions on the job site. Glass shall be 4 mm less than the rebate size in either dimension, with allowance for edge spacers, shims and setting blocks.
- .3 Free rabbets, stops and glass edges of dirt, moisture, oil and other foreign matter detrimental to or obstructing glazing material.

3.2 **GLASS INSTALLATION**

- .1 Check that all openings and stops to be painted are primed before commencing Work.
- .2 At completion of the Work, replace at own expense, glass provided under this section which is broken due to loose setting, binding in the frame, pinched by glazing clips, inadequate or improper use of setting blocks, improper workmanship or other causes.

3.3 **INTERIOR GLAZING**

- .1 Standard hollow metal doors: Install glass with continuous glazing channels on glass edges. Set glass and secure in place with stops butted tight to glazing channels. Screw stops to door with countersunk fluorocarbon coated oval head screws.
- .2 Standard wood doors: Install glass with continuous glazing channels on glass edges. Set glass and secure in place with stops butted tight to glazing channels. Secure stops to door with screws provided, with heads slightly below glass stop surface.
- .3 Standard hollow metal frames for screens and borrowed lights: Place setting blocks and spacers as required to support glass. Use a minimum of two setting blocks, locate at one-quarter points. Locate spacers at jamb edges of glass, uniformly spaced at 600 mm o.c. maximum, and 300 mm maximum from top and bottom.
- .4 Fire rated hollow metal doors: Set glass on continuous setting block with 6 mm gap between glazing stops and embed in putty in accordance with NFPA 80 requirements. All exposed joints between the metal and glass shall be struck and pointed.

3.4 **EXTERIOR GLAZING**

- .1 Apply setting blocks at quarter points on all four sides of openings.
- .2 Cut glazing tape to proper length and set against permanent stops approximately 0.8 mm below sightline. Install horizontal strips first, extend over entire width of opening before applying vertical strips. Weld corners together by butting tape and dabbling with sealant.

- .3 Remove backing paper from tape prior to setting glass.
- .4 Apply continuous heel bead between glass and sash.
- .5 Place glass in opening, press tightly and evenly against glazing tape.
- .6 Apply continuous glazing tape on removable stop. Place and screw stop in place with fluorocarbon coated oval head screws. Apply elastomeric sealant cap bead over top between glass and removable stop.

3.5 **MIRROR INSTALLATION**

- .1 Install with concealed, tamperproof clips, or 100% adhesive method. If clips are used, install cushion tape completely around perimeter of mirror back, set in concealed location within 25 mm of edge. Apply adhesive in strict accordance with manufacturer's printed instructions.
- .2 Where inset in ceramic tile, maintain a mirror-to-tile joint width of not more than 2 mm all around. Otherwise, remove mirror and replace same to satisfy the joint requirement, all at no cost to the Owner.

3.6 **FROSTED SAFETY FILM**

- .1 Install frosted safety film in locations as shown on Drawings and as recommended by manufacturer. Install in accordance with manufacturer's written instructions.

3.7 **IDENTIFICATION OF GLAZING**

- .1 Provide on one side of all glass lites, temporary, easily removable, large safety decals, immediately after glass installation. Maintain safety markings until final clean-up. Remove all markings at time of final clean-up.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- | | | |
|----|--------------------------|--|
| .1 | CISC/CPMA | - Canadian Institute of Steel Construction/
Canadian Paint Manufacturers Association |
| .2 | CSA A82.22-M | - Gypsum Plasters |
| .3 | CSA A82.57-M | - Inorganic Aggregates for Use in Interior
Plaster |
| .4 | CAN/CSA-G40.20/ G40.21-M | - General Requirements for Rolled or Welded
Structural Quality Steel/Structural Quality
Steels |
| .5 | SSPC | - Steel Structures Painting Council |
| .6 | AODA | - Accessibility for Ontarians with Disabilities
Act |

1.3 **QUALITY ASSURANCE**

- .1 Use only skilled tradesmen in accordance with CSA A82.30.

1.4 **SUBMITTALS**

- .1 Submit a Shop Drawing showing control joint arrangement in accordance with Section 01 33 00.

1.5 **DELIVERY, HANDLING AND STORAGE**

- .1 Deliver manufactured materials in original packages and containers bearing brand and manufacturer's name.
- .2 Protect this Work and the work of other trades from damage at all times. Make good or replace any damaged Work caused by the execution of the work of this trade at no additional cost to the Owner.
- .3 Store plaster materials off-ground, and away from any damp surface until ready for use. Remove damaged or deteriorated materials from the site and replace at no additional cost to the Owner.

1.6 **COORDINATION**

- .1 Coordinate with mechanical, electrical and other trades to accommodate fixtures, fittings and any other Work in furred, lathed and plastered areas.

1.7 **SCAFFOLDING**

- .1 Furnish scaffolding, hoisting equipment, etc., required for completion of the Work. Erect scaffolding so as not to interfere with the work of other trades. Promptly remove as soon as the various parts of the Work are concluded. Scaffolding shall be supported only from the floor and shall be inspected by the Consultant prior to the start of all Work.

1.8 **ENVIRONMENTAL CONDITIONS**

- .1 Provide adequate controlled ventilation during application and drying of plaster. Take precautions to prevent too rapid or uneven drying.

2 Products

2.1 **MATERIALS**

- .1 Running and furring channels: 38 mm x 19 mm and 19 mm x 19 mm galvanized steel as required and as shown.
- .2 Metal lath: Galvanized expanded diamond lath, weighing 1.8 kg/m², self furring where placed against a flat surface.
- .3 Gypsum lath: 9.5 mm x 400 mm x 1200 mm long conforming to CSA A82.24, latest edition.
- .4 Tie wire: 1.3 mm (16 gauge) annealed galvanized steel wire.
- .5 Furring rods, brackets: Mild steel, sized as required.
- .6 Casing beads (plaster stops): Square nose and round nose 0.5 mm (26 gauge) galvanized steel with keys or expanded mesh flanges for plaster, sized to accept plaster thickness specified.
- .7 Corner reinforcing beads: 75 mm wide reinforcing strip of metal lath bent to form 38 mm flanges on adjoining corners. Use at plaster interior corners.

AND/OR

- .8 Corner reinforcing beads (heavy duty): 0.5 mm (26 gauge) galvanized steel with expanded wing keys for all exterior plaster corners.

2.2 **CEMENT PLASTER**

- .1 Cement plaster: One part Type 10 Portland cement to three to four parts sand by volume with 15% to 25% lime putty.
- .2 Sand: Washed, free from earth and other harmful materials conforming to the following sieve analysis:

Sieve Size	Percent by Weight Passing Sieve	
No. 4	100	-
No. 8	80	98
No. 16	60	90
No. 30	35	70
No. 50	10	30
No. 100	No more than 10	

- .3 Finish coat: White silica sand, graded to pass a 20 mesh sieve.
- .4 Water: Clean and free from injurious amounts of oil, acid, alkali, organic matter.

2.3 **GYPSUM PLASTER**

- .1 Basecoat plaster: Gypsum neat plaster (hardwall) conforming to CSA A82.22-M.
- .2 Finishing plaster: Hydrated finishing lime and gypsum gauging plaster to CSA A82.22-M, latest editions.
- .3 Sand: Conforming to CSA A82.57-M.
- .4 Bonding plaster (on masonry walls): Specially formulated for use as scratch coat and brown coat as supplied by manufacturer of basecoat plaster.
- .5 Bonding agent (on concrete walls): Compatible with basecoat plaster, as supplied by manufacturer of plaster used. Submit test data and performance record to the Consultant.
- .6 Dense plaster: Plaster of density and thickness to minimum weight of 48 kg/m².
- .7 Isolating hangers: Domtar "Sound Insulation Saddles", or approved equal.

2.4 **FIREPROOFING PLASTER**

- .1 Fireproofing plaster: Gypsum plaster conforming to CSA A82.22-M with integrally mixed perlite aggregate conforming to CSA A82.57-M.
- .2 Metal lath and tie wire: As specified for cement plaster, but self furring.
- .3 Finishing plaster: Hydrated finishing lime and gypsum gauging plaster conforming to CSA A82.22-M, latest edition.

3 Execution

3.1 **SUSPENSION SYSTEM AND LATH INSTALLATION**

- .1 Install ceiling suspension system. Provide supplementary steel supports as required for support of plaster ceilings including mechanical and electrical components in ceiling. Do NOT hang suspension system from metal deck.
- .2 Install metal lath on supports for ceiling in accordance with manufacturer's directions.
- .3 Butt gypsum lath together to moderate contact. Neatly cut around outlets, pipes and openings.

3.2 **PLASTER PREPARATION**

- .1 Clean surfaces to be plastered free of dust, loose particles and other foreign matter which may be detrimental to the bond of the plaster and the surface being plastered. Prepare surfaces to receive plaster.
- .2 Frame for openings and built-in equipment. Install square end expanded wing casing beads around openings, frames, and at edges of plaster, junctions with drywall and unplastered walls, etc. Ensure that they are installed straight, solid and true to line.
- .3 Ensure that all lath and grounds are properly in place before commencing plastering operations.

- .4 Ensure that all conduits, pipes, cables and outlets are properly plugged, capped or covered and all wall sleeves are installed before commencing Work.
- .5 Mask or cover abutting Work with at least 760 mm wide continuous band of heavy building paper to afford protection to same work against droppings, etc. Remove on completion of Work.
- .6 Subdivide ceiling and provide control joints, centred at columns in accordance with reviewed control joint layout.
- .7 The following points shall also be isolated with control joints:
 - .1 At juncture of plaster ceiling with vertical surfaces (walls, columns, beams, etc.).
 - .2 Where plastered masonry walls abut plastered concrete.
 - .3 Where control joints occur in base wall or partition.
 - .4 At jambs of door openings.
 - .5 At construction changes within the plans of the partition or ceiling.

3.3 **MIXING**

- .1 Mix plaster in accordance with plaster manufacturer's printed directions.
- .2 Use watertight containers for mixing. Keep equipment clean and free from set and hardened materials. Clean equipment after each batch. Use only freshly mixed materials. Mix only as much plaster as can be used in one hour. Protect mixes from frost, dust and evaporation.

3.4 **APPLICATION**

- .1 Plaster shall be three-coat work, 19 mm overall thickness.
- .2 Discard partly set, frozen, caked or lumpy material.
- .3 Make plaster work straight, true, flush with grounds and provide a surface free from defects detrimental to appearance or performance.
- .4 Completely isolate plaster ceilings from unplastered works, taking care to avoid splashing and marring adjoining Work.
- .5 Terminate plaster at movement and control joint sides, with the plaster edge encased in plaster stops.
- .6 Basecoat plaster: Apply to a minimum thickness of 16 mm measured from face of lath.
- .7 Apply scratch coat using sufficient material and pressure to form full keys on plaster base. Scratch to a rough surface and allow to set.
- .8 Apply brown coat over dampened scratch coat to a total thickness of 16 mm for basecoats. Bring flush with grounds, rod and darby to a true surface and leave rough, ready to receive finish coat. Rod base coat with a long straight edge to prevent surface variations exceeding 3 mm in 3000 mm. (Damp cure for at least seventy-two hours using a fine fog spray. Apply only as much water as can be readily absorbed.)

- .9 Where plaster finish is flush with door and window frames, cut base coats free to allow for movement. Groove back finish coat at intersections with frames to prevent chipping. Cut plaster free of electrical outlets and other openings.
- .10 The first and second coat over metal lath shall consist of hardwall plaster and sand proportioned in accordance with manufacturer's recommendations.
- .11 The base coats to receive the finish coat shall be brought to a true and even plane, ready to receive the finish coat.
- .12 Apply first coat of three coat work and cross scratch to form key. Apply second coat after first coat has hardened on metal lath. Rod plaster to a true surface with rod and darby and clean out angles. Roughen surface to receive putty finish.
- .13 Apply 13 mm parging, straightened and trowelled smooth where wall carpet is scheduled. Putty finish not required on parging.
- .14 Apply wire lath, furring channels and (perlite) plaster fireproofing to columns where indicated on the Drawings.
- .15 Finish coat: Apply after seven days, sand float cement plaster finish to dampened base coat. Apply from corner to corner in one operation, to a true, even surface. Trowel during set to provide smooth, dense surfaces, free of irregularities and blemishes.
- .16 Prepare lime putty by mixing lime with water and allow mixture to soak for twenty-four hours.
- .17 Prepare finish by mixing with gauging plaster in the required proportions.
- .18 If base coat is dry and suction irregular or excessive, spray surface lightly with water. Avoid excessive wetting.
- .19 Apply gypsum-lime putty trowel finish over base coat by scratching in thoroughly. Lay on well, double back and fill out to a true, even surface 1.5 mm to 3 mm thick. Allow finish to dry a few minutes then trowel well with water to a smooth, polished finish, free from any blemishes or irregularities.

3.5 **FIREPROOFING PLASTER**

- .1 Install lath and apply fireproofing plaster in thickness to obtain the specified fire ratings, all in accordance with ULC requirements. Trowel to a smooth finish.
- .2 Provide corner beads for fireproofed structural members.

3.6 **CLEANING UP**

- .1 Daily, as the Work proceeds and on completion, remove surplus materials completely, leaving floors, heating units, pipes, etc. and the premises generally in good condition. Remove all rubbish of this trade to an off-site disposal.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- | | | |
|----|--------------------------|--|
| .1 | ASTM A653/653M | - Standard Specification for Sheet Steel, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dip Process |
| .2 | ASTM A568/A568M | - Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for |
| .3 | ASTM C1396/C1396M | - Standard Specification for Gypsum Board |
| .4 | ASTM C475/C475M | - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board |
| .5 | ASTM C645 | - Standard Specification for Nonstructural Steel Framing Members |
| .6 | ASTM C1002 | - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs |
| .7 | CAN/CSA-G40.20/ G40.21-M | - General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels |
| .8 | SSPC | - The Society for Protective Coatings, "Steel Structures Painting Manual, Vol. 2" |
| .9 | AODA | - Accessibility for Ontarians with Disabilities Act |

1.3 **QUALITY ASSURANCE**

- .1 Retain workmen skilled in gypsum board work to perform Work of this section in accordance with this Specification and the latest printed directions of the manufacturer.

1.4 **DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials in original packages, containers and bundles bearing brand and manufacturer's name. Handle materials with care to prevent damage thereto. Store in a covered area off the ground, on flat, smooth, dry surfaces.
- .2 Protect this Work against damage at all times. Protect from moisture until ready for use.

1.5 **PROJECT/SITE CONDITIONS**

- .1 In cold weather and during period of gypsum board application and joint finishing, maintain temperatures within the building uniformly within the range of 13°C to 21°C (55°F to 70°F). Also provide adequate ventilation to eliminate excessive moisture within the building during this same period.

2 Products

2.1 **MATERIALS**

- .1 Manufacturer: Canadian Gypsum Co. Limited (CGC), Georgia-Pacific Corp. (GP), or Certain Teed Gypsum Canada Inc., unless specifically stated otherwise. Gypsum board shall conform to the flame spread rating requirements of the Ontario Building Code.
- .2 Main runner channels: 38 mm x 19 mm, cold rolled galvanized steel channels, weighing not less than 0.8 kg/m conforming to ASTM A568/568M and ASTM A653/653M.
- .3 Metal furring channels: 22 mm winged flange type, cold rolled galvanized steel channels conforming to ASTM A568/568M and ASTM A653/653M.
- .4 Hangers: 5 mm diameter pencil rods or 32 mm x 3 mm galvanized steel flat bars to CSA A82.30-M.
- .5 Tie wire: Not less than No. 18 gauge galvanized wire.
- .6 Metal studs: Standard gypsum board screw-on stud system complete with floor and ceiling runners conforming to ASTM A568/568M, ASTM C645 and ASTM A653/653M. Size: 32 mm wide x depths shown on Drawings. Use 20 gauge for abuse-resistant board.
- .7 Metal Stud Reinforcement: Provide hollow structural steel, stud, angle and steel plate sections, galvanized sheet steel minimum 1.214 mm (18 ga) where required to support manufactured components.
- .8 Shaftwall framing: "C-H" studs complete with "J" runners and "E" studs as required, all hot-dip galvanized.
- .9 Gypsum board: 13 mm and 16 mm thick, with tapered and rounded edge for joint filling, and in 1200 mm wide sheets of maximum practical lengths to minimize end joints:
 - .1 For general use: GP "ToughRock", CGC "Sheetrock" or CertainTeed "ProRoc" Regular Gypsum Board" conforming to ASTM C1396.
 - .2 For exterior soffit application: CGC "Exterior Ceiling Panel", GP "ToughRock Soffit Board" or Certain Teed equivalent, conforming to ASTM C1396.
 - .3 For fire rated assemblies: 16 mm thick Type "X" core conforming to ASTM C1396.
 - .4 For exterior wall sheathing: GP "Dens Deck" or Certainteed "ProRoc Sheathing Treated Core", CGC "Gyplap Sheathing", GP "ToughRock Sheathing", 13 mm thick conforming to ASTM C79.
 - .5 Liner for shaftwall: CGC "Shaftwall Linerpanel" or GP "Toughwall Fireguard Shaftliner" or Certain Teed equivalent, double bevelled edge, 25.4 mm thick, conforming to ASTM C1396.

- .6 For abuse resistant use: CGC "Abuse-Resistant Gypsum Board Panels" with tapered edges, GP "ToughRock Abuse-Resistant Gypsum Board", or Certain Teed equivalent.
- .7 Interior Ceiling board (sag resistant): "Easi-Lit Lightweight Drywall" by CertainTeed Gypsum Inc., "Sheetrock Interior Ceiling Board" by CGC Inc., "ToughRock CD Ceiling Board" by Georgia Pacific Canada.
- .10 Cement board: In accordance with ASTM C1396/C1396M, "Durock Cement Board by CGC Inc", "Permabase" by National Gypsum.
- .11 Backer board for shower rooms: 13 mm thick, in any of the following types:
 - .1 Walls: Cementitious board, "PermaBase" by National Gypsum, "Util-A-Crete" distributed by Olympia Tile International Inc., "Durock" distributed by Canadian Gypsum Company, or "Wonder Board" by Canwel.
 - .2 Ceilings: Composite board, "Dens-Shield" by Georgia Pacific or Certain Teed equivalent.
- .12 Column covers: Non-combustible glass fibre-reinforced high density gypsum (GRG) conforming to ASTM E-84, fabricated in two vertically divided sections attached with screws and with field finished joint. All fasteners are to be concealed. Provide all support structures. Acceptable manufacturers: Formglas Inc. or DecoForm Inc.
- .13 Backer board screws: "Hi-Lo" bugle head Type S point concrete backer board screws, corrosion resistant.
- .14 Gypsum board screws: 5 mm x 25 mm (No. 6 gauge) x 1" long for metal furring application and 5 mm x 32 mm (No. 6 gauge) x 1-1/4" long for metal stud application. Screws shall be self-drilling, case hardened, with socket countersunk heads to ASTM C1002, Type S.
- .15 Screws for gypsum board on wood studs: 5 mm (No. 6 gauge) x length to penetrate minimum 16 mm into wood. Screws shall conform to ASTM C1002, Type W.
- .16 Nails for exterior gypsum board sheathing on wood framing: Roofing type, galvanized.
- .17 Inserts for concrete slabs: Ceiling Wire X-CW or Ceiling Clip X-CC by Hilti Canada, Tie wire anchors, Red Head TW-1614 by ITW Canada Inc., Parabolt Wire Hanger distributed by Acrow-Richmond Ltd., T-14 Eyebolt by Ramset Ltd. or Tie Wire Drive TW-932 by Isometric Ltd, or accepted equal.
- .18 Accessories
 - .1 External corner reinforcement: Domtar "Metal Corner Bead", CGC "Dur-A-Bead", Certainteed "AquaBead Corner Reinforcement" or GP equivalent.
 - .2 Casing beads: 0.56 mm (25 gauge) galvanized steel designed to accept the specified thickness of gypsum board.
 - .3 Joint reinforcement tape (gypsum board): Domtar "Joint Tape" CGC "Perf-A-Tape", Certainteed "FibaTape" or GP equivalent, conforming to ASTM C475.
 - .4 Joint reinforcement tape (backer board): Glass mesh.

- .5 Joint filler, topping cement: For gypsum board, use manufacturer's high grade premixed compound. For composite and cementitious backer board, use board manufacturer's high grade premixed compound for waterproof exposure.
- .6 Control joint strip: Roll formed zinc coated metal with a tape protected void, 6 mm wide throat x 11 mm deep with flanges for embedding in joint compound.
- .7 Cement board joint filler: Type as recommended by cement board manufacturer.
- .19 Adhesive for gypsum board on rigid insulation: 3M No. 2166 or ICI Devco D.W.24.
- .20 Adhesive for gypsum board on masonry or concrete walls: Joint filler mixed with water in accordance with manufacturer's directions.
- .21 Acoustic insulation: 50 mm thick QuietZone Acoustic Batt by Owens Corning, "Sustainable Insulation Noise Reducer" by Certainteed, "Thermafiber Sound Attenuation Fire Blanket" by Thermafiber Inc., "SAFB" by Fibrex Insulations, Inc. or "AFB" by Roxul.
- .22 Acoustic sealant and spray: Tremco "Acoustical Sealant", PRC "PR181", U.S.E.-Hickson "Kop•R•100" or Wilrep "SilenSeal" (water based), "CP 506 Smoke and Acoustic Sealant" or "CP 572 Smoke and Acoustic Spray" by Hilti Canada, or accepted equal. Covering bead at exposed applications shall be a material compatible with acoustic sealant, suitable for painting, as supplied by acoustic sealant manufacturer.
- .23 Supplementary steel supports: Steel conforming to Section 05 50 00 of this Specification.
- .24 Metal deck flute closure: Moulded to deck profile; moulded cellular neoprene or rubber closure pieces at non-rated locations and fire rated closed cell neoprene conforming to ASTM D1056 or D2056 at fire rated locations.

2.2 **FRAMING SYSTEMS**

- .1 Acceptable products: Model CFS-TTS "Firestop Top Track Seal" by Hilti Canada or approved equal.
- .2 Slip-type head joints: Deflection track.
- .3 Firestop top track seal: One-piece, pre-formed, polyurethane foam based, firestop seal for use with standard head-joint top tracks and bottom-joint tracks, and slip-type head joints in fire-rated construction at top of bottom of partition to maintain continuity of the fire resistance rated assembly. Provide in width and configuration required to accommodate depth and installation of studs and designed to saddle over the top track or under the bottom track.
 - .1 Track seal shall be UL 2079 tested for specific fire rated construction conditions conforming to construction assembly type, space requirements and fire-rating required for each application.
 - .2 Performance Requirements:
 - .1 Movement: +/- 50%
 - .2 Surface burning characteristics in accordance with CAN/ULC S102-10:
 - .1 Flame spread: 15
 - .2 Smoke developed: 35

.3 Mold-mildew performance in accordance with ASTM G21-96, Class 0.

.4 VOC content: 0.16 lb/gallon

3 Execution

3.1 **SUSPENSION SYSTEM**

.1 Locate anchorage points in reinforced concrete floor slab underside (35 MPa (others) compressive strength) in accordance with gypsum board manufacturers' suspension requirements. Drill holes with carbide-tipped drill bits conforming to ANSI B94.12-M. Install anchors; minimum installation depth and method of expansion as recommended by anchor manufacturer.

.2 DO NOT secure hangers to metal deck or mechanical ducts. Hang grillage for suspended gypsum board ceilings independent of walls, pipes, ducts. Securely anchor to the building structural framing (slab).

.1 Space hangers at 1200 mm maximum centres along the carrying channels, and not more than 150 mm from ends.

.2 Place supplementary steel supports as required to maintain hanger spacing and to keep metal deck and mechanical ducts free from hangers being secured to.

.3 Space carrying channels at maximum 1200 mm centres and not less than 25 mm nor more than 150 mm from boundary walls.

.1 Run the channels transverse to structural framing members.

.2 Where splices are necessary, lap members at least 200 mm and wire each end with two loops.

.3 Avoid clustering or lining up splices. Attach to rod hangers by bending hanger sharply under bottom flange of runner and securely wire in place with a saddle tie.

.4 Note: All stems on precast concrete double tee deck have 13 mm diameter holes, at 1200 mm o.c. and are available to ALL trades for attachments and hangers. Not all holes will therefore be used for gypsum board suspension alone. Provide supplementary steel as required and attach to holes that are available.

.5 Install furring channels transverse across carrying channels or other supports.

.1 Space at 400 mm centres and not less than 25 mm nor more than 150 mm from boundary walls, openings, interruptions in ceiling continuity and change in direction.

.2 Secure to each support with clips or equivalent attachment.

.3 Splice joints by nesting and tying channels together or with custom splicers.

.4 Level to a maximum tolerance of 3 mm over 3600 mm.

.5 Reinforce wherever necessary for the proper support of luminaires, access hatches, ceiling grilles, outlet boxes, ventilating outlets and all other openings.

.6 Provide special furring as required at recessed lights.

- .6 Provide (expansion/) control joints in ceilings, furring and panelling where stresses are likely to develop, such as at the following locations:
 - .1 At abutting structural elements
 - .2 At dissimilar walls and ceilings
 - .3 At dissimilar backup interface at structural expansion and control joints
 - .4 At wings of "L", "U" and "T" shaped ceiling areas
 - .5 At 9000 mm maximum spacing in continuous runs
- .7 Form control joints using continuous furring channels along each side of joint locations, and filling control joint space with specified joint strip, secured in place, making straight joints. Temporarily tape control joint "V" grooves in preparation for joint filling.

3.2 **STEEL STUDS AND FURRING**

- .1 Install tracks at floors, ceilings and underside of deck over, align accurately and secure to structure at 600 mm centres maximum. Avoid piercing metal deck.
- .2 Close opening between top track and steel deck flutes on all full height partitions and bulkheads with specified deck flute closure. Install carefully and compress into place to close flute openings.
- .3 Close opening between track and concrete deck on all full height partitions. Where partitions are at right angles to stems on precast concrete double tee deck, extend studs above bottom of stems as required to support gypsum board. Cut and fit top track between stems.
- .4 On full height partitions at coffered ceilings, stop studs at ceiling level, install studs from top of ceilings to concrete deck. Cut and fit top track between stems as required.
- .5 Place studs vertically at 400 mm o.c. and not more than 50 mm from abutting walls, openings and each side of corners. Install studs and secure to tracks.
- .6 Arrange for mechanical and electrical horizontal runs within walls to be installed simultaneously with partitions.
- .7 Provide freedom for deflection under beams and deck to prevent transmission of structural loads to studs, or install 50 mm deep telescoping top tracks.
- .8 At openings, install horizontal track to accommodate intermediate studs. Cut out flanges at each end of track, turn up webs and screw to studs. Install intermediate studs above and below openings at same spacing as wall studs.
- .9 Provide double studs at all hollow metal door jambs. Secure at top and bottom and brace back to adjacent studs at mid-point.
- .10 Provide control joints in gypsum board partitions where stresses are likely to develop, such as at the following locations:
 - .1 At abutting structural elements
 - .2 At dissimilar backup interface
 - .3 At dissimilar walls and ceilings

- .4 At structural expansion and control joints
- .5 At door and other openings
- .6 At 9000 mm maximum spacing in continuous runs
- .11 Form control joints using double studs back to back on each side of joint locations, and filling control joint space with specified joint strip secured in place, making straight joints. Temporarily tape control joint "V" grooves in preparation for joint filling.
- .12 Fixture and cabinet supports: Verify location of supports within gypsum board assemblies to support wall mounted fitments, cabinets, and other items. Cooperate and coordinate with carpentry trade and provide information in ample time to ensure supports are provided in the correct locations.
- .13 Metal Stud Reinforcement: Ensure rigid and secure installation capable of offering resistance to minimum 227 kg (500 lbs) pull force. Galvanize stud reinforcements in moist areas. Do not use wood blocking for this purpose. Provide additional reinforcing framing studs or furring channels secured between studs for attachment and support without limitations for the following:
 - .1 Washroom accessories.
 - .2 Fire hose cabinets.
 - .3 Access panels.
 - .4 Architectural woodwork.
 - .5 Miscellaneous specialties.
 - .6 Fitments and fixtures.
 - .7 Equipment

3.3 **GYPSON BOARD ON METAL SUSPENSION, STEEL STUDS AND FURRING**

- .1 Erect gypsum boards vertically or horizontally, whichever results in fewer end joints. Locate edge or end joints over supporting members. Stagger vertical joints over different studs on opposite sides of partitions.
- .2 Locate vertical joints at least 300 mm from the jamb lines of openings.
- .3 Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1.6 mm open space between boards. Do not force into place.
- .4 Position boards so that both tapered edge joints abut, and mill-cut or field-cut where end joints abut. Do not place tapered edges against cut edges or ends.
- .5 Attach gypsum board to framing (and blocking) as required for additional support at openings and cutouts.
- .6 Do not locate joints within 200 mm of corners or openings, except where control joints are shown at jamb lines or where openings occur adjacent to corners in the partition/wall layout. Where necessary, place a single vertical joint over the centre of wide openings.

- .7 Where feasible, and where recommended by manufacturer, install gypsum board with "floating" corner construction, unless isolation of the intersecting boards is indicated or unless control or expansion joints are indicated.
- .8 Drive screws with a power screw-gun and set with the countersunk head slightly below the surface of the board.
- .9 In the case of double layers of gypsum board, screw first layer to studs and furring, laminate second layer to first using joint filler as an adhesive. Stagger joints between first and second layers. Brace face layer until adhesive has dried.
- .10 Install fire rated gypsum board to provide the fire ratings shown. Conform to applicable ULC/Warnock-Hersey designs and to manufacturer's specifications. Provide corner beads on all external corners.
- .11 Receive access panels from mechanical division and install in gypsum board assemblies. Coordinate locations with mechanical division.

3.4 **ACOUSTIC INSULATION**

- .1 Install sound attenuation blankets to full height and full width of partitions where indicated. Fit carefully behind electrical outlets and other Work which penetrates partitions.

3.5 **INSTALLATION OF SHAFTWALL**

- .1 Install runners at floors and underside of deck over, align accurately and secure to structure at 600 mm centres maximum with short leg toward finish side of wall.
- .2 Close opening between top track and steel deck flutes on all full height partitions and bulkheads with specified deck flute closure. Install carefully and compress into place to close flute openings.
- .3 Cut liner panel 25 mm less than floor to ceiling height and erect vertically between J-runners. If wall exceeds maximum panel length, position panel and joints within upper and lower third points of wall. Stagger joints top and bottom in adjacent panels and reinforce joints with horizontal C-H studs. Screw-attach studs or runners on walls over 4800 mm high.
- .4 Install studs to within 10 mm of floor to ceiling height, between liner panel, with panel edge inserted into stud groove. Install full length steel E-studs or J-runners vertically at intersections, corners, and columns. Frame openings to maintain structural support for wall.
- .5 Install gypsum panels on finish side to studs with 25 mm type S screws at 300 mm maximum.
- .6 Provide freedom for deflection under deck to prevent transmission of structural loads to studs.
- .7 Install horizontal shaftwall using C-H studs at 600 mm o.c. unless shown otherwise. Use J-runner to connect system to wall studs. Screw fasten gypsum board to J-runners.
- .8 Provide control joints where stresses are likely to develop, such as at the following locations:
 - .1 At abutting structural elements

- .2 At dissimilar backup interface
- .3 At dissimilar walls and ceilings
- .4 At structural expansion and control joints, openings
- .5 At 9200 mm maximum spacing in continuous runs
- .9 Form control joints using J-runners or E-studs back to back on each side of joint locations, and filling control joint space with specified joint strip secured in place, making straight joints.
- .10 Install firestopping and sealant along perimeter edge, top and penetrations in fire rated assembly.

3.6 **GYPSUM BOARD ON RIGID INSULATION**

- .1 Apply gypsum board by mechanical screwing and adhesive to insulation and to channels impaled in insulation. Channels are vertical, at 400 mm (600 mm) o.c.
- .2 Apply adhesive to foil face of insulation or back of wallboard with 3 mm continuous beads at 200 mm o.c.
- .3 Erect gypsum board vertically or horizontally, whichever results in fewer end joints. Press to firm contact with adhesive.
- .4 Screw to all channels at 300 mm o.c. using power screw-gun. Set screws with countersunk heads slightly below board surface.

3.7 **ACCESSORIES**

- .1 Erect plumb, or level, with minimum joints.
- .2 Corner reinforcing bead: Install along all external angles. Secure with screws at 225 mm o.c. Apply filler over flanges flush with nose of the bead and extending at least 75 mm onto surface of board each side of corner. When filler dries, apply a thin coat of topping cement and blend onto adjoining surfaces.
- .3 Casing beads: Install where wallboard butts against a surface having no trim concealing the juncture. Secure with screws at 300 mm o.c. Apply filler over flange flush with nose of the bead and extending at least 75 mm onto surface of board. When dry, apply a thin coat of topping cement and blend onto adjoining surfaces.
- .4 Recess channels and trim: Secure recess channels and special metal trim to substrate. Provide casing beads full height on wallboard edges at recess channels and metal trim.

3.8 **JOINT TAPING, FINISHING**

- .1 Apply a coat of joint filler over board each side of joint and embed reinforcing tape. Cover edges of embedded tape with a thin coat of joint filler and complete joint with a final coat of topping cement feathered at least 200 mm each side of joint and cambered to a maximum thickness of 1.6 mm.
- .2 Fill any gaps between boards at internal corners with joint filler, allow to dry. Apply thin coat of joint filler over board 50 mm on each side of corner. Embed angularly creased reinforcing tape and cover edges of tape with a thin coat. Apply second coat over tape on one side of corner and allow to dry before covering tape on other side. Apply finish coat of topping cement.

- .3 Fill screw holes and depressions over each screw and nail head with joint filler/topping cement.
- .4 After topping cement has dried, sand surface lightly with No. 00 sandpaper and leave smooth, ready for painting. Apply second coat of filler if required.
- .5 Finish work smooth, seamless, plumb, true, flush and with square, plumb, neat corners.
- .6 Remove control joint "V" groove tape.

3.9 **JOINT TREATMENT OF BACKER BOARD - TILED AREAS**

- .1 Pre-fill joints of board with thin-set mortar and embed glassfibre tape. Press to a smooth finish. Allow to cure.
- .2 Provide control joint around ceiling perimeter, in addition to locations outlined earlier in this section.

3.10 **JOINT TREATMENT AND FINISHING OF BACKER BOARD - UNTILED**

- .1 Apply 50 mm glassfibre tape uniformly over joints and corners in a bed of joint compound. Cover fasteners with joint compound. Apply in accordance with manufacturer's directions.
- .2 Apply board manufacturer-recommended base coat uniformly on surface of board.
- .3 Apply 2.4 mm thick uniform water resistant skim coat as recommended by board manufacturer, finish smooth similar to that of gypsum board, ready to receive coating.
- .4 Provide control joint around ceiling perimeter, in addition to locations outlined earlier in this section.

3.11 **FINISHING**

- .1 Finishing shall conform to the following ASTM C840 finish levels:
 - .1 Level 0: For temporary construction.
 - .1 No taping, finishing or corner beads required.
 - .2 Level 1: Gypsum board in areas above ceilings, concealed spaces, service corridors and other areas not open to public view, and in areas where sound and smoke control is required.
 - .1 All joints and angles shall have tape embedded in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
 - .3 Level 2: Where water resistant gypsum backing board (ASTM C630) is used as tile substrate, in warehouse storage or similar areas where surface appearance is not a primary concern.
 - .1 All joints and angles shall have tape embedded in joint compound and have one separate coat of joint compound wiped with joint knife and leaving a thin coating over the tape and fastener heads. Cover accessories by one coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges shall be acceptable.

- .4 Level 3: Gypsum board in areas to receive heavy or medium texture finishes before final painting or where heavy grade wall coverings are to be applied as the final decoration. Do not use where smooth painted surfaces or light to medium wall coverings are specified.
 - .1 All joints and angles shall have tape embedded in joint compound and two separate applications of joint compound over all joints, angles and fastener heads. Cove accessories with two separate coats of joint compound. Joint compounds shall be smooth and free of tool marks and ridges. Cover the prepared surface with a drywall primer prior to the application of the final decoration.
- .5 Level 4: Gypsum board in areas where flat paints, light textures (or backed wall coverings) are to be applied. Adequately conceal joints and fasteners if wall covering material is lightweight, contains limited pattern, has a gloss finish or combination of these finishes.
 - .1 All joints and angles shall have tape embedded in joint compound and have three separate coats of joint compound over all joints, angles and fastener heads. Cover accessories with three separate coats of joint compound. All joint compounds shall be free of tool marks and ridges. Cover the prepared surface with a drywall primer prior to the application of the final decoration, and repair if required.
- .6 Level 5: Where gloss, semi-gloss or non-textured flat paints are specified.
 - .1 Equal to level 4 and, in addition, apply a skim coat. Immediately shear off excess material leaving a film covering the paper. Cover the prepared surface with a drywall primer prior to the application of the final decoration.

3.12 **ACOUSTICAL CAULKING**

- .1 Apply acoustic sealant as the installation of acoustically insulated partitions proceed to ensure concealment of sealant. Work includes sealing perimeter of partitions, and openings and penetrations through partitions to achieve STC rating (required) shown on Drawings, in accordance with sealant manufacturer's printed directions.
- .2 Seal as follows
 - .1 At partitions, provide continuous, two 6 mm concealed beads of acoustical sealant under tracks and runners, behind steel studs at perimeter, and wherever Work abuts dissimilar materials.
 - .2 At ceilings, provide continuous, two 6 mm concealed beads of acoustical sealant wherever Work abuts dissimilar materials.
 - .3 Provide double seal at laminated partition faces. Install face layer with 6 mm edge clearance at terminations of Work, and install continuous bead of acoustical sealant all around.
 - .4 At openings and cutouts, fill open spaces between edges of gypsum board and fixtures, cabinets, ducts and other flush or penetrating items, with continuous bead of acoustical sealant.
 - .5 Seal sides and backs of electrical boxes to completely close up openings and joints with a bead of acoustical sealant.

- .6 Where sound-rated partitions intersect non-rated walls or partitions, extend sound-rated construction to completely close sound flanking paths through non-rated construction. Seal joints between face layers at vertical interior angles of intersecting partitions.
- .7 Ceiling plenums: Where sound-rated partitions extend through non-sound rated ceilings to structural substrates above, extend the same treatment to that portion of the partition above the ceiling as specified for portion below the ceiling.
- .8 For double-layer partition applications, install base layer only above ceilings.
- .3 Note: Where acoustic sealant is applied at exposed joints, apply a covering bead of topping sealant finish to a smooth, shallow concave surface.
- .4 Remove any excess sealant and smears as Work progresses and leave the Work in a clean condition to Consultant's satisfaction.

3.13 **CUTTING, DRILLING AND PATCHING**

- .1 Cut, drill and patch gypsum board as may be necessary to accommodate the work of other trades.

3.14 **PROTECTION BOARD**

- .1 Neatly cut boards in straight line. Position in place and butt together in moderate contact with 3 mm gap between boards.
- .2 Predrill and screw in place keeping a fastener distance of 19 mm from edge of board, and in accordance with manufacturer's directions.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 ASTM C920 - Standard Specification for Elastomeric Joint Sealants
.2 TTMAC - Terrazzo, Tile and Marble Association of Canada
.3 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **QUALITY ASSURANCE**

- .1 Retain a Subcontractor regularly engaged in installing ceramic tile for a minimum of five years, and whom has had a minimum of three successful installations of the type called for in this section, each at least three years old. Likewise Subcontractor shall be a member in good standing of the Terrazzo, Tile and Marble Association of Canada (TTMAC).
.2 Submit upon Consultant's request, documented evidence of compliance with the foregoing.

1.4 **SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00.
.2 Submit one representative sample plate of (each) tile material specified. Mount tiles on 400 mm x 400 mm plywood using specified thin set mortar, grout and sealer. Identify with Project name and number, date, tile type and manufacturer's name, and Subcontractor's name.
.3 Approved samples shall be used as minimum standard for all Work under this section and installed Work must match samples in every respect.
.4 Certification: Submit certification for each type of floor tile as follows:
.1 Porcelain tiles shall be tested in six categories of slip resistance. Using the most recent edition of ASTM C1028, test for wet and dry slip resistance using three surfaces; rubber, leather and neolite.
.2 Minimum acceptable values when tested in accordance with the above standards shall be:
.1 Rubber wet 0.60 minimum.
.2 Rubber dry 0.60 minimum.
.3 Leather wet 0.60 minimum.
.4 Leather dry 0.60 minimum.

.5 Neolite wet 0.60 minimum.

.6 Neolite dry 0.60 minimum.

.3 Certification shall have been conducted by a nationally recognized independent testing laboratory acceptable to the Consultant.

1.5 **DELIVERY, STORAGE AND HANDLING**

.1 Deliver materials in adequate crates or containers with manufacturer's name and Product description clearly marked thereon.

.2 Handle and store tiles in a manner to avoid chipping, breakage or the intrusion of foreign matter. Take precautions to protect the mortar and grout admixtures from freezing or from excessive heat.

1.6 **MAINTENANCE**

.1 Upon completion of Work, deliver maintenance tiles in quantities equivalent to 5% (to nearest full carton) of each tiled area (wall and floor), including fittings, as required for Owner's future maintenance purposes.

.2 Obtain maintenance tiles and fittings from the same production run as tiles and fittings installed. Put in heavy duty boxes and clearly label.

1.7 **MAINTENANCE GUIDE**

.1 Submit four copies of TTMAC Maintenance Guide latest edition, for inclusion in the Owner's Maintenance Manual in accordance with Section 01 33 00. Give specific warning of any maintenance practice or materials which may disfigure the finished Work.

1.8 **WARRANTY**

.1 Warrant Work of this section against defects and deficiencies for a period of two years from date Work is certified as substantially performed in accordance with the general conditions of the Contract.

.2 Promptly make good defects and deficiencies which become apparent within the Warranty Period by replacing defective Work satisfactory to the Consultant and at no expense to the Owner.

.3 Defects shall include but not limited to loss of bond, loosening, cracking, splitting, warping and deformations.

2 **Products**

2.1 **MATERIALS**

.1 Floor tiles: Porcelain ceramic tiles complete with trim fittings including bullnosed tiles for floors at doors where tile meets other finishes thinner than the porcelain tile, and 100 mm coved base units to match tiles. Types as follows:

.1 General Tile; Floor:

.1 Through body unglazed porcelain tile.

.2 Colour: to be selected by Consultant

- .3 Size: 300 x 600 mm.
- .4 Slip Resistance: DCOF- 0.42 min. dry/wet in accordance with ANSI A137.1, when tested to BOT 3000 Digital Tribometer.
- .5 Approved manufacturers:
 - .1 Olympia Tile
 - .2 Stonetile
 - .3 Or accepted equal
- .2 Washroom Floors:
 - .1 Through body unglazed porcelain tile.
 - .2 Colour: as indicated on Drawings
 - .3 Size: 300 mm x 600 mm.
 - .4 Slip Resistance: Slip Resistance: DCOF- 0.42 min. dry/wet in accordance with ANSI A137.1, when tested to BOT 3000 Digital Tribometer.
 - .5 Approved manufacturers: Emotion by D9 or approved alternative
- .3 Shower Floors:
 - .1 Through body unglazed porcelain tile.
 - .2 Colour: as indicated on Drawings.
 - .3 Sizes: 48 mm x 48 mm.
 - .4 Slip Resistance: DCOF- 0.42 min. dry/wet in accordance with ANSI A137.1, when tested to BOT 3000 Digital Tribometer.
 - .5 Approved manufacturers: STI Mosaic by Stonetile or approved alternative.
- .2 Wall (and ceiling) tiles: Glazed ceramic wall tiles in 100 mm x 400mm size complete with trim fittings including integral coves, sanitary caps and beads. Types as follows:
 - .1 Washroom / Shower Walls:
 - .1 Collection: Colour & Dimension.
 - .2 Colour: as indicated on Drawings.
 - .3 Manufacturer: Olympia Tile or accepted equal.
 - .2 Washroom / Shower Accent:
 - .1 Collection: Colour & Dimension.
 - .2 Colour: as indicated on Drawings.
 - .3 Manufacturer: Olympia Tile or accepted equal.

- .3 Kitchen Countertop and Backsplash:
 - .1 Collection: Supernatural
 - .2 Colour: Empire White
 - .3 Manufacturer: Caesarstone "Quartz" or accepted equal
- .4 Levelling coat: Latex liquid and factory mixed cement/powder.
 - .1 Daltile "Laticrete 3701/226"
 - .2 Mapei "Kerabond/Keralastic"
 - .3 Kiesel "Servoflex-Trio-Supertech": Flexible full transfer thinset and medium bed mortar
- .5 Waterproof membrane: Meeting ANSI 118.10 Specification for load bearing, bonded, waterproof membranes for thin-set ceramic tile and dimension stone installation.
 - .1 Mapei "Mapelastic" with Mapei reinforcing mesh
 - .2 Laticrete "9235"
 - .3 Kiesel "DMS-1K Schnell SuperTech": Fast setting, one component, cement based waterproofing and sealing sleeves and strips
- .6 Crack suppressant membrane: Fabric or mesh reinforced, meeting TTMAC requirements.
 - .1 Mapei "Mapelastic"
 - .2 Laticrete "9235"
 - .3 Kiesel "DMS-1K Schnell SuperTech": Fast setting, one component, cement based waterproofing with sealing sleeves and strips
- .7 Setting Bed and Thin-set:
 - .1 Thin set liquid latex-portland cement mortar: Field mixed, high strength thin bed mixture of latex-additive portland cement-filler powder.
 - .1 For tiles 200 mm x 200 mm or less in size:
 - .1 Mapei "Kerabond/Keralastic"
 - .2 Laticrete "4237/211"
 - .3 Flextile "41/silica sand and cement"
 - .4 Kiesel "Servoflex-Trio-Supertech": Flexible full transfer thinset and medium bed mortar
 - .2 For tiles over 200 mm x 200 mm up to 300 mm x 300 mm in size:
 - .1 Mapei "Kerabond / Keralastic"
 - .2 Laticrete "4237 / 211"
 - .3 Flextile "53 / 44"

- .4 Kiesel "Servoflex-Trio-Supertech": Flexible full transfer thinset and medium bed mortar
- .3 For 330 mm x 330 mm tiles, use a full contact thin set mortar:
 - .1 Mapei "Ultracontact"
 - .2 Kiesel "Servoflex-Trio-Supertech": Flexible full transfer thinset and medium bed mortar
- .4 Polymer modified portland cement grout: Field mixed, high strength polymer modified portland cement/sand for floors; unsanded for wall applications. Colour to match tiles.
 - .1 Grout line width greater than 5 mm
 - .1 Mapei "Ultracolor Plus"
 - .2 Laticrete "Floor grout with 1776 additive"
 - .3 Flextile "PM 600 Grout"
 - .4 Kiesel "Servoflex F": Universal flexible, water and stain repellent grout
 - .2 Grout line width between 1.5 mm to 3 mm
 - .1 Mapei "Ultracolor Plus"
 - .2 Laticrete "Wall grout with 1776 additive"
 - .3 Flextile "PM 500 Grout"
- .8 Kiesel "Servoperl": Water and stain repellent grout.
- .9 Edge protection and transition strips:
 - .1 Anodized aluminum profile with textured, sloped exposed surface, tapered leading edge and integrated grout joint spacer. Transition strips shall form a smooth transition where tile abuts another flooring surface.
 - .1 Material and Finish: Satin Anodized Aluminum
 - .2 Height: 12.5 mm
 - .3 Ramp length: 64 mm.
 - .4 Accepted manufacturer: Schluter "RENO-RAMP-K" or accepted equal.
 - .2 Ball-and-socket hinged profile with sloped exposed surface, tapered leading edge, integrated trapezoid-perforated anchoring leg and integrated grout joint spacer. Transition strips shall form a smooth transition where tile abuts another flooring surface.
 - .1 Material and Finish: Satin Anodized Aluminum
 - .2 Height: as required to coordinate with tile selection and setting system selected.

- .3 Ramp length: as required.
 - .4 Accepted manufacturer: Schluter "RENO-V" or accepted equal.
 - .3 Tile edge protection (for outside corners and edges): "Jolly" by Schluter as supplied by Centura. Finish: Anodized aluminum.
 - .10 Floor sealer and protective coating: Compatible with tiles installed as recommended by tile manufacturer, to protect tile from yellowing, powdering, scuffing, acid, alkalis, calcium chloride and detergent dulling.
 - .11 Use epoxy grout or approved group sealer for all tiled floors.
 - .12 Prefabricated control and expansion joints: Provide "Movement Joint Profiles" by Schluter or approved alternative in styles and sizes to suit application and as approved by Consultant.
- 3 Execution
- 3.1 **PREPARATION OF SURFACES**
- .1 Ensure surfaces are thoroughly clean, dry and sound. Remove oil, wax, grease, dirt, paint, form release agent, and other foreign material that may impair proper tile bond to wall and floor surfaces. Use mechanical methods such as sanding for walls or bead blasting for floors.
 - .2 On surfaces to be waterproofed, prepare concrete substrate in accordance with waterproofing manufacturer's preparation standards.
 - .3 Ensure substrates are structurally sound, level and plumb, within a maximum tolerance of 3 mm in 2.4 m for vertical surfaces, and horizontal surfaces within a maximum tolerance of 6 mm in 3 m from finished levels of the surface, or better.
 - .4 Trowel apply a levelling coat on uneven surfaces, or surfaces which do not guarantee a plumb or level finish to the tile, at a minimum of 6 mm thick.
 - .5 Do not set tile on surfaces containing frost. Maintain temperature to a minimum of 10°C (50°F) during installation. Maintain temperature above freezing until mortar and grout have properly cured. The lower the temperature, the longer tile curing will take.
- 3.2 **FLOOR CONTROL JOINTS**
- .1 Clean control joints occurring in slab areas to receive tile and blow clean with compressed air. Use a vacuum to avoid spreading dust in areas to be tiled. Grout flush to slab with cement compound using same materials as specified for levelling coat.
- 3.3 **TILE LAYOUT**
- .1 Lay out Work to produce a symmetrical pattern with minimum amount of cutting. Ensure cut tile at room perimeter is not less than one-half full size.
- 3.4 **WATERPROOFING MEMBRANE**
- .1 Prepare concrete sub-floor in accordance with waterproofing manufacturer's directions.
 - .2 Apply with a trowel on prepared substrate to a total dry film thickness of 635 microns (25 mils) in accordance with manufacturer's directions. Carry up walls to 100 mm high.

- .3 In the case of reinforcing mesh or fabric, embed mesh or fabric while the first coat is fresh and apply a second coat on the mesh or fabric in accordance with manufacturer's written directions.

3.5 **INSTALLATION**

- .1 Mix thin set mortar and grout components to proportions and methods specified by mortar and grout manufacturer, to achieve maximum bond strength within the capacity of the mortar or grout.
- .2 Use mortar and grout within their pot life as specified by manufacturer.
- .3 For Tiles Less Than 200 x 200 mm In Size
 - .1 Apply mortar with a notched trowel using a scraping motion to work the material into good contact with surface to be covered. A trowel having notches approximately 4 x 4 mm is recommended. Back of tiles must have 95% mortar coverage.
 - .2 Apply only as much thin set mortar that can be covered within twenty minutes or while surface of thin set mortar is still fresh. Discard thin set mortar that has skinned over and apply fresh thin set mortar. Set tiles in place and beat with a small beating block as necessary to ensure a proper contact of the thin set mortar to the back of the tile and also to level the tiled surface. Align tile to show uniform joints and then allow to set until firm, refer to thin set mortar manufacturer's written instructions. Clean excess thin set mortar from surface of tile with a damp cloth or sponge while the thin set mortar is fresh.
- .4 For Tiles 200 mm x 200 mm or Larger
 - .1 Apply thin set mortar with the flat side of a notched trowel using a scraping motion to key in the mortar into good contact with surface to be covered. A trowel notches approximately 8 mm x 8 mm x 8 mm is recommended, comb in one direction. Back of tiles must have 95% mortar coverage.
 - .2 Install with back-buttering to achieve good adhesion.
- .5 Lay out Work so that fields are centred on areas, with no tiles of less than half-size used at room perimeter.
- .6 Maintain heights of panels in full courses to nearest indicated dimension.
- .7 Align joints of wall tile with floor tile.
- .8 Make joints between tile uniform, plumb, straight, true, even and with adjacent tile flush.
- .9 Provide fittings (base, wall caps and wall corner units) to complement tile system. Install edge protection at external vertical corners.
- .10 Installation Methods
 - .1 Ceramic tile on concrete floor slab: Install ceramic tile floor, base fittings with thin set mortar in accordance with TTMAC Installation Manual, Detail 311F, latest edition.
 - .2 Ceramic tile on cementitious board ceilings in dry areas: Install ceramic tile with thin set mortar in accordance with TTMAC Installation Manual, Detail 315C, latest edition.

- .3 Tile on concrete or masonry walls: Install tile and fittings with thin set mortar in accordance with TTMAC Installation Manual, Detail 303W, latest edition. Install wall tile full height unless shown otherwise.
- .4 Ceramic tile on gypsum board walls in dry areas: Install ceramic tile and fittings with thin set mortar in accordance with TTMAC Installation Manual, Detail 304W, latest edition.
- .5 Ceramic tile on cementitious board walls in wet areas: Install ceramic tile and fittings with thin set mortar in accordance with TTMAC Installation Manual, Detail 305W, latest edition.
- .6 Tile on stairs: Install tile, fittings, and risers with thin set mortar in accordance with TTMAC Installation Manual, Detail 318S, latest edition.
- .11 Tile control joints: Provide 6 mm wide control joints in tiled floors where shown and directly over control joints in floor slab or masonry walls, in accordance with TTMAC Installation Manual, Detail 301MJ, latest edition. Apply sealant as specified.
- .12 Cut and fit tile neatly to piping, fittings, projections and around recesses for recessed washroom accessories. Where surface mounted equipment and accessories are to be installed on tiled surfaces, extend tile over surfaces. Make cut edges smooth, even and free from chipping. Chipped and broken edges are not acceptable.
- .13 Cut circular cutouts for pipe and drain penetrations by core drilling only.

3.6 **GROUTING**

- .1 Do not proceed with grouting until at least forty-eight hours after tile has set to prevent displacement of tiles.
- .2 Ensure grout is applied to the full thickness of the tile.
- .3 Force grout into joints in accordance with grout manufacturer's directions to produce watertight, filled joints without voids, cracks and excess grout. Finish flush to edge thickness of tile.
- .4 Do not grout internal corner intersections of wall tile.
- .5 Protect grouted work from traffic for minimum forty-eight hours. Epoxy grout will achieve chemical and stain resistance after ten days therefore protect Work against spills until curing period has lapsed.

3.7 **SEALANT**

- .1 Apply sealant around piping and fittings extending through tiled surfaces.
- .2 Apply sealant in tile control joints and in internal tile to tile joints.
- .3 Tool to a smooth, flush surface, free from air bubbles and contamination. Provide backer rod only where required to control depth of sealant.

3.8 **CLEANING**

- .1 Clean off excess grout with soft burlap or sponge moistened with clean water.
- .2 After grouting has cured, clean and polish ceramic wall (and ceiling) tile. Likewise, thoroughly clean ceramic and quarry floor tile. Clean in accordance with TTMAC

recommendations for treating new work as specified in its "Maintenance Guide". Do not use acid for cleaning.

- .3 Apply two coats of sealer to unglazed ceramic floor tile (quarry floor tile) in accordance with sealer manufacturer's printed directions.
- .4 Re-point joints after cleaning as required to eliminate imperfections. Avoid scratching tile surfaces.

3.9 **PROTECTION ON COMPLETION**

- .1 After completion, close tiled areas to traffic for a minimum period of seventy-two hours.
- .2 Cover Work temporarily with building paper properly lapped and taped at joints, or other protection, until the Work is accepted by Consultant.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 CAN/ULC-S102 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
- .2 ASTM E84 - Standard Testing Method for Surface Burning Characteristics of Building Materials
- .3 ASTM E580 - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions (for Seismic)
- .4 ASTM E1264 - Standard Classification for Acoustical Ceiling Products – acoustical testing (classification of tile)
- .5 Indoor Air Quality - GreenGuard
- .6 ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
- .7 ASTM C636/C636M - Standard Practice for Installation on Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
- .8 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **SUBMITTALS**

.1 Submit in accordance with Section 01 33 00.

.2 Shop Drawings: Show/include the following:

- .1 Suspension system layout; conditions at abutting, intersecting and penetrating construction; dimensional locations of lighting fixtures, diffusers, sprinkler heads, other items that pierce the ceiling plane, and suspension hangers.
- .2 Locations of accessible openings in acoustic tile ceilings.
- .3 Product data on ceiling grid system, acoustic units, clearly indicating the specific items proposed for use if manufacturer's catalogs are submitted.

.3 Samples: Submit the following:

- .1 300 mm long samples of suspension system parts, including trim.
- .2 300 mm x 300 mm samples of acoustic units.

- .4 Certificates: Submit certificate attesting that installed acoustical ceiling systems meet the fire-resistance ratings required for this Project.
- .5 Maintenance data: Submit maintenance instructions for recommended cleaning materials and methods for acoustic units and trim. Include precautions for use of and composition of cleaning materials detrimental to acoustic units and trim.

1.4 **DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials in original packages, containers and bundles, bearing brand and manufacturer's name and ULC/Warnock Hersey labels.
- .2 Store materials in a covered area, off-ground, on flat, smooth, dry surfaces. Protect from moisture. Remove damaged or deteriorated materials from site.
- .3 Comply with acoustic unit manufacturer's recommendations regarding temperature and humidity conditions before, during and after ceiling installation.

1.5 **PROJECT CONDITIONS**

- .1 Environmental requirements: Continuously maintain rooms or areas scheduled to receive acoustical treatment at not less than 21°C (70°F), and at occupancy humidity, at least three days prior to installation and three days after this Work is completed. Schedule the Work to eliminate the risk of damage to these materials due to adverse environmental conditions in rooms or areas when and after this Work is installed.

1.6 **MAINTENANCE**

- .1 Extra stock: Leave spare acoustic units and full-size plenum barrier boards in quantity equivalent to 2% (to nearest box) of each type of acoustic ceiling. Obtain spare units from same production run as installed units. Product to be packaged with protective covering for storage and identified with labels describing contents.

2 **Products**

2.1 **MATERIALS**

- .1 Exposed or concealed grid system: 38 mm leg x 24 mm flange zinc coated cold rolled steel per ASTM C635, factory finished satin white:
 - .1 Chicago Metallic "200 Snap Grid"
 - .2 CGC Interiors "DX Fast-Loc"
 - .3 Bailey Metal Products Limited "Standard B.E. Safe-T-Lock"
 - .4 Armstrong "Prelude ML"
- .2 Exposed or concealed grid system: 9/16"
 - .1 Chicago Metallic "4000 Temptra"
 - .2 CGC Interiors "Centricitee DXT"
 - .3 Certainteed "Elite Narrow Stab System"
 - .4 Armstrong "Suprafine XL"

- .3 SEISMIC GRID SYSTEM:
 - .1 Chicago Metallic "200 Snap Grid", heavy duty
- .4 Exposed grid system: Double web, aluminum, white finish, non-corrosive for high humidity exposure.
 - .1 Chicago Metallic "830 All Aluminum"
 - .2 CGC Interiors "AX All Aluminum"
 - .3 Armstrong "Prelude Plus XL Aluminum"
- .5 Fire rated exposed grid system: Intermediate duty zinc coated cold rolled steel with double-web tees, rated to achieve fire rating required for Project. Finish in factory applied satin white.
 - .1 Chicago Metallic "1250 F/R"
 - .2 CGC Interiors "DXL Fire-Rated Systems"
 - .3 Certainteed "15/16" FireSecure Stab System"
 - .4 Armstrong "Prelude XL FireGuard"
- .1 Acoustic lay-in panels: 610 mm x 1220 mm x 16 mm or 610 mm x 610 mm x 16 mm or match existing condition. Incombustible mineral fiber, square or reveal edge, white factory-painted exposed surface. Minimum NRC rating of 0.70.
 - .1 Rockfon "Alaska" or "Artic"
 - .2 CGC Interiors "Mars"
 - .3 Certainteed "Symphony M"
 - .4 Armstrong "Ultima"
- .2 Moisture resistant lay-in panels: 600 mm x 1220 mm x 16 mm, or 610 mm x 610 mm x 16 mm or match existing condition. Incombustible mineral fiber, square edge, with white vinyl facing, non-perforated:
 - .1 Armstrong "Clean Room VL".
- .3 High humidity-resistant acoustic lay-in panels: 610 mm x 1200 mm x 16 mm or 610 mm x 610 mm x 16 mm or match existing condition. Incombustible mineral fiber, square edge, white medium texture surface:
 - .1 Rockfon "Koral"
 - .2 CGC Interiors "Radar Ceramic ClimaPlus 56645"
 - .3 Armstrong Minaboard "Ceramaguard Fine Fissured No. 608"
- .4 Plenum Barrier Board Insulation: Stone wool insulation, 610 mm x 1220 mm x 38 mm thick, aluminum foil faced with fibre reinforcement, Class A, conforming to CAN/ULC-S102.
 - .1 Warning Label: Printed in black ink on the facing shall be warning labels 100 mm high by 100 mm wide spaced 300 mm in both directions with the words "Noise

Barrier. Do not remove barrier or damage foil facing.". Warning labels shall be oriented in all four directions in ninety-degree increments so legible from any edge of the board.

- .1 "Plenum Barrier Board" by Rockfon.
- .2 Or accepted equal.
- .5 Hangers: Soft-annealed, zinc coated steel wire minimum 2.64 mm (12 gauge), meeting "heavy-duty" classification of ASTM C635.
- .6 Edge mouldings: By Rockfon, CGC Interiors, Certainteed or Armstrong to complement ceiling grid, and installed around ceiling perimeters, in factory finished satin white on zinc coated cold rolled steel. Conform to manufacturer's requirements.
- .7 Metal closures and trim: Bonderized and with factory-applied white baked enamel finish in white. If coloured, coordinate with ceiling tile colour and manufacturer's colour selection. Use anchors standard with manufacturer. Corrosion-resistant factory finished units. Provide anchors as standard with manufacturer.
- .8 Panel hold-down clips: Standard of grid manufacturer.
- .9 Supplementary splines: Hard fiber or steel splines as standard with grid manufacturer.
- .10 Supplementary steel supports: Steel conforming to Section 05 50 00.

3 Execution

3.1 EXAMINATION

- .1 Inspect substrates and previously placed Work to determine suitability and completeness. Start of this Work constitutes an acceptance of existing conditions. Correct failure of this Work due to unsatisfactory existing conditions at no increase in Contract Price. Similarly, if the Work needs to be removed to correct defects in substrates or previously placed Work, perform both removal and replacement at no increase in Contract Price.

3.2 EXPOSED GRID LAY-IN PANEL CEILINGS

- .1 Install main tees, cross tees, and wall moldings so bottom flanges are in flat, level plane at finish ceiling elevations. Arrange grid so opposite wall edge panels are of equal width but not less than one-half panel width, and lay out and erect grid system to provide panel pattern shown.
- .2 Install exposed ceiling grid per ASTM C636, reviewed Shop Drawings, and specified herein. Place secondary steel framing to span structural steel as required.
- .3 Erect main beams parallel to main wall and to each other; space uniformly at centres specified.
- .4 In ceilings having recessed lighting fixtures, modify grid framing to provide main beams along and parallel to both long sides of lighting fixtures.
- .5 Support main beams with hangers along each run, spaced at not more than 1200 mm centers; except in areas of steel framing, Provide hangers at each intersection of main beam and framing.

- .6 If ductwork or equipment located in ceiling plenum area interferes with hanger spacing, Provide a trapeze or other arrangement reviewed by Consultant to support main beams at proper spacing.
- .7 Do not secure hangers to metal roof deck, ductwork, conduit, piping, equipment, or support system for any of these. Provide additional hangers at each diffuser, grille and other points of extra loading.
- .8 Secure hangers to main beams to develop full strength of hangers and per manufacturer's published directions. Secure hangers to construction above per ASTM C636 and following requirements:
 - .1 Exposed concrete slab: Use anchors, cast-in hanger wires or inserts, specifically designed for hanger use.
 - .2 Steel beams: Use beam clips.
 - .3 Steel joists: Wrap hanger wire around lower chord member.
 - .4 Permanent metal forms and cellular floor deck: Tabs, holes or slots specifically provided for hanger attachment; prevent hanger twisting or turning by cross tying.
- .9 Install primary cross tees at right angles to main beam tees and space uniformly at centers specified. Join ends of cross tees to web of main beams with a positive interlock; except at light fixtures, secure members together with concealed steel clips and bolts. Install tees to produce fine-line joints between flanges of abutting members.
- .10 Install secondary cross tees at right angles to primary tees and space uniformly at centers specified, and secure in a manner similar to primary tees.
- .11 At locations where ceilings abut walls, columns and other vertical surfaces, install continuous wall molding to trim ceiling edges.
 - .1 Install molding with bottom horizontal leg at elevation required to support acoustic panel and to be flush with bottom flange of grid members [for concealed, flush with the bottom of tile], and with vertical leg concealed, as per manufacturer's instructions.
 - .2 Bolt moldings to supporting construction at 600 mm on centre and within 150 mm of end of each molding piece.
 - .3 Butt joints in moulding inconspicuously if several pieces are required in any one run.
- .12 At recessed-grid system for reveal-edge lay-in panels, install "W" shaped wall molding, of profile specified, to retain recessed detail at ceiling perimeters.
- .13 Install acoustic lay-in panels in grid system openings supported by bottom flanges of members in accordance with manufacturer's instructions.
- .14 Where within 6000 mm of exterior doors, secure each lay-in panel into grid opening with concealed hold-down clips.
- .15 Install reveal-edge panels with angled or square edges resting on bottom flanges of members, with panel surface extending below bottom flanges.

3.3 FIRE-RESISTANCE RATED CEILINGS

- .1 Provide fire-resistance rated ceilings where required, including proper construction of framing and furring and proper thickness and weight of acoustic units, to produce hourly fire-resistance ratings called for.
- .2 Requirements for materials, methods of erection and application specified under appropriate headings of this section apply except where more stringent requirements are defined for particular fire-resistance rating by Underwriters' Laboratories of Canada or Warnock-Hersey.

3.4 PLENUM BARRIER BOARD

- .1 Install plenum barrier board insulation to form contiguous sound barrier above demising walls or under raised floors according to manufacturer's instructions.

3.5 ADJUSTING AND CLEANING

- .1 After interior finishing Work has been substantially completed, or when directed by Consultant, inspect acoustical treatment Work. Replace broken, chipped or damaged Work, reset loose units or units out of place, and touch up marred surfaces with matching paint. Upon completion of the Project, clean acoustical surfaces free from dirt and other markings and in good condition acceptable to Consultant.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.
- .2 This section specifies testing of concrete floor slabs to guarantee a suitable substrate to receive the floor finishes specified in Division 9. Perform and pay for the following:
 - .1 Moisture tests using calcium chloride quantitative test method
 - .2 Humidity tests
 - .3 Dew point tests
 - .4 pH tests
 - .5 Verify 28-day curing of concrete
 - .6 Coordinate HVAC requirements for testing purposes
 - .7 Notify all parties of test results

1.1 **REFERENCE**

.1 Conform to the latest edition of the following:

- .1 AODA - Accessibility for Ontarians with Disabilities Act

1.2 **QUALITY ASSURANCE**

- .1 Technicians: Individuals from a company engaged in the business of performing construction testing and inspection services of the type required by this section, for a minimum of two years within the past five years. Tasks involved include the following:
 - .1 Testing in accordance with specified ASTM testing standards.
 - .2 Keeping a record of testing inspection details.
 - .3 Coordination with floor finishes trades.
 - .4 Electronic reporting of test results to Consultant.

1.3 **APPLICABLE TESTING STANDARDS**

.1 Perform tests in accordance with the latest edition of the following standards:

- .1 ACI 302.2R-06 - Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials
- .2 ASTM D4262 - Standard Test Method for pH of Chemically Cleaned or Etched Concrete
- .3 ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by Plastic Sheet Method

- | | | |
|----|--------------------------|---|
| .4 | ASTM F710 | - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring |
| .5 | ASTM F1869 | - Standard Test Method for Measuring Moisture Vapour Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride |
| .6 | ASTM F2170 | - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In Situ Probes |
| .7 | ASTM F2420 | - Standard Test Method for Determining Relative Humidity on the Surface of Concrete Floor Slabs Using Relative Humidity Probe Measurements and Insulated Hood |
| .8 | CSA A23.1/A23.2 | - Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete |
| .9 | ICRI Guideline No. 03732 | - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays |

1.4 **SUBMITTALS**

- .1 Technicians' qualifications: Submit the following in accordance with Section 01 33 00:
- .1 Confirmation of technicians' qualifications as specified.
 - .2 Confirmation of test method to be used.
- .2 Test Reports
- .1 Submit to the Consultant, summary of tests leading to satisfactory results, prior to floor finish installation. Report to follow specified contents and format. No floor finish installation shall proceed without satisfactory test results reported to, and acknowledged by, the Consultant.

2 Products

2.1 **MATERIALS**

- .1 Not applicable

3 Execution

3.1 **FLOOR FINISHES SCHEDULE COORDINATION**

- .1 Coordinate testing with the schedule of floor finishes operations. Installation of finishes is predicated upon a concrete substrate that is suitable for installation of finishes as proven by satisfactory test results.

3.2 **SITE MEETING**

- .1 Prior to start of Work, attend a site meeting with the Construction Manager and Consultant, Contractor and Floor Finishes Subcontractors. Purpose of the meeting is to ensure familiarity with the requirements of the Work, common understandings reached, methodologies, relationships and protection of work criteria are understood.

3.3 TESTING

- .1 An appropriate environment is required during testing. Coordinate provision of HVAC during test periods.
- .2 Remove curing compound and/or sealer at test locations using hand-held grinders.
- .3 Perform moisture testing in accordance with ASTM F1869 methods. No alternative test methods accepted.
- .4 Follow ASTM standards for number and frequency of tests. At any rate, satisfactory test results must be representative of the total floor.
- .5 Perform relative humidity tests in accordance with ASTM F2170.
- .6 Perform pH testing in accordance with ASTM D4262 and ASTM F710.

3.4 REPORTING

- .1 All reports shall be prepared by the technician conducting the test, who shall affix his/her signature to the reports. The reports shall confirm compliance of the Work with the Contract Documents and be signed by the technician.
- .2 Report format shall be columnar, containing the information listed below, and, where applicable, contain notations of the specified standard or other reference covering the items to be tested.
- .3 Information required in the reports:
 - .1 Test location.
 - .2 Test method used (indicate passing result).
 - .3 Confirm surface for testing has been prepared.
 - .4 Start time and date of placing calcium chloride test.
 - .5 Relative humidity (RH) at start time.
 - .6 Ambient temperature (AT) at start time.
 - .7 Results after test period.
 - .8 Relative humidity (RH) at end of test.
 - .9 Ambient temperature (AT) at end of test.
 - .10 Satisfactory or unsatisfactory results. Repeat tests if results not satisfactory. Coordinate results with floor finishes trades.
 - .11 Observations or comments.
 - .12 Name and signature of technician; date report sent to Consultant.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.
- .2 Red oak flooring for 95 Lavinia Avenue.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 AODA - Accessibility for Ontarians with Disabilities Act
- .2 FSC - Forest Stewardship Council: FSC Chain-of-Custody certification.

1.3 **SUBMITTALS**

.1 Samples

- .1 Submit in accordance with Section 01 33 00.
- .2 Submit three samples, minimum 150 mm square representing actual product, colour and patterns.
- .3 Identify samples with Project name, job number, date, colour, manufacturer's name and Contractor's name.

.2 Shop Drawings: Submit adhesive Product data confirming specified requirement.

.3 Maintenance instructions: Submit three copies of Product maintenance manual to Consultant prior to completion of the Work. Manual to contain specific maintenance recommendations and specific warning of any maintenance practice or materials which may damage or disfigure the flooring.

1.4 **DELIVERY, STORAGE AND HANDLING**

.1 Deliver and store materials undamaged in original wrappings or containers, with manufacturer's labels and seals intact. Store materials in a warm, dry area.

.2 Prevent damage to materials during handling and storage. Stack material not over two cartons in height, nor in excess of allowable floor loading. Store materials on smooth surfaces only, in an area designated by Consultant.

.3 Protect this Work and the work of other trades at all times.

1.5 **QUALITY ASSURANCE**

.1 Manufacturer shall be a company specializing in the products specified in this Section with a minimum five years documented experience.

.2 Installer shall specialize in performing Work of this section with a minimum of two years documented experience with projects of similar scope and complexity.

- .3 Construct a mock-up with actual materials for review by the Owner. Locate mock-up as acceptable to the Owner and provide temporary foundations and support. If deemed acceptable, the mock-up may form part of the Work.

1.6 **PROJECT CONDITIONS**

- .1 Maintain temperature of rooms and materials within limits acceptable by the manufacturer. Avoid high humidity and cold drafts.

1.7 **MAINTENANCE**

- .1 Extra stock: Leave maintenance tiles in quantity equivalent to 5% (to nearest full carton) of (each) installed tiles for Owner's future use. Label cartons as to contents and indicate areas where tiles were used.

2 **Products**

2.1 **MATERIALS**

- .1 Prefinished engineered hardwood flooring with tongue and groove finish and micro V-bevel (all four sides):
 - .1 Thickness: 10 mm overall; 4 mm sawn hardwood layer, 6 mm 5-ply plywood base.
 - .2 Width: 65 mm
 - .3 Length: from 635 mm to 1168 mm.
 - .4 Installation: glued.
 - .5 Subfloor: wood.
 - .6 Grade: select and better.
 - .7 Finish: Ultra resistant finishing system made of aluminum oxide and nanosilica particle composites suspended in UV cured polyurethane.
 - .8 Acceptable product:
 - .1 "Alive series" by Mirage, to match existing.
- .2 Adhesive shall be as recommended by the manufacturer.

3 **Execution**

3.1 **PREPARATION**

- .1 Confirm presence of vapour retarder under the floor slab.
- .2 Comply with Section 09 60 10 - General Requirements for Floor Finishes. Be responsible for full compliance with such requirements and install flooring to stay in place without failure.
- .3 Vacuum clean and remove from surfaces to receive Work of this section, oil, grease and other materials deleterious to bond.
- .4 Fill cracks, crevices and holes in concrete sub-floors. Finish smooth and level. Grind bumps and ridges level.

- .5 Grout sawcut and control joints to be covered with flooring.

3.2 **INSPECTION OF SUBSTRATE**

- .1 Have the technical representative of the flooring material manufacturer inspect the prepared substrate. Prior to flooring installation, obtain a written confirmation from the flooring material manufacturer that the prepared floor substrate is suitable to receive the floor finish material.

3.3 **FLOORING INSTALLATION**

- .1 Spread primer evenly over floor surfaces. Permit primer to dry. Apply adhesive evenly over floor surfaces. Allow adhesive to become tacky before laying flooring.
- .2 Lay flooring with joints straight, in true plane, butted to moderate contact, symmetrical with and parallel to axes of rooms to provide equal size perimeter tile on each side. Distribute variations in shade or pattern to obtain a uniform effect. Abrupt variations will not be acceptable.
- .3 Cut and fit neatly around fixed objects. Fit tightly to electrical and mechanical fittings, piping and equipment. Scribe and fit to abutting surfaces.
- .4 At door openings, where no thresholds occur and where the flooring is not continuous, finish flooring against strike side of door stop.

3.4 **FIELD QUALITY CONTROL**

- .1 Promptly remove and replace flooring showing bumps from underlying dirt, discolouration, excessive wear, shrinkage or adhesion failure. Remove and replace base showing shrinkage or adhesion failure.

3.5 **CLEANING AND PROTECTION**

- .1 Comply with flooring manufacturer's recommendations.
- .2 Limit foot traffic on finished wood flooring.
- .3 Protect from damage during construction operations. Promptly repair any damaged surfaces. Remove and replace Work which cannot be satisfactorily repaired.
- .4 Clean products in accordance with the manufacturer's recommendations.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **QUALITY ASSURANCE**

- .1 Applicator: Accredited firm using tradesmen experienced and skilled in the installation of resilient sheet flooring with heat welded joints. All Work shall be under the supervision of a competent foreman at all times.
- .2 Sheet flooring Products: Supply from consecutive manufacturing process to maintain consistent colour match between adjacent sheets. Replace installed flooring showing undue colour variation, in the sole opinion of the Consultant.

1.3 **SUBMITTALS**

.1 Samples

- .1 Submit in accordance with Section 01 33 00.
- .2 Submit three 300 x 300 mm samples of resilient sheet flooring with centre seam (and base). Seam to illustrate quality of joint treatment.
- .3 Identify samples with Project name, job number, date, colour, manufacturer's name and Contractor's name.
- .2 Maintenance instructions: Submit three copies of Product maintenance manual containing specific maintenance recommendations and giving specific warning of any maintenance practice or materials which may damage resilient sheet flooring.

1.4 **DELIVERY, STORAGE AND HANDLING**

- .1 Deliver and store materials undamaged in original wrappings or containers, with manufacturer's labels and seals intact. Store materials in a warm, dry area.
- .2 Prevent damage to materials during handling and storage. Do not stack material in excess of allowable floor loading. Store materials on smooth surfaces only.
- .3 Protect this work and the work of other trades at all times.

1.5 **PROJECT CONDITIONS**

- .1 Maintain temperature of rooms and materials a minimum of 21°C (70°F) twenty-four hours before, during and seven days after tile installation. Avoid high humidity and cold drafts.

1.6 **WARRANTY**

- .1 Warrant Work of this section against defects and deficiencies for a period of five years from date Work is certified as substantially performed in accordance with the general conditions of the Contract.

- .2 Promptly make good defects and deficiencies which become apparent within the Warranty Period by replacing defective Work satisfactory to the Consultant and at no expense to the Owner.
- .3 Defects shall include but not limited to material shrinkage, cracking, and splitting, failure in adhesive bond, bubbling, blistering, delamination and seam failure. Making good includes removal and disposal of defective material including moving and replacing of equipment, furniture and other such items to allow installation of replacement material.

2 Products

2.1 MATERIALS

- .1 Sheet flooring: minimum 2.0 mm thick sheet vinyl, solid homogeneous, commercial grade, chemical resistant, non-conductive and with slip resistance of R10. Colour to be selected by Consultant.
 - .1 "Medintech/ Medintone" by Armstrong Flooring
 - .2 Or approved equal
- .2 Resilient base: In accordance with ASTM F1861, 3 mm thick, rubber cove base, 150 mm height high set-on cove base, with coped internal corners and preformed external corners. Colour as indicated on Drawings.
- .3 Edge protection and transition strips:
 - .1 Textured, sloped exposed surface, tapered leading edge and integrated grout joint spacer. Transition strips shall form a smooth transition where resilient flooring abuts another flooring surface.
 - .1 Material and Finish: Satin Anodized Aluminum
 - .2 Height: 12.5 mm
 - .3 Ramp length: 64 mm.
 - .4 Accepted manufacturer: Schluter "0" or accepted equal.
 - .2 Ball-and-socket hinged profile with sloped exposed surface, tapered leading edge, integrated trapezoid-perforated anchoring leg and integrated grout joint spacer. Transition strips shall form a smooth transition where resilient flooring abuts another flooring surface.
 - .1 Material and Finish: Satin Anodized Aluminum
 - .2 Height: as required to coordinate with tile selection and setting system selected.
 - .3 Ramp length: as required.
 - .4 Accepted manufacturer: Schluter "RENO-V" or accepted equal.
 - .3 Sheet cove to wall: Aluminum (PVC) extruded "J" trim, smooth finish, in maximum lengths.
 - .4 Edging to floor penetrations: Aluminum, type recommended by flooring manufacturer.

- .4 Adhesive: Solvent-free, of type that will tolerate moisture emission of 10 lbs/1000 sq.ft/24 hrs from the concrete slab and as recommended by flooring manufacturer
- .5 Colours: as indicated on Drawings.
- .6 Wax: As recommended by flooring manufacturer.
- .7 Sawcut and control joint filler: Latex-cement compound.
- .8 Sub-floor filler: Two-part latex requiring no water, as recommended by flooring manufacturer.
- .9 Floor mouldings, transitions, and terminations: In accordance with ULC S102.2, Class I, manufactured from highest quality raw materials, smooth and free from imperfections, one piece vinyl adapters, thresholds, edge guards, cove sticks, caps, reducers, each from manufacturer's standard colour range.
 - .1 Manufacturers:
 - .1 Armstrong
 - .2 Tarkett
 - .3 Ropppe

3 Execution

3.1 **PREPARATION**

- .1 Confirm presence of vapour retarder under the floor slab.
- .2 Comply with Section 09 60 10 - General Requirements for Floor Finishes. Be responsible for full compliance with such requirements and install flooring to stay in place without failure.
- .3 Vacuum clean and remove oil, grease and other deleterious materials from surfaces to receive the Work of this section.
- .4 Fill cracks, crevices and holes in concrete sub-floors. Finish smooth and level. Grind bumps and ridges level.
- .5 Grout sawcut and control joints to be covered with flooring.

3.2 **INSPECTION OF SUBSTRATE**

- .1 Have the technical representative of the flooring material manufacturer inspect the prepared substrate. Prior to flooring installation, obtain a written confirmation from the flooring material manufacturer that the prepared floor substrate is suitable to receive the floor finish material.

3.3 **FLOORING INSTALLATION**

- .1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.
- .2 Prime concrete slab to flooring manufacturer's printed instructions. Spread primer evenly over floor surfaces. Permit primer to dry.

- .3 Apply adhesive evenly over floor surfaces. Allow adhesive to become tacky before laying flooring.
- .4 Lay flooring in full rolls wherever possible to minimize seams: Locate major seams in accordance with Shop Drawings. Seams shall be tight and parallel to axis of rooms.
- .5 Hot weld all inside corners, outside corners, flat and vertical seams using rod to match colour of sheet flooring. Trim flush with a sharp trimming spatula.
- .6 Cut and fit neatly around fixed objects. Fit watertight to electrical and mechanical fittings, piping and equipment. Scribe and fit to abutting surfaces.
- .7 At drains, remove clamping ring. Let edge of flooring into body of drain and reinstall clamping ring.
- .8 At door openings, where no thresholds occur and where flooring is not continuous, finish flooring against strike side of door stop.
- .9 Roll after laying with a polished, clean roller weighing at least 45 kg.
- .10 Install metal trim with drilled-in stainless steel expansion anchors into concrete sub-floors.
- .11 Install vinyl edge trim with mastic adhesive.

3.4 **FORMING OF FLASH COVE BASE**

- .1 Clean substrate and prime with one coat of adhesive.
- .2 Apply adhesive to back of base.
- .3 Flash cove 100 mm4" up wall. Use premoulded vinyl fillet strip at junction of flooring and wall to ensure uniform radius throughout.
- .4 Cap off top edge of flash cove using aluminum cap strip.
- .5 Set base against wall and floor surfaces tightly by sing a hand roller.
- .6 Scribe and fit to door frames and other obstructions.
- .7 Heat weld base at internal and external corners in accordance with manufacturer's printed instructions.

3.5 **BASE INSTALLATION**

- .1 Before installing base, fill cracks and irregularities with a filler recommended by base manufacturer. Install base in longest possible lengths with joints vertical and tight. Accumulated short lengths not permitted. Scribe and fit to abutting surfaces. Bend and apply base continuous on radius corners. Butt joints and keep flush without gaps.

3.6 **CLEANING**

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.
- .2 Clean and wash floor and base to remove dirt, to flooring manufacturer's printed instructions. Allow to dry. Apply protection as follows:
 - .1 Upon completion of work, apply one sealer coat to finished floor to prevent scuffing.

- .2 Before turnover of Work to the Consultant, clean floor, apply another sealer coat and apply buff finish.

3.7 **PROTECTION**

- .1 Protect new floors from time of final set of adhesive until final inspection.
- .2 Prohibit traffic on floor for forty-eight hours after installation.
- .3 Do not drag object across the finished floor. Provide plywood runway as required.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **SUBMITTALS**

.1 Samples

- .1 Submit in accordance with Section 01 33 00.
- .2 Submit three samples of each type of resilient tile flooring and base, and treads and nosings.
- .3 Identify samples with Project name, job number, date, colour, manufacturer's name and Contractor's name.

.2 Shop Drawings: Submit adhesive Product data confirming specified requirement.

.3 Maintenance instructions: Submit three copies of Product maintenance manual to Consultant prior to completion of the Work. Manual to contain specific maintenance recommendations and specific warning of any maintenance practice or materials which may damage or disfigure resilient tile flooring.

1.4 **DELIVERY, STORAGE AND HANDLING**

.1 Deliver and store materials undamaged in original wrappings or containers, with manufacturer's labels and seals intact. Store materials in a warm, dry area.

.2 Prevent damage to materials during handling and storage. Stack material not over two cartons in height, nor in excess of allowable floor loading. Store materials on smooth surfaces only, in an area designated by Consultant.

.3 Protect this Work and the work of other trades at all times.

1.5 **PROJECT CONDITIONS**

.1 Maintain temperature of rooms and materials a minimum of 21°C (70°F) twenty-four hours before, during, and seven days after tile installation. Avoid high humidity and cold drafts.

1.6 **MAINTENANCE**

.1 Extra stock: Leave maintenance tiles in quantity equivalent to 5% (to nearest full carton) of (each) installed tiles for Owner's future use. Label cartons as to contents and indicate areas where tiles were used.

2 Products

2.1 **MATERIALS**

- .1 Vinyl composition tile: CSA 126.1-M, Type A, homogeneous type, asbestos free, 305 mm x 305 mm, 3 mm thick, in any of the following:
 - .1 Amtico Duravinyll by American Biltrite Products Ltd.
 - .2 Excelon by Armstrong World Industry Canada Ltd.
 - .3 Vinyl Plus (Connoisseur Series) by Domco Industries Ltd.
 - .4 Flextile Commercial Reinforced Tile by Olympia Floor and Wall Tile Co.
 - .5 Cortina or Thru-Quartz by Tarkett Canada
- .2 Static dissipative floor tile: Conforming to ASTM F-1700, Class 1, Type A, resistance higher than the average of 1,000,000 ohms and less than the average of 100,000,000 ohms as tested in accordance with NFPA 99 2-6.3.8, ASTM F-150, UL 779, and ANSI/ESD S7.1. The tile shall be 3 mm in thickness and of size 300 x 300 mm. Provide tile manufacturer's standard copper foil grounding system.
- .3 Anti-Fatigue Flooring: Highly compressed homogeneous vinyl wear layer with a high-performance urethane topcoat, glass fiber interlayer and a calendared CDF backing. To be used to fill in removed flooring under cabinetry, sinks, etc. Flooring shall be flush with the existing flooring when installed. "Eternal Comfort" by Forbo in 13002 Silver Concrete colour or accepted equal.
- .4 Stair tread: One-piece homogeneous (rubber) (vinyl), 6 mm thick, heavy duty solid (marbleized) pattern as manufactured by Mondo Rubber International, American Biltrite Products Ltd., The Johnson Rubber Co. or Flexco:
 - .1 Integral stair nosing: Square nose, 6 mm thick, 40 mm vertical face minimum 40 mm non-slip safety strip rebated into tread, of colour 70% or greater contrast with tread colour as selected by Consultant.
 - .2 Resilient stair riser: One-piece, top set rubber, 2.0 mm thick, full riser height.
- .5 Rubber base: 3 mm thick x 50mm, 75 mm or 100 mm high set-on cove base, with coped internal corners and preformed external corners.
- .6 Edge protection and transition strips:
 - .1 Anodized aluminum profile with textured, sloped exposed surface, tapered leading edge and integrated grout joint spacer. Transition strips shall form a smooth transition where resilient floor abuts another flooring surface.
 - .1 Material and Finish: Satin Anodized Aluminum
 - .2 Height: 12.5 mm
 - .3 Ramp length: 64 mm.
 - .4 Accepted manufacturer: Schluter "RENO-RAMP-K" or accepted equal.
 - .2 Ball-and-socket hinged profile with sloped exposed surface, tapered leading edge, integrated trapezoid-perforated anchoring leg and integrated grout joint

spacer. Transition strips shall form a smooth transition where resilient floor abuts another flooring surface.

.3 Material and Finish: Satin Anodized Aluminum

- .1 Height: as required to coordinate with tile selection and setting system selected.
- .2 Ramp length: as required.
- .3 Accepted manufacturer: Schluter "RENO-V" or accepted equal.

.7 Thresholds: Vinyl edge trim where floors of two different colours butt; mill finish extruded aluminum thresholds where floors of different levels butt; mill finish aluminum butt level type at edges of resilient flooring at finished concrete floors.

.8 Rubber floor and landing tile/stair treads: Molded resilient rubber compound, RCA Rubber "Target Tile and Stair Treads" distributed by Central Supply Co., or Flexco "Radial Rubber Tile and Stair Treads" distributed by Andron Agencies Ltd. Nominal thickness, including raised pattern shall be 5 mm for tile, and 6 mm, tapered to 3 mm for treads. Note: tiles at corridors shall have 1 mm maximum raised pattern.

.9 Treads shall be square nosed, in specified nominal thickness x tread size. Risers shall be coved to follow profile of metal coved riser.

.10 Floor mat: Construction Specialties "Pedimat" or K.N. Crowder "Ken-A-Mat" complete with vinyl inserts in colour selected by the Consultant from manufacturer's standard range.

.11 Non-slip stair tread and landing nosings: Vinyl, square nose, full tread depth, 32 mm vertical face (diamond) (smooth) surface finish.

.12 Epoxy adhesive and caulking compound: As required for surfaces involved recommended and supplied by rubber tile and tread manufacturer.

.13 Adhesive: solvent-free, of type that will tolerate moisture emission of 10 lbs./1000 sq.ft/24 hrs from the concrete slab.

.14 Wax/floor finish: As recommended by flooring manufacturer.

.15 Sawcut and control joint filler: Latex-cement compound.

.16 Sub-floor filler: Non-shrink latex-cement compound to provide cementitious paste, as recommended by flooring manufacturer.

2.2 **COLOURS AND PATTERNS**

.1 Selected by Consultant from manufacturer's standard selection.

3 Execution

3.1 **PREPARATION**

.1 Confirm presence of vapour retarder under the floor slab.

.2 Comply with Section 09 60 10 - General Requirements for Floor Finishes. Be responsible for full compliance with such requirements and install flooring to stay in place without failure.

- .3 Vacuum clean and remove from surfaces to receive Work of this section, oil, grease and other materials deleterious to bond.
- .4 Fill cracks, crevices and holes in concrete sub-floors. Finish smooth and level. Grind bumps and ridges level.
- .5 Grout sawcut and control joints to be covered with resilient tile flooring.

3.2 **INSPECTION OF SUBSTRATE**

- .1 Have the technical representative of the flooring material manufacturer inspect the prepared substrate. Prior to flooring installation, obtain a written confirmation from the flooring material manufacturer that the prepared floor substrate is suitable to receive the floor finish material.

3.3 **FLOORING INSTALLATION**

- .1 Spread primer evenly over floor surfaces. Permit primer to dry. Apply adhesive evenly over floor surfaces. Allow adhesive to become tacky before laying flooring.
- .2 Lay tile with joints straight, in true plane, butted to moderate contact, symmetrical with and parallel to axes of rooms to provide equal size perimeter tile on each side. Distribute variations in shade or pattern to obtain a uniform effect. Abrupt variations will not be acceptable. Lay in pattern as directed by Consultant.
- .3 Cut and fit neatly around fixed objects. Fit tightly to electrical and mechanical fittings, piping and equipment. Scribe and fit to abutting surfaces.
- .4 At door openings, where no thresholds occur and where the resilient tile flooring is not continuous, finish resilient tile flooring against strike side of door stop.
- .5 Roll after laying with a polished, clean roller weighing at least 45 kg.
- .6 Install floor mats in mat sinkages.
- .7 Install metal thresholds with drilled-in stainless steel screws with plastic plugs in concrete sub-floors.
- .8 Install vinyl edge trim with adhesive.

3.4 **INSTALLATION - STATIC DISSIPATIVE TILE**

- .1 Install in accordance with manufacturer's instructions.
- .2 If the adhesive is bleeding or oozing at the seams, immediately remove the excess adhesive with a clean cloth dampened with warm soapy water or denatured alcohol before the adhesive cures. After cleaning with denatured alcohol, rinse with a clean soft cloth dampened with clean water. Do not allow adhesive to cure on the surface of the tile.
- .3 Heat weld all seams to achieve a unitized system. Borders and other specialty cut tiles must be scribed and cut fit snugly, not tightly, against the wall, threshold, transition strip, fixtures, or other obstacles.
- .4 Roll and cross roll each section of tile laid with a 45 kg three-section roller within thirty minutes after the tile section has been installed. Use a hand roller in areas that cannot be reached with the larger roller. Conduct a visual inspection during the rolling process to ensure there has been no shifting of the tiles and that there is no adhesive on the surface

of the tile. Inspect each section laid after rolling to check for raised edges. Roll and cross roll a second time approximately thirty minutes after the initial rolling.

- .5 Grounding: Ground flooring with copper foil strips while the adhesive is wet in order to achieve a 100% transfer to the copper foil backing, under the tile nearest ground point. Also apply adhesive to the top section of the copper foil strips to complete the conductivity and to bond the tile directly to the copper foil strips. Allow the other half of the length of the strip to "pigtail" up the wall to permit an electrician to mechanically connect the copper foil to the ground point. Protect or enclose all connections as required by safety codes. Bridge expansion joints, sawcuts, etc. with a copper strip from a tile on one side of the expansion joint, sawcut, etc. to a tile on the other side of the expansion joint, sawcut, etc. to ensure continuity. Resistance testing should be conducted in accordance with the test method, voltage, and conditions specified.
- .6 Testing for electrical resistance: Test static dissipative floor for electrical resistance approximately seven days after the installation. The adhesive must be allowed to properly cure and the flooring system to stabilize to the ambient conditions. The electrical resistance will be tested according to ASTM F-150, ANSI/ESD S7.1-2005, NFPA 99, and UL 779. Test will be conducted at 10 volts for conductive tile. If readings are unacceptable, 100 volts should be used and that should be the default reading. Use 100 volts only for static dissipative tile. Perform both point to point and point to ground tests. Testing will also be conducted according to any special test method or procedure as specified by the customer in the specification.

3.5 **BASE INSTALLATION**

- .1 Before installing base, fill cracks and irregularities with a filler recommended by base manufacturer.
 - .1 Install base in longest possible lengths with joints vertical and tight. Accumulated short lengths not permitted.
 - .2 Scribe and fit to abutting surfaces.
 - .3 Bend and apply base continuous on radius corners.
 - .4 Butt joints and keep flush without gaps.

3.6 **STAIR TREAD INSTALLATION**

- .1 Pre-cut and fit treads prior to spreading adhesive.
 - .1 Fill back side of tread nose with a caulking bead; brush on adhesive on understeps and back of treads, as well as back of risers, and on receiving substrate.
 - .2 Allow to become tacky to touch before installing.
 - .3 Treads shall be fully bonded to substrate, with tread nosing butted tight against stair tread nosing.
 - .4 Roll with hand roller after installation.

3.7 **FIELD QUALITY CONTROL**

- .1 Promptly remove and replace flooring showing bumps from underlying dirt, discolouration, excessive wear, shrinkage or adhesion failure. Remove and replace base showing shrinkage or adhesion failure.

3.8 **CLEANING AND WAXING**

- .1 Comply with flooring manufacturer's recommendations.
- .2 Remove adhesive from surfaces as work progresses. Clean surfaces with a mild soap solution. Rinse clean, dry and apply two coats of wax. Polish thoroughly.
- .3 Cover waxed and polished surfaces with fibre reinforced, non-staining kraft paper, secure in position with gummed tape to prevent drifting. Remove covering prior to substantial performance.
- .4 Clean rubber tile and treads with a mild soap solution. Rinse immediately after mopping, with clean, warm water. Do not use compounds containing oil. Buff with a power buffer.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.
- .2 Work of this section includes but not limited to the following:
 - .1 Receive and Install roll carpet supplied by Owner
 - .2 Supply and Install accessories to complete installation

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 ASTM E648 - Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
- .2 CAN/ULC S102.2-M - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
- .3 CGSB 4-GP-129 - Carpets, Commercial
- .4 NFPA-99 - National Fire Protection Association, Health Care Facilities
- .5 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **SUBMITTALS**

.1 Samples

- .1 Submit in accordance with Section 01 33 00.
- .2 Submit two 300 mm x 300 mm samples of carpet, complete range of manufacturer's colour samples (for each type of carpet specified), specifications of adhesives and samples of base and trim, for review and colour selection.
- .3 Samples to be prepared by manufacturers, after consultation with Consultant. Installed Product must match approved samples in every respect.

.2 Shop Drawings

- .1 Submit in accordance with Section 01 33 00.
- .2 Illustrate carpeted floor and wall areas, carpet selection, pile direction and seaming diagram (location and length). Arrange pile direction and seam location to suit pattern continuity and to provide a quality installation minimizing wastage. Include for appropriate amount of overage to suit particular pattern being installed.
- .3 Submit adhesive Product data confirming specified requirement.

- .3 Test reports: Submit a test report from an independent testing and inspection organization to substantiate conformity of carpet to be supplied for the Project, to test requirements specified.

1.4 **DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials in original, factory sealed rolls, containers and wrappers. Handle and store and prevent damage, contamination and deterioration to Work of this section.
- .2 Clearly mark carpet with register number and dye lot on each bale.

1.5 **PROJECT/SITE ENVIRONMENTAL REQUIREMENTS**

- .1 Moisture: Ensure substrate is within moisture limits prescribed by manufacturer.
- .2 Temperature: Maintain ambient temperature of not less than 18°C (64.4°F) from seventy-two hours before installation to at least seventy-two hours after completion of work.
- .3 Relative humidity: Maintain relative humidity between 10% and 65% RH for forty-eight hours before, during and forty-eight 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: Provide continuous ventilation during and after carpet application. Run ventilation system twenty-four hours per day during installation; provide continuous ventilation for seven days after completion of carpet installation.

1.6 **MAINTENANCE**

- .1 Upon completion of the Work, deliver a minimum of 10% (to the nearest full carton) of total amount of each type of tile as required for Owner's future maintenance purpose.
- .2 Ensure such tiles are from same production run as tiles installed, and boxes are clearly labelled.

1.7 **WARRANTY**

- .1 Warrant Work of this section against defects and deficiencies for the periods stated below from date Work is certified as substantially performed in accordance with the general conditions of the Contract.
 - .1 Manufacturer's Warranty: Ten years against unravelling, wear, colour fading and deterioration of backing materials, including materials and workmanship detrimental to appearance or performance.
 - .2 Installer's Warranty: Two years against loose fitting, breaking of seams or breaking away from sub-base.
- .2 Promptly make good defects and deficiencies which become apparent within the Warranty Period by replacing defective Work satisfactory to the Consultant and at no expense to the Owner.

2 **Products**

2.1 **MANUFACTURERS**

- .1 Interface

- .2 Tarkett
- .3 Or accepted equal

2.2 MATERIALS

- .1 Carpet: Provide carpet uniform in colour and texture to match existing.
- .3 Sub-floor filler: White premix latex floor leveller by Projex.
- .4 Adhesive: Solvent-free, of type that will tolerate moisture emission of 10 lbs./1000 sq.ft/24 hrs from the concrete slab.
- .5 Base gripper: Type as recommended by carpet manufacturer.
- .6 Multi-purpose latex sealer: #812 by Roberts for sealing carpet edge.
- .7 Vinyl base: Furnish 100 mm or 150 mm set-on coved (straight) base with preformed external corners and coped internal corners. Adhesive as recommended by base manufacturer.
- .8 Carpet base (for carpet tiles): Same type as carpet tiles but in roll quality, in the longest possible length available, and 50 mm, 75 mm or 100 mm high.
- .9 Carpet base (for roll carpet): The same roll carpet used on the floor, extended 100 mm up walls.
- .10 Carpet base cap strip: Vinyl, Finercraft No. 703, or approved equivalent. Colour as selected by Consultant.
- .11 Rubber base: 3 mm thick x 100 mm high set-on cove base, with coped internal corners and preformed external corners.
- .12 Edge protection and transition strip:
 - .1 Anodized aluminum profile with textured, sloped exposed surface, tapered leading edge and integrated grout joint spacer. Transition strips shall form a smooth transition where carpet abuts another flooring surface.
 - .1 Material and Finish: Satin Anodized Aluminum
 - .2 Height: 12.5 mm
 - .3 Ramp length: 64 mm.
 - .4 Accepted manufacturer: Schluter "RENO-RAMP-K" or accepted equal.
 - .2 Ball-and-socket hinged profile with sloped exposed surface, tapered leading edge, integrated trapezoid-perforated anchoring leg and integrated grout joint spacer. Transition strips shall form a smooth transition where carpet abuts another flooring surface.
 - .1 Material and Finish: Satin Anodized Aluminum
 - .2 Height: as required to coordinate with tile selection and setting system selected.
 - .3 Ramp length: as required.

.4 Accepted manufacturer: Schluter "RENO-V" or accepted equal.

.13 Carpet divider fire stops: K.N. Crowder No. CT 60 9.5 high x 100 mm wide.

2.3 TESTS

.1 Carpet shall have been tested to, and passed the following test requirements:

.1 Flooring radiant panel test (ASTM E-648): mean average critical radiant flux of 0.45 w/sq.cm or higher.

.2 Flammability: The following aspect shall comply with requirements of CGSB 4-GP-129 and requirements of authorities having jurisdiction, when tested to CAN/ULC S102.2:

.1 Flame spread

.2 Fuel contribution

.3 Smoke developed

.3 Electrostatic propensity (AATCC 134): Not more than 2 kV.

.4 Surface resistivity (NFPA 99): Not more than 2 kV x 10¹⁰ ohms.

.5 Seconds (NFPA 99): 5000 - 500 V not more than 0.5; 5000 - 0 V not more than 2.0 V.

3 Execution

3.1 PREPARATION

.1 Confirm presence of vapour retarder under the floor slab.

.2 Comply with Section 09 60 10 - General Requirements for Floor Finishes. Be responsible for full compliance with such requirements and install flooring to stay in place without failure.

.3 Ensure floors are dry, completely cured, and free from dust, dirt, oil, paint, grease and other contaminants.

.4 Repair depressions and cracks with latex base compound. Sweep and vacuum surfaces before laying carpet.

.5 Grind ridges and high spots smooth and level.

3.2 INSPECTION OF SUBSTRATE

.1 Have the technical representative of the flooring material manufacturer inspect the prepared substrate. Prior to flooring installation, obtain a written confirmation from the flooring material manufacturer that the prepared floor substrate is suitable to receive the floor finish material.

3.3 INSTALLATION

.1 Install in accordance with manufacturer's printed directions.

.2 Commence installation after other trades have completed their work in areas to receive carpet Work.

- .3 Lay carpet with pile in same direction throughout a given floor area. A change in direction of pile will only be permitted in visually isolated areas which cannot be viewed simultaneously with other carpeted areas of same selection.
- .4 Lay carpet by direct glue-down system according to printed instruction procedures of manufacturer of carpet being installed. Lay carpet tile without evidence of seams.
- .5 Lay carpet with adhesive. Wait for glue to set before stretching carpet.
- .6 Where carpet meets ceramic tile, double glue carpet 600 mm from the tile.
- .7 Apply seam sealer to every edge of the total roll carpet installation around floor perimeter and around openings to prevent fraying and unravelling. Apply seam sealer along the trimmed edge where the face yarn enters the backing.
- .8 Cut carpet to fit accurately around perimeter of room, into all recesses, and around fixtures.
- .9 Keep seams to a minimum. When making seams, overlap the carpet by at least one row of tufts. Position seams so that where possible:
 - .1 The seams run the length of the area.
 - .2 Main traffic runs along rather than across the seam.
 - .3 Incident light does not strike across the seam.
 - .4 Avoid seams perpendicular to doorway openings.
 - .5 Seams are away from areas subject to pivoting traffic.
- .10 Position edges of carpet in door reveals directly under door bottom.
- .11 Extend floor carpet up at walls to specified height and into cap strip to form a coved carpet base.
- .12 Roll down carpet into adhesive bed using 45 kg roller. Roll in both directions. Do not over-roll.
- .13 Install edging strips at all openings or doorways, and where carpet abuts other floor coverings.
- .14 Make cut-outs for all floor mounted items where they occur on carpet. Keep holes to an absolute minimum diameter to allow services involved to pass through, and diameter of holes shall be such that trim will completely hide hole when installed. Cooperate and coordinate with electrical trade to ensure correct location of outlets is obtained.
- .15 Glue carpet to access box covers. Use glue recommended by carpet manufacturer.
- .16 Apply wall carpet with specified adhesive and in accordance with ULC requirements.
- .17 Install edge protection and transition strip at exposed carpet edges and where carpet terminates flush with other surfaces, or where transition is made to another material. Where carpet meets tile, leave carpet maximum 1.6 mm higher than the tile.
- .18 Install rubber base. Provide coped internal corners and premoulded external corners.
- .19 Install carpet divider fire stop at all fire doors over twenty minute rating where carpet occurs.

- .20 Ensure entire carpet installation is level, flush across seams, continuous in texture, patterns and colour. Ensure joints are invisible and surface is free of wrinkles, bubbles and other defects.

3.4 **CLEANING**

- .1 On completion, remove dirt, carpet scraps, etc., from surfaces of carpet.
- .2 Clean carpet with beater-type vacuum cleaner.
- .3 Remove any soiled spots or excessive adhesive with spot remover as recommended by carpet manufacturer.
- .4 Remove loose pieces of face yarn by cutting with sharp scissors.
- .5 Protect carpet areas with 6 mil polyethylene sheets. Tape joints to prevent shifting.
- .6 On completion, permit Owner's Representative to inspect waste carpet scraps for possible retention for future repairs before removal from site. This is in addition to maintenance materials specified herein.

End of Section

1 General

1.1 **SECTION INCLUDES**

.1 Labour, Products, equipment and services necessary to complete the Work of this section.

.2 Work of this section includes but is not necessarily limited to, the following:

.1 Exterior Painting

.1 Heat and smoke vents

.2 Fresh air and exhaust air hoods on roof

.3 Hollow metal doors, transom panels and frames

.4 Steel stairs, handrails, supports, ladders and cage

.5 Pipe bumpers

.6 Guard posts around PIV's

.7 Steel window sash, sub-frames, mountings, rod bars

.8 Sprayed masonry coating

.9 Concrete block walls

.2 Interior Painting

.1 Exposed building surfaces as indicated on Room Finish Schedule(s)

.2 Overhead door frames, tracks, brackets, fenders and supplementary steel supports

.3 Vertical lift door frames, counterweight enclosures and supplementary steel supports

.4 Hollow metal doors, frames and transom panels

.5 Fire doors and frames

.6 Borrowed light frames

.7 Glazed screen frames, mullions and closures

.8 Exposed steel items for the work of all trades

.9 Steel stairs, landings and railings

.10 Pipe bumpers

.11 Access panels and doors

.12 Screens

.13 Steel supports for wood benches

.14 Wood fitments unless plastic laminated as noted

- .15 Natural gas piping
 - .16 Finish painting of prime painted diffusers, registers and grilles
 - .17 Conduit, piping, ductwork, lighting panels, etc. exposed to view in areas listed on the Room Finish Schedule
- .3 The following surfaces are not to be painted:
 - .1 Exterior concrete surfaces
 - .2 Concealed ceiling spaces and walls above gypsum wallboard ceilings and acoustic tile ceilings
 - .3 Surfaces scheduled as having "No Finish" in room finish schedules
 - .4 Exposed concrete floors
 - .5 Plywood backing panels in electrical, telephone and communication equipment rooms
 - .6 Stainless steel piping

1.2 REFERENCES

- .1 Department of Justice Canada
 - .1 Canadian Environmental Protection Act (CEPA).
- .2 Environmental Protection Agency (EPA)
 - .1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24, (for Surface Coatings).
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual.
- .5 National Fire Code of Canada
- .6 Society for Protective Coatings (SSPC)
 - .1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.
- .7 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act (TDGA).
- .8 Accessibility for Ontarians with Disabilities Act (AODA), latest edition

1.3 QUALITY ASSURANCE

- .1 Qualifications

- .1 Contractor: Minimum of five years proven satisfactory experience. Provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
- .2 Journeymen: Qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.
- .3 Apprentices: Working under direct supervision of qualified tradesperson in accordance with trade regulations.
- .2 Conform to the standards contained in the Master Painters Institute Architectural Painting Specification Manual, latest edition (hereafter referred to a MPI Painting Specification) for all painting procedures including preparation and application of materials. MPI Painting Specification Manual as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
- .3 All paint manufacturers and Products used shall be as listed under the "Approved Products" section of the MPI Architectural Painting Specification Manual.
- .4 All painting and decorating Work shall be inspected by a paint inspection agency (inspector) acceptable to the specifying authority and the local MPI Accredited Quality Assurance Association. The painting contractors shall notify the paint inspection agency a minimum of one week prior to commencement of Work and provide a copy of the Project painting Specification, plans and elevation drawings (including pertinent details) as well as a finish schedule.
- .5 All surfaces requiring painting shall be inspected by the paint inspection agency who shall notify the Consultant and Contractor in writing of any defects or problems prior to commencing painting Work or after the prime coat shows defects in the substrate.

1.4

SUBMITTALS

- .1 Product Data
 - .1 Submit Product data and instructions for each paint and coating Product to be used.
 - .2 Submit Product data for the use and application of paint thinner.
 - .3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS). Indicate VOCs during application and curing.
- .2 MPI Inspection
 - .1 Submit consent of surety with Bid submission as proof of ability to supply a 100% two year maintenance bond, if an MPI Accredited Assurance Association's guarantee option is not used.
 - .2 Submit list of all painting materials to the Consultant and the paint inspection agency for review prior to ordering materials.
 - .3 When requested, submit invoice list of all paint materials ordered for Project Work to paint inspection agency indicating manufacturer, types and quantities for verification and compliance with Specification and design requirements.

.3 Samples

- .1 Submit full range colour sample chips to indicate where colour availability is restricted.
- .2 Submit duplicate 200 x 300 mm sample panels of each paint and stain with clear coating with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:
 - .1 3 mm plate steel for finishes over metal surfaces.
 - .2 13 mm maple plywood for finishes over wood surfaces.
 - .3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
 - .4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.
- .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
- .4 Certificates: Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Manufacturer's Instructions
 - .1 Submit manufacturer's installation and application instructions.
- .6 Closeout submittals: Submit maintenance data for incorporation into maintenance manual. Include following:
 - .1 Product name, type and use.
 - .2 Itemized list complete with manufacturer, Product number, paint type and colour coding for all colours used for Owner's later use in maintenance.
 - .3 MPI Environmentally Friendly classification system rating.

1.5 **DELIVERY, STORAGE AND HANDLING**

- .1 Packing, Shipping, Handling and Unloading
 - .1 Pack, ship, handle and unload materials to jobsite with containers and labels intact.
- .2 Acceptance at Site
 - .1 Identify Products and materials with labels indicating:
 - .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.

- .3 Remove damaged, opened and rejected materials from site.
- .4 Storage and Protection
 - .1 Provide and maintain dry, temperature controlled, secure storage.
 - .2 Store materials and supplies away from heat generating devices.
 - .3 Store materials and equipment in well ventilated area with temperature range 7°C to 30°C (45°F to 86°F).
- .5 Store temperature sensitive Products above minimum temperature as recommended by manufacturer.
- .6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.
- .7 Remove paint materials from storage only in quantities required for same day use.
- .8 Fire Safety Requirements
 - .1 Provide one 9 kg fire extinguisher adjacent to storage area.
 - .2 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.
 - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.
- .9 Waste Management and Disposal
 - .1 Separate waste materials for reuse and recycling.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP).
 - .4 Separate for reuse and recycling and place in designated containers; steel, metal and plastic waste in accordance with WMP.
 - .5 Place materials defined as hazardous or toxic in designated containers.
 - .6 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, regional and municipal regulations.
 - .7 Ensure emptied containers are sealed and stored safely.
 - .8 Unused paint and coating materials must be disposed of at legal hazardous material collections site.
 - .9 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) 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.

- .10 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .11 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .12 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:
 - .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 approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .13 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

1.6

SITE CONDITIONS

- .1 Heating, Ventilation and Lighting
 - .1 Provide heating facilities to maintain ambient air and substrate temperatures above 10°C (50°F) for twenty-four hours before, during and after paint application until paint has cured sufficiently.
 - .2 Provide continuous ventilation for seven days after completion of application of paint.
 - .3 Coordinate use of existing ventilation system with Consultant and ensure its operation during and after application of paint as required.
 - .4 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
 - .5 Provide minimum lighting level of 323 lux on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels
 - .1 Unless pre-approved written approval by Product manufacturer, do not perform painting when:
 - .1 Ambient air and substrate temperatures are below 10°C (50°F).
 - .2 Substrate temperature is above 32°C (90°F) unless paint is specifically formulated for application at high temperatures.

- .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
- .4 The relative humidity is under 85% or when the dew point is more than 3°C (38°F) variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3°C (38°F) below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint Work.
- .5 Rain or snow is forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
- .6 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand "normal" adverse environmental factors.
- .2 Perform painting Work when maximum moisture content of the substrate is below:
 - .1 Allow new concrete and masonry to cure minimum of twenty-eight days.
 - .2 15% for wood.
 - .3 12% for gypsum board.
- .3 Test for moisture using calibrated electronic moisture meter. Test concrete floors for moisture using "cover patch test".
- .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions
 - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.

1.7

GUARANTEE

- .1 Furnish either the local MPI Accredited Assurance Association's two year guarantee, or, alternatively, a 100% two year maintenance bond - both in accordance with MPI Architectural Painting Specification Manual requirements. The maintenance bond shall warrant that all painting Work has been performed in accordance with MPI Architectural Painting Specification Manual requirements.
- .2 All painting and decorating Work shall be in accordance with MPI Architectural Painting Specification Manual requirements and shall be inspected by the local MPI Accredited Quality Assurance Association's Paint Inspection Agency (Inspector), whether using either the MPI Accredited Quality Assurance Association's guarantee, or the maintenance bond option. The cost for such inspections, and for either the local MPI Accredited Quality Assurance Association's Guarantee, or the maintenance bond, shall be included in the Base Bid Price.

- .3 Painting and decorating Subcontractors choosing the maintenance bond option shall provide a maintenance bond consent from a reputable surety company licensed to do business in Canada. Cash or certified cheque are not acceptable in lieu of surety consent.

2 Products

2.1 **MATERIALS**

- .1 Paint materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.): As listed in the MPI Approved Products List (APL) are acceptable for use on this Project.
 - .1 Painting shall be premium grade.
 - .2 Provide paint materials for paint systems from one manufacturer.
- .2 Only qualified Products with E2 or E3 "Environmentally Friendly" rating are acceptable for use on this Project.
- .3 Conform to latest MPI requirements for exterior and interior painting Work including preparation and priming.
- .4 Shellac and turpentine: Highest quality Product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.
- .5 Provide paint Products meeting MPI "Environmentally Friendly" ratings based on VOC (EPA Method 24) content levels.
- .6 Use MPI listed materials having minimum E2 or E3 rating where indoor air quality (odour) requirements exist.
- .7 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:
 - .1 Water-based for concrete, concrete block and gypsum board
 - .2 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
 - .3 Manufactured without compounds which contribute to smog in the lower atmosphere.
- .8 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .9 All materials and paints shall be lead and mercury free and shall have low VOC content where possible.
- .10 All paint materials shall have good flowing and brushing properties and shall dry or cure free of blemishes or sags.
- .11 Where required, paints and coatings shall meet flame spread and smoke developed ratings designated by local code requirements and/or authorities having jurisdiction.

2.2 COLOURS

- .1 General: Colours for some elements to be painted are based on certain Product brands as indicated on the Drawings. Other Products may be used on the condition that colours selected by the Consultant must be matched at no extra cost even if it requires custom matching.

2.3 PAINT MIXES

- .1 Perform colour tinting operations prior to delivery of paint to site.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .4 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish (flat)	Maximum 5	Maximum 10
Gloss Level 2 - Velvet-Like Finish	Maximum 10	10 to 35
Gloss Level 3 - Eggshell Finish	10 to 25	10 to 35
Gloss Level 4 - Satin-Like Finish	20 to 35	min. 35
Gloss Level 5 - Traditional Semi-Gloss Finish	35 to 70	
Gloss Level 6 - Traditional Gloss	70 to 85	
Gloss Level 7 - High Gloss Finish	More than 85	

2.5 EXTERIOR PAINTING SYSTEMS

- .1 Concrete, Concrete Block
 - .1 EXT 3.1A - Latex gloss finish
- .2 Structural Steel and Metal Fabrications: Exposed steel, pipe bollards
 - .1 EXT 5.1D - Alkyd semi-gloss finish.
- .3 Galvanized metal (not chrome passivated): Exterior miscellaneous metal, hollow metal doors and pressed steel frames, rooftop ducts, vents, and piping, as indicated and as specified.
 - .1 EXT. 5.3B - Alkyd semi-gloss finish
 - .2 For hot-dip galvanized surfaces, apply polyamine epoxy tie-coat in lieu of cementitious primer and apply alkyd topcoat.
- .4 Natural Gas Piping
 - .1 Paint surface of exterior natural gas piping

- .2 EXT 5.1D - Alkyd, semi-gloss finish, yellow colour
- 2.6 **INTERIOR PAINTING SYSTEMS**
 - .1 Concrete Vertical Surfaces
 - .1 INT 3.1C - Latex, semi-gloss finish.
 - .2 Concrete masonry units: Concrete block:
 - .1 INT 4.2D - High performance architectural latex, semi-gloss finish.
 - .3 Structural steel and metal fabrications: Exposed structural and miscellaneous metals
 - .1 INT 5.1C-DD - dry fall, water based acrylic, semi-gloss finish.
 - .4 Galvanized metal (not chrome passivated): Doors, frames, ferrous metal pickets/railings, miscellaneous steel, pipes, exposed decking underside, and ducts
 - .1 INT 5.3K - water based acrylic, semi-gloss finish (over water based primer).
 - .2 For hot-dip galvanized surfaces, apply polyamine epoxy tie-coat in lieu of cementitious primer and apply alkyd topcoat.
 - .5 Galvanized metal (not chrome passivated): Exposed decking underside, and ducts
 - .1 INT 5.3H- dry fall, water based acrylic, flat finish.
 - .6 Gypsum board: Gypsum wallboard:
 - .1 INT 9.2B - High performance architectural latex, flat for ceilings; semi-gloss for walls.
 - .7 Canvas and Cotton Coverings
 - .1 INT 10.1A - Latex, flat finish.
 - .8 Interior of all Pipe Spaces and Ducts Visible Through Grilles, and all Surfaces Visible Through Louvres Occurring in Ceilings
 - .1 INT 10.1A - Latex, flat finish, black colour unless indicated otherwise.

Note: Prepare surfaces as required by applying proper primers on the surface to which paint is applied. For surfaces above ceilings, paint surfaces after all services have been installed and prior to ceiling installation.
 - .9 Piping and Conduit (except gas piping)
 - .1 INT 5.1C-G5 - dry fall, water based acrylic, semi-gloss finish.
 - .10 Natural Gas Piping
 - .1 INT 5.1C-G5 - INT 5.1C-G5 - dry fall, water based acrylic, semi-gloss finish, yellow colour
 - .11 Fire Protection Piping
 - .1 INT 5.1C-G5 - dry fall, water based acrylic, semi-gloss finish, red colour.

3 Execution

3.1 **MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: Comply with manufacturer's written recommendations or specifications, including Product technical bulletins, handling, storage and installation instructions, and data sheet.

3.2 **GENERAL**

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.3 **EXAMINATION**

- .1 Examine substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Consultant damages, defects, and unsatisfactory or unfavourable conditions before proceeding with Work.
- .2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with Work until conditions fall within acceptable range as recommended by manufacturer.

3.4 **PREPARATION**

.1 Protection

- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed Consultant
- .2 Protect items that are permanently attached such as fire labels on doors and frames.
- .3 Protect factory finished Products and equipment.

.2 Surface Preparation

- .1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
 - .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
 - .3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Consultant.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:

- .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air, as appropriate for the given condition.
- .2 Wash surfaces with a biodegradable detergent and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
- .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
- .4 Allow surfaces to drain completely and allow to dry thoroughly.
- .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
- .6 Use trigger operated spray nozzles for water hoses.
- .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
 - .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
 - .2 Apply wood filler to nail holes and cracks.
 - .3 Tint filler to match stains for stained woodwork.
- .6 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1 m.
- .7 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast Products from surfaces, pockets and corners to be painted by brushing with clean brushes or other suitable means.
- .8 Touch up of shop primers with primer as specified.

3.5 **APPLICATION**

- .1 Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application
 - .1 Apply paint in uniform layer using brush and/or roller type 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 free of roller tracking and heavy stipple.

- .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray Application
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of 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 uniform layer, with overlapping at edges of spray pattern. Back roll first coat application.
 - .4 Brush out immediately all runs and sags.
 - .5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.
- .5 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats to remove visible defects.
- .8 Finish closets and alcoves as specified for adjoining rooms.
- .9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6 **MECHANICAL/ELECTRICAL EQUIPMENT**

- .1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.
- .2 Boiler room, mechanical and electrical rooms: Paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.
- .3 Other unfinished areas: Leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .5 Do not paint over nameplates.
- .6 Keep sprinkler heads free of paint.
- .7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .8 Paint fire protection piping red.

- .9 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
- .10 Paint natural gas piping yellow.
- .11 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- .12 Do not paint interior transformers and substation equipment.

3.7 **SITE TOLERANCES**

- .1 Walls: No defects visible from a distance of 1 m at ninety degrees to surface.
- .2 Ceilings: No defects visible from floor at forty-five degrees to surface when viewed using final lighting source.
- .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.8 **RESTORATION**

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

3.9 **FIELD QUALITY CONTROL**

- .1 All surfaces, preparation and paint application shall be inspected by the paint inspection agency.
- .2 Painted surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to the painting inspection agency inspector.
 - .1 Runs, sags, hiding or shadowing by inefficient application methods.
 - .2 Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
 - .3 Damage due to touching before paint is sufficiently dry or any other contributory cause.
 - .4 Damage due to application on moist surfaces or caused by inadequate protection from the weather.
 - .5 Damage and/or contamination of paint due to wind-blown contaminants (dust, sand blast materials, salt spray, etc.).
- .3 Painted surfaces rejected by the inspector shall be made good at the expense of the Contractor. Small affected areas may be touched up; large affected areas or areas

without sufficient dry film thickness of paint shall be repainted. Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 AODA - Accessibility for Ontarians with Disabilities Act
- .2 TADG - Toronto Accessibility Design Guidelines

1.3 **SUBMITTALS**

- .1 Shop Drawings shall contain detailed description, and bear item numbers, marked to show quantity, colour, model numbers, fabrication details, and installation instructions.

1.4 **DELIVERY, STORAGE AND HANDLING**

- .1 Deliver packaged materials in original, undamaged containers with manufacturer's labels and seals intact. Handle and store materials in accordance with manufacturer's and Supplier's recommendations to prevent damage thereto.

1.5 **PROTECTION**

- .1 Protect the Work of this section from damage of any kind. Protect other work from damage resulting from Work of this section. Replace damaged work which cannot be repaired, cleaned or restored.

2 Products

2.1 **ACCESSIBLE PUSH BUTTON MOUNTING POST / BOLLARDS**

- .1 Push plate switch mounting post (bollards), 6" square surface mount post, 1/8" thick walls, molded ABS flame and impact resistant peaked cap, steel surface mounting base and heavy-duty anchor fasteners to secure to existing concrete. Provide in-ground concrete mounting base for new concrete. Posts shall be 42", 48" or 54" in height to accommodate standard push plate switch, or as indicated on Drawings. Refer to hardware schedules.

- .1 Surface Mounted, stainless steel or aluminum:

- .1 Model No. "CM-42" or CM-48" by Camden
- .2 Model No. "BPS6" (42") by SDC
- .3 Or accepted equal

- .2 In-Ground Mounted, stainless steel or aluminum:

- .1 Model No. "CM-42-IG", by Camden
- .2 Model No. "BPG6" in-ground mount (54") by SDC, Security with Black HDPE mortise removable cap with secure transmitter mount.

- .3 Or accepted equal
 - .2 Card Reader and Push Button Bollard Post: surface mounted, concealed base with standard mounting bolts. Welded angled top, 2 preps for round push plates and card reader, aluminum finish. Size as indicated on Drawings.
 - .1 Model No. "RT13", (Part number B-4X6-AT-PCCLR-BP-2P) by Wikk.
 - .2 Or accepted equal
 - .3 Touch Panel Column, Surface or Bollard Mounted
 - .1 Sturdy 1/8" extrusion with architectural finish, 628 aluminum (standard), 9"x6" or 36"x6" or as indicated on Drawings, Ingress-R.E.X Touch Panel Column, fully active.
 - .1 Model No. 482AA9 or 482AA36, blue infill, SPDT by SDC Security
 - .2 Or accepted equal
- 2.2 **PUSH PLATE SWITCH**
 - .1 Narrow Push Plate Switch
 - .1 Heavy duty, surface or flush mount, all active switch, 18-gauge stainless steel or aluminum, concealed mounting screws. Refer to hardware schedule.
 - .1 "CM-25", CM-26" or CM-35 by Camden
 - .2 Square Push Plate Switch
 - .1 Heavy duty, surface or flush mount, all active switch, 4 1/2" faceplate, stainless steel or aluminum, tamperproof screws. Refer to hardware schedule.
 - .1 "CM-45" or "CM-46" by Camden
 - .3 Round Push Plate Switch
 - .1 Heavy duty, surface or flush mount, all active switch, 18-gauge stainless steel faceplate. Stainless steel or aluminum, tamperproof screws. Refer to hardware schedule.
 - .1 "CM-60" by Camden.
- 2.3 **TOUCHLESS SWITCH**
 - .1 Wave Button: surface mounted, wired touchless / hands-free switch, built-in controls, stainless steel face plate, adjustable operating range, motion sensor for indoor and outdoor use. Refer to hardware schedule.
 - .1 "CM-331" by Camden
 - .2 Touchless Switch Restroom Kit: Surewave Touchless Restroom Control System. Refer to hardware schedule.
 - .1 "CX-WC16" by Camden

2.4 **EMERGENCY CALL SYSTEM**

- .1 Emergency call kit for universal washroom, complete equipment package, audible and visual annunciation, push/pull mushroom button, instructional signage. Refer to hardware schedule.

- .1 "CX-WEC10K2" by Camden

3 Execution

3.1 **INSTALLATION**

- .1 Install miscellaneous specialties perfectly rigid in accordance with manufacturers' printed directions.
- .2 After installation, test-operate and adjust operable parts as required for ease of operation.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.
- .2 Work includes, but is not necessarily limited to, the following:
 - .1 Sign graphics
 - .2 Cut-out letters
 - .3 Wall plates
 - .4 Door plates
 - .5 Number plates
 - .6 Barrier-free signage plates
 - .7 Signage at magnetic locked doors
 - .8 Project Information signage for public buildings

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .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 - Aluminum Association Designation System for Aluminum Finishes
- .5 CAN/CSA-G164 - Hot Dip Galvanizing of Irregularly Shaped Articles
- .6 CSA W47.2 - Certification of Companies for Fusion Welding of Aluminum
- .7 CSA W59-M - Welded Steel Construction (Metal Arc Welding)
- .8 CAN/CGSB-1.108 - Bituminous Solvent Type Paint
- .9 CGSB 41-GP-6M - Sheets, Thermosetting Polyester Plastics, Glass Fiber Reinforced
- .10 CSA - Canadian Standards Association
- .11 CNIB - Canadian National Institute for the Blind

.12 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **SUBMITTALS**

.1 Shop Drawings

- .1 Submit Shop Drawings in accordance with Section 01 33 00.
- .2 Submit Shop Drawings and catalogue sheets.
- .3 Indicate materials, thicknesses, sizes, finishes, colours, construction details, removable and interchangeable components, mounting methods, schedule of signs.
- .4 Submit full size templates drawn-to-scale details for individually fabricated (or incised) lettering indicating word and letter spacing.

.2 Samples

- .1 Submit samples in accordance with Section 01 33 00.
- .2 Submit sample of each type sign, sign image and mounting method.

1.4 **QUALIFICATIONS**

- .1 Manufacturer of signs shall be specialist in this field having minimum five years proven experience in sign manufacturing and installation of each type of signs specified.

1.5 **MAINTENANCE DATA**

- .1 Provide maintenance data for signs for incorporation into manual specified in Section 01 33 00.

2 Products

2.1 **MATERIALS**

- .1 Acceptable manufacturers:
 - .1 Forward Signs Inc.
 - .2 Approved alternative
- .2 Source sign fabrication made by one manufacturer from one of the following:
 - .1 Neon Products Ltd.
 - .2 Steel Art Signs Ltd.
 - .3 Imperial Sign Ltd.
- .3 Aluminum extrusions: Aluminum Association alloy AA 6063-T5, minimum 2 mm thick, free from scratches and surface blemishes.
- .4 Sheet aluminum: Aluminum alloy AA6063-T5, minimum 0.75 mm thick for exposed work requiring finish to match extruded Sections.

- .5 Prefinished sheet aluminum: Plain sheet with manufacturer applied baked enamel finish to Aluminum Association designation AA-M22-C22-A41 (clear) or AA-M22-C22-A42 (black) 0.25 mm thick on face and 0.0076 mm thick on back.
- .6 Prefinished sheet steel: Conforming to Canadian Steel Sheet Building Institute Bulletin finished with Z275 zinc coating in accordance with CSSBI Standards and prepainted as follows:
 - .1 Finish: Coil coated, baked-on, 70% Kynar 500 or Hylar 5000 based fluoropolymer enamel, 10000 Series by Stelco Inc., or Dofasco Inc. on exposed surfaces as applied by Baycoat. Coil coated surfaces pretreated and primed prior to application of coating. Paint colour: As selected by Consultant.
- .7 Galvanized steel sheet: Commercial quality to ASTM A653/A653M, GRADE A, with zinc coating designation.
- .8 Acrylic sheet: Polymethylmethacrylate (PMMA) cast sheet suitable for intended use in sign fabrication, (translucent white) (transparent clear) (colours as indicated).
- .9 Fiberglass sheet: To CGSB 41-GP-6M, flat sheet, smooth finish, colours as indicated.
- .10 Engraving sheet: Lamicoid 3.2 mm thick plastic sheet, (black) (white) core.
- .11 Welding materials: To CSA W59.
- .12 Solder: To ASTM B32.
- .13 Self-stick foam tape: Minimum 1.6 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.
- .14 Adhesives, paints, sealants and solvents for acrylic and fiberglass sheet: Type recommended by sheet manufacturer for applicable condition.
- .15 Acrylic topcoat: Clear, non-yellowing, exterior grade, satin finish, acrylic polyester resin protective coating, compatible with (acrylic) (fiberglass) (metal) surface of type recommended by sheet manufacturer.
- .16 Bituminous paint: To CAN/CGSB-1.108, Type 2.

2.2 **FINISHES**

- .1 Anodized Aluminum
 - .1 Clear finish: Conform to Aluminum Association designation AA-M22-C22-A41 in uncoloured anodized finish with film thickness of 0.25 mm.
 - .2 Colour finish: Conform to Aluminum Association designation AA-M22-C22-A42 to match sample.
- .2 Galvanized finish: On irregular shaped articles, 600 g/m² zinc coating to CAN/CSA G164.
- .3 Chrome and nickel plating: To ASTM B456, satin finish.
- .4 Prefinished metals: As specified herein.
- .5 Bronze finishes: To match sample.

2.3 **GENERAL FABRICATION REQUIREMENTS**

- .1 Fabricate signs in accordance with details on Drawings, Specifications and Shop Drawings to present a safe and rigid installation.
- .2 Build units square, true, accurate to size, free from visual or performance defects.
- .3 Accurately fit and securely join sections to obtain tight, closed joints.
- .4 Allow for thermal movement without distortion of components.
- .5 Do not use exposed fasteners unless indicated otherwise on Drawings, and shall be inconspicuous and same finish and colour as base metal on which they occur.
- .6 Polish exposed edges of plastic and metal to smooth, slightly convex profile.
- .7 Do steel welding to CSA W59 aluminum welding to CSA W47.2 Finish exposed welds flush and smooth.
- .8 Brush-apply bituminous paint to aluminum in contact with dissimilar metals, concrete or masonry.
- .9 Do not locate manufacturer's nameplates on sign surfaces visible in completed work.
- .10 Letters shall be as indicated otherwise on Drawings, and be clear cut and free from ragged or indistinct edges.

2.4 **SIGN GRAPHICS**

- .1 Sign graphics to be well defined, arranged for balanced appearance, and properly word- and letter-spaced. Acceptable manufacturers for computer cut graphics:
 - .1 System Graphics
 - .2 Alpine Graphics Productions
 - .3 Autograph Trim
 - .4 Canada Decal Inc.
- .2 Silk screen process: Apply colour photographic produced silk screen printed images to (face) (back) side of transparent sign faces; face side of opaque sign faces.
- .3 Engraving: Apply sign text using pantograph mechanical engraving machine to obtain incised (paint-filled) letters.
- .4 Self-stick vinyl film: Individual letters, numerals and symbols cut from 0.1 mm thick matte finish, exterior grade PVC film, with self-stick adhesive backing. Colour selected by Consultant from manufacturer's standard range.
- .5 Decals: Silk screened or printed images on minimum 0.025 mm, clear matte finish, PVC film, with self-stick adhesive backing. Protect image subject to abuse with laminated film overlay of same material as decal base.

2.5 **CUT-OUT LETTERS**

- .1 Cut letters and symbols from (opaque) (translucent) (coloured acrylic) (plain) (embossed) (aluminum sheet).

- .2 (Helvetica) typeface, upper (and lower) case; sizes and thicknesses as indicated. Make corners (cutter radius) (square cut).
- .3 Fabricate aluminum with (clear) (colour) anodizing) (baked enamel) finish.

2.6 **WALL PLATES**

- .1 Plastic Wall Plates
 - .1 Fabricate from (clear) (colour) (acrylic sheet) (fibreglass) minimum 3.2 mm thick. Sizes as indicated.
 - .2 Sign graphics: Apply by silk screen paint filled, engraving or self-stick vinyl film letters.
- .2 Metal Wall Plates
 - .1 Fabricate from (extruded) (sheet) aluminum sign plates, minimum 3.2 mm thick, with (clear) (colour) anodized) (baked enamel) finish. Sizes as indicated.
 - .2 Sign graphics: Apply by (silk screen), (engraving) or (self-stick vinyl letters).
- .3 Interchangeable mounting: Supply wall plates with semi-concealed, retaining holders that permit quick but vandal-resistant interchange of sign face. No exposed fasteners permitted. Exposed portions to match sign face.
- .4 Fixed mounting: Prepare wall plates for fixing by surface fasteners with rosette covers concealed tamperproof clips to self-stick foam tape. Include back-up plates for fixing to uneven surfaces where required.
- .5 Bracket mounting: Fabricate brackets for wall projecting or ceiling suspended sign plates as detailed: of (clear) (white translucent) acrylic (clear) (coloured) anodized aluminum finish, 4.8 mm thick.

2.7 **DOOR PLATES**

- .1 Fabricate sign faces of (clear) (colour) (acrylic sheet) (fiberglass) (sheet) (extruded) (clear) (colour) anodized aluminum. Sizes and thickness as indicated on Drawings.
- .2 Sign graphics: Apply by (silk screen) (engraving) (self-stick vinyl letters).
- .3 Interchangeable mounting: Supply door plates with semi-concealed, retaining holders that permit quick but vandal-resistant interchange of sign face. No exposed fasteners permitted. Exposed portions to match sign face.
- .4 Fixed mounting: Use self-stick foam tape.
- .5 Mounting on transparent surfaces: Use self-stick foam tape. Include blank back-up plate for opposite side.
- .6 Washroom pictographs: Cut-out figures without backgrounds.

2.8 **NUMBER PLATES**

- .1 Fabricate number plates for (columns) (doors) (windows) of engraving sheet. Size as indicated on Drawings.
- .2 Engrave 9.5 mm high, single line numerals incised to expose contrasting coloured core.

2.9 **BARRIER-FREE SIGNAGE PLATES**

- .1 3D-graphics signs for the visually impaired, the Barrier-Free Act, building codes and CNIB and CSA recommendations. Minimum description:
 - .1 Raised letters, Grade 2, Braille and graphics system on injection moulded acrylic, styrene or polycarbonate substrate and protected with a non-glare, matt finish.
 - .2 Double sided tape mounting.
 - .3 Colours as selected by the Consultant.
- .2 Washroom Door
 - .1 Tactile type universal male or female symbol and a universal barrier-free symbol on a dark coloured 150 mm wide x 150 mm high square.
 - .2 Braille signs under the universal symbols, within the square.
 - .3 Tactile type bilingual text (Men-Hommes) or (Women-Femmes) under the dark coloured square.
- .3 Stair Shaft
 - .1 The sign is to be multi-layer process consisting of substrate, laminating adhesive, background film, profile film, test film and top film.
 - .2 Location: Mounted on wall on the latch side of doors leading to stair shafts.
- .4 Handrails
 - .1 150 mm long high contrast handrail wayfinding sign with Braille and 25 mm wide hazard strip on either side of the sign to be 200 mm in total length indicating the stair number and floor/level number.
 - .2 Location: On centre within the extension piece of the handrail.
 - .3 Colour: as indicated on Drawings.
 - .4 Acceptable Manufacturer:
 - .1 Atec Signs Inc.
 - .2 or accepted equal.

2.10 **SIGNAGE AT MAGNETIC LOCKED DOORS**

- .1 Aluminum plate with the following text engraved in Helvetica typeface, 25 mm high: "EMERGENCY EXIT, UNLOCKED BY FIRE ALARM".
- .2 Paint plate with one colour. Paint engraved text with a contrasting colour. Paint to be baked enamel finished.
- .3 Colours as selected by Consultant.

2.11 **PROJECT INFORMATION SIGNAGE FOR PUBLIC**

- .1 Refer to Section 10 14 00.01 City of Toronto Construction-Improvement Signs for information on the standard template to be used for projects accessible to the public.

3 Execution

3.1 **INSTALLATION**

- .1 Erect and secure signs plumb and level at elevations.
- .2 Comply with sign manufacturer's installation instructions and approved Shop Drawings.
- .3 Mechanical Attachment
 - .1 Apply signage to concrete or solid masonry with lag screws and expansion bolts or screws.
 - .2 Apply to hollow masonry with toggle bolts or equivalent.
 - .3 Secure behind stud walls or above ceilings into framing members.
 - .4 Mechanical fasteners shall be non-staining, non-ferrous type.
 - .5 Fabricate special fasteners as required for installation conditions.
- .4 Adhesive attachment: Use self-stick adhesive foam tape to manufacturer's instructions to adequately fix sign and prevent "rocking". Keep tape maximum 1.6 mm from edges.

3.2 **CLEANING**

- .1 Leave signs clean and polish all exposed surfaces.
- .2 Touch up any damaged finishes.

End of Section

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Corporate Specialty Signage – Capital Construction/Improvement Sign: Large

All requests for variations from the Corporate Identity Program (CIP) standards must be submitted to approvals@toronto.ca

As well as the corporate "family" of standard signs, specific Capital Construction/Improvement signs have been approved for use in order to consistently identify City of Toronto construction sites and road/sidewalk repair work. There are two sizes of Capital Construction/Improvement signs – 48" square (see example at right) and 24" square (see page 49).

The sign's fixed **Header** includes the Toronto Primary Logo positioned in the upper left corner and a consistent standard slogan "Building a great city together".

The sign's **Body** consists of a Project Title (maximum three lines and 28 characters per line), Additional Project Details (maximum three lines and 34 characters per line), Expected Completion Date and Contract Number.

The sign's fixed **Footer** includes the Call 311 identifier positioned at left and the Toronto website address positioned at right.

The Header bar, Project Title and Footer bar will be in the corporate blue (Pantone 647) with reversed white logos/text. All other text will be black.



Header:

Fixed Toronto Primary Logo and slogan text Pantone 647 blue (with reversed white logos/text)

Body:

1 Project Title (two lines preferred)

Univers 65 bold - 250 pt, Pantone 647 blue, upper/lower case

Line 1: Project type (primary work) e.g., "Watermain Replacement"

Line 2: Primary street where work is taking place e.g., "Bloor Street West" 28 characters maximum per line

2 Project Details (one or two lines preferred may use three)

Univers 55 Roman - 200 pt, Black, upper/lower case

Provide limits of project e.g., "Bay Street to Avenue Road" 34 characters maximum per line

3 Start

Univers 65 - 150 pt, Black, upper/lower case

"Spring" + Year or "Summer" + Year or "Fall" + Year or "Winter" + Year or Month + Year

4 End

Univers 65 - 150 pt, Black, upper/lower case

"Spring" + Year or "Summer" + Year or "Fall" + Year or "Winter" + Year or Month + Year

5 Contract Number (two lines)

Line 1 Univers 55 Roman Bold - 150 pt, Black, upper/lower case

Line 2 Univers 55 Roman - 150 pt, Black, upper/lower case

Footer:

Fixed standard Call 311 identifier and City of Toronto web address, Pantone 647 Blue (with reversed white logo/text)

Notes:

- Only 1, 2, 3, 4, 5 are fields in which text can be specific to each job.
- Project title and information should use clear language and avoid technical jargon and reflect Construction Notices.

Drawing specifications also found at: http://www.toronto.ca/techservices/conspecs_signs.htm

To assure compliance with CIP sign specifications, requests for signage consultation and sign design development must be submitted to design@toronto.ca during the planning stage.

Corporate Specialty Signage – Capital Construction/Improvement Sign: Small

All requests for variations from the Corporate Identity Program (CIP) standards must be submitted to approvals@toronto.ca

As well as the corporate "family" of standard signs, specific Capital Construction/Improvement signs have been approved for use in order to consistently identify City of Toronto construction sites and road/sidewalk repair work. There are two sizes of Capital Construction/Improvement signs – 24" square (see example at right) and 48" square (see page 48).

The sign's fixed **Header** includes the Toronto Primary Logo positioned in the upper left corner and a consistent standard slogan "Building a great city together".

The sign's **Body** consists of a Project Title (maximum three lines and 28 characters per line), Additional Project Details (maximum three lines and 34 characters per line), Expected Completion Date and Contract Number.

The sign's fixed **Footer** includes the Call 311 identifier positioned at left and the Toronto website address positioned at right.

The Header, Project Title and Footer will be in the corporate blue (Pantone 647) with white reversed logos/text. All other text will be black.



Header:

Fixed Toronto Primary Logo and slogan text Pantone 647 blue (with reversed white logos/text)

Body:

- 1 Project Title** (two lines preferred)
Unifers 65 bold - 125 pt, Pantone 647 blue, upper/lower case
Line 1: Project type (primary work) e.g., "Watermain Replacement"
Line 2: Primary street where work is taking place e.g., "Bloor Street West"
28 characters maximum per line
- 2 Project Details** (one or two lines preferred may use three)
Unifers 55 Roman - 100 pt, Black, upper/lower case
Provide limits of project e.g., "Bay Street to Avenue Road", 34 characters maximum per line
- 3 Start**
Unifers 65 - 75 pt, Black, upper/lower case
"Spring" + Year or "Summer" + Year or "Fall" + Year or "Winter" + Year or Month + Year
- 4 End**
Unifers 65 - 75 pt, Black, upper/lower case
"Spring" + Year or "Summer" + Year or "Fall" + Year or "Winter" + Year or Month + Year
- 5 Contract Number** (two lines)
Line 1 Unifers 55 Roman Bold - 75 pt, Black, upper/lower case
Line 2 Unifers 55 Roman - 75 pt, Black, upper/lower case

Footer:

Fixed standard Call 311 identifier and City of Toronto web address, Pantone 647 blue (with reversed white logo/text)

Notes:

- It is preferred that 24 x 24 signs are installed for pedestrian / foot traffic only as this size sign is difficult for moving traffic to read.
- Only 1, 2, 3, 4, 5 are fields in which text can be specific to each job.
- Project title and information should use clear language and avoid technical jargon and reflect Construction Notices.

Drawing specifications also found at: http://www.toronto.ca/techservices/conspescs_signs.htm

To assure compliance with CIP sign specifications, requests for signage consultation and sign design development must be submitted to design@toronto.ca during the planning stage.

Corporate Specialty Signage – Capital Construction/Improvement Sign: Informational/Didactic

All requests for variations from the Corporate Identity Program (CIP) standards must be submitted to approvals@toronto.ca

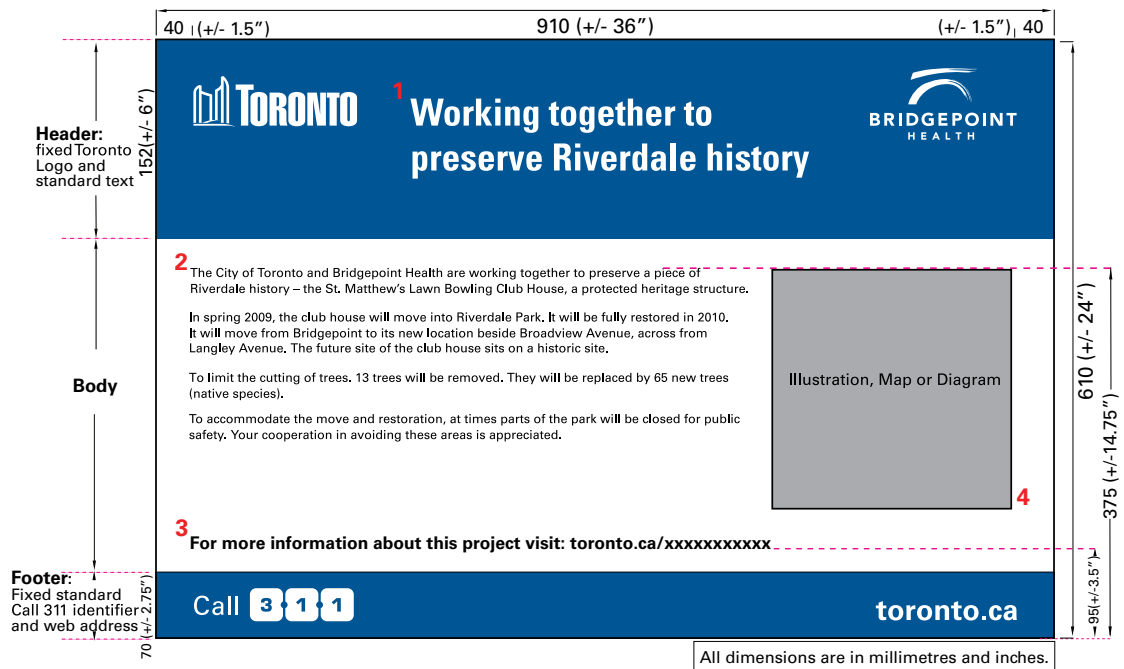
As well as the corporate "family" of standard signs, and the two sizes of specialty Capital Construction/Improvement signs, an Informational/Didactic sign has also been approved for use. As shown in the example at right, this Informational/Didactic sign format allows for extensive descriptive information and visuals related to the project, but does not replace the need for the large and/or small Capital Construction/Improvement signs required at the street or sidewalk.

The sign's **Header** can accommodate the Toronto Primary Logo, a unique heading and a partner identifier, as needed and appropriate.

The sign's **Body** includes descriptive text and can also accommodate appropriate photos, plans and/or graphics.

The sign's fixed **Footer** includes the Call 311 identifier and the Toronto website at right.

The Header and Footer will be in the corporate blue (Pantone 647) with reversed white logos/text. All other text will be black.



Header:

Fixed Toronto Primary Logo and slogan text (1) Univers Bold 100 pt, White and partner logo if applicable, Pantone 647 Blue (with reversed white logos/text)

Body:

2 Project Details

Univers 55 Roman - 36 pt, Black, upper/lower case, flush left as in example above, column width variable as needed

3 Information Line

Univers 65 Bold - 50 pt, Black, upper/lower case

4 Illustration, Map or Diagram - 10"x10" in example, or multiple images as needed

Footer:

Fixed standard Call 311 identifier and City of Toronto web address, Pantone 647 Blue (with reversed white logo/text)

Notes:

- Only 1, 2, 3, 4 are fields specific to each job.
- Project title and information should use clear language and avoid technical jargon.
- All white areas are white engineering grade reflective sheeting.
- All blue areas are Pantone 647 blue.
- Size is 36"x 24" (910mm x 610mm).
- Signboards will be constructed out of 19mm exterior grade plywood or 19mm PVC foamboard.

To assure compliance with CIP sign specifications, requests for signage consultation and sign design development must be submitted to design@toronto.ca during the planning stage.

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.
- .2 Work includes, but is not necessarily limited to, the following:
 - .1 Field-verify dimensions and site conditions at sign locations; engineer signs and sign foundations; provide electrical hook-up to illuminated signs where needed; and provide fastenings for attachment and installation of all signs where needed.
 - .2 Coordinate with Owner and other trades as required for completing the Work.
 - .3 Installation shall include unloading, receiving and handling, storing, relocating, uncrating, inspecting, cleaning and assembly, testing and adjusting sign units into final locations.
 - .4 Installation of all work shall be completed according to deadlines determined by Owner's Representative.

1.2 **REFERENCES**

- .1 Conform to the latest edition of the following:
 - .1 AODA - Accessibility for Ontarians with Disabilities Act

1.3 **GENERAL REQUIREMENTS**

- .1 Provide all materials, labour, equipment, and services to furnish and install the complete sign package.
- .2 The new signs shall have internally illuminated logo and letters electrically controlled by a photocell, in the case of primary and secondary Identification signs, or applied vinyl in the case of other identification signs and guide, information, orientation and regulation signage.
- .3 The Owner's logo shall be done using the colour of Akzo/Nobel Blue ATO-208 and the colour shall match the Owner's previously selected colour shades and utilize the Owner's standard fonts and text as specified in the Design Intent Drawings.
- .4 All signs shall meet the local governing sign ordinances, including those addressing content, anchorage and weather durability.
- .5 Extent of the signage and graphics is shown on the Drawings and in the appendix. Quantities of required signs shall be per scheduled in message schedule unless revised by Owner.
- .6 Symbols shall be as specified by the United States Department of Transportation (DOT) and the American with Disabilities Act (ADA).
- .7 Forms of signage shall include site identification, directional and regulatory, and parking area/space identification.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver signs and mounting hardware to Site packaged to prevent damage and marked for easy identification.
- .2 Store materials in clean, dry location protected from damage and stored horizontal and flat to prevent warping. Replace damaged materials at no added cost to the Owner.

1.5 QUALITY ASSURANCE

- .1 Materials and workmanship shall be new and of the best grades of their kind for their specified purpose.
- .2 The term "or as approved" shall mean a material and/or method approved by the Architect-Engineer as equal to those named in Specifications.
- .3 Contractors who wish to bid on a material or method assumed "equal" to those specified must submit a written request including supporting technical data with their bid.
- .4 Sign units shall be engineered to be rigid, without buckling of any member, failure of any points, distortion, or other damage. Joints shall be weathertight and vandal proof.
- .5 Joints in members shall be internally aligned and shall provide for thermal expansion and contraction. Exposed corners of frames shall be mitered and welded, with sharp ninety degree corners, unless otherwise specified. Joints and seams shall be filled and ground smooth so as not to be visible on the finished sign.
- .6 Welding shall conform to applicable AWS standard and shall be free of defects. Welding shall be done prior to finishing. Aluminum-to-aluminum joints on the exterior of a sign shall be continuous heli-arc welded and finished smooth.
- .7 Exterior signs shall be engineered to be rigid and withstand movement, shear and torsion loads. Exposed areas of sign shall not oilcan. Sign shall withstand wind load of 30 pounds per square foot (psf) without permanent malformation or damage, or a higher wind load as specified by applicable local ordinances.
- .8 Use only personnel thoroughly skilled and experienced with the Products and method for fabrication and installation of signage specified. Work done and materials furnished shall be first class in every respect and, unless otherwise specified, materials and equipment shall be new and of the latest design.

1.6 ELECTRICAL WORK

- .1 Electrical Work shall bear the label of Underwriters Laboratories, Inc. (UL) approval.
- .2 Electrical fixtures and assemblies shall meet UL requirements and be installed in accordance with National Electrical Code (NEC) standards.
- .3 The Owner will be responsible for providing a power source to the base of each sign requiring power. The Owner will identify main trunk lines from which electrical power may be pulled. Power to be 120/240 volts at 60 cycles unless otherwise noted in the documents.
- .4 It is the responsibility of the Sign Contractor to provide required illumination and electrical connections, manipulate the existing conduit to its proper location, install an external disconnect, extend the conduit through the concrete base to align with the point of hookup, run the power supply through it and hook up the sign. Conduit running from the disconnect switch to the sign shall travel within the concrete base, not on its surface.

- .5 The Contractor shall coordinate with Division 26 Specification sections and Drawings.

1.7 **FIELD MEASUREMENTS**

- .1 Take field measurements where required to verify or supplement dimensions indicated and be responsible for accurate fit of the work.

1.8 **UTILITIES AND SERVICES**

- .1 Protect existing utilities and services within and adjacent to area of Work, from damage while performing the Work.
- .2 If utilities or services are uncovered that are not indicated on the Drawings, advise Owner and do not work in the immediate area until instructed by the Owner.

1.9 **EARTHWORK**

- .1 Backfill excavations as promptly as work permits.
- .2 Repair and re-establish grades where damaged during demolition and installation.

1.10 **SUBMITTALS**

- .1 Drawings: Submit Shop Drawings for fabrication and installation of the signs. Include plans, elevations, and typical large-scale details of construction, sign working and lettering layout. Show anchorages and accessory items. Furnish location template Drawings for items supported or anchored to permanent construction.
- .2 Samples: Submit samples/prototypes for verification of the following:
- .1 Two samples of each specified sign colour, paint and vinyl, for colour verification, 100 mm x 100 mm minimum size.
- .2 Two samples of Casocryl Black'n White acrylic sheet, 100 mm x 100 mm minimum size.
- .3 Two samples of ACM Alucobond with silver metallic A 3001-DXLE finish.
- .3 Submit within ten days following approvals, a final schedule of fabrication and installation and total completion.
- .4 Submit two copies of maintenance and instructional information for use by the Owner. Information shall describe proper maintenance such as cleaning and touch-up, and shall include guarantees, special warranties and replacement data. Manufacturer brochures describing the material used in the Work shall also be furnished. This shall include finish paint formula and manufacturer's numbers, etc.
- .5 All submittals shall be sent to the Architect-Engineer through the Owner's Representative per Division 1 requirements.
- .6 Submit Product data for lamping/lighting fixtures.

1.11 **WARRANTY**

- .1 Provide a written five year full replacement warranty to the Owner that all signage will be free of defects due to workmanship or materials including but not limited to fading, peeling, de-lamination, and installation.

- .2 During the Warranty Period, the Contractor agrees to restore defective Work to the standard of the Contract Documents without cost to the Owner, including materials and labour.
- .3 Lamps and light fixtures shall be warranted a minimum of one year from final approval against failure of operation. If a unit becomes defective within this time period it shall be replaced at no cost to Owner.
- .4 Joints in acrylic plastic construction shall be warranted for five years against failure or delamination. If unit becomes defective within this time period it shall be replaced at no cost to the Owner.
- .5 Vinyl die-cut letters shall be warranted for five years against delamination from substrate.
- .6 All warranties shall begin on the date of the Owner's final acceptance of the Work.

2 Products

2.1 **ACCEPTABLE MANUFACTURERS**

- .1 Forward Signs Inc.
- .2 Approved alternative

2.2 **ADHESIVE VERY HIGH BOND TAPE**

- .1 Double-coated high bond acrylic tape for joining of sign units, of thickness needed to achieve maximum adhesion with minimum visibility.
- .2 Acceptable manufacturers:
 - .1 Graphtec Industries
 - .2 3M Co.

2.3 **ALUMINUM**

- .1 Aluminum sheet: Provide aluminum sheet of alloy and temper recommended by the aluminum producer or finisher for the type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 209 for 5005-H-15.
- .2 Aluminum extrusions: Provide aluminum extrusions of alloy and temper recommended by the aluminum producer or finisher for the type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 221 for 6063-T5.
- .3 Filler metal for welding aluminum shall be the alloy recommended for each application by the manufacturer of aluminum alloy.
- .4 Aluminum shall be separated from direct contact with concrete and metals other than stainless steel, zinc, cadmium or nickel bronze, by painting contact surfaces with zinc chromate primer and aluminum paint or with a coat of heavy-bodied bituminous paint or by non-absorptive tape or gasket.

2.4 **ANCHORS AND INSERTS**

- .1 Use non-ferrous metal inserts for interior installations. Furnish inserts, as required, to be set into masonry Work.

2.5 **FASTENERS**

- .1 Unless otherwise indicated, use concealed fasteners fabricated from metals that are non-corrosive to either the sign material or the mounting surface.

2.6 **CEILING SUSPENSION CABLING**

- .1 Follow manufacturer recommendation.

2.7 **PLASTICS**

- .1 Cast acrylic sheet: Provide cast (not extruded or continuous cast) methyl methacrylate monomer plastic sheet, in sizes and thickness indicated, with a minimum allowable continuous service temperature of 80°C (176°F), and of the following types.
- .2 Transparent sheet: Where sheet material is indicated as “clear” provide colourless sheet in matte finish, with light transmittance of 92%, when tested in accordance with the requirements of ASTM D 1003.
- .3 Acceptable Manufacturer (Transparent Sheets)
 - .1 Plexiglass (Rohm and Haas Co.)
 - .2 Lexan (General Electric Co.)
- .4 Opaque plastic sheet: ABS sheet, in thickness indicated, with lightly textured surface. Polyvinylchloride (PVC) sheet, expanded low-density closed cell material with smooth flat surfaces.
- .5 Acceptable Manufacturer (Opaque Sheet)
 - .1 Alucobond Technologies Inc.
 - .2 Architect-Engineer approved equivalent.

2.8 **VINYL FILM**

- .1 Provide opaque non-reflective, vinyl film, 2 mil minimum thickness, with pressure sensitive adhesive backing, suitable for interior applications.
- .2 Legends shall securely adhere when subjected to any temperature within the range of -34°C to +93°C (-30°F to +200°F) and shall not crack, chip or peel voluntarily.
- .3 Shrinkage of letters shall not exceed 0.4 mm in any direction.
- .4 Acceptable Products are:
 - .1 3M's Scotchcal
 - .2 Avery Dennison's "Fasson 1000 series Premium Vinyl

2.9 **CONCRETE**

- .1 Concrete Work shall conform to applicable ACI codes and standards in conformance with the requirements of Section 03 30 00.
- .2 Concrete Work for sign foundations shall be 3000 psi mix, air entrained in conformance with the requirements of Section 03 30 00. Concrete shall be vibrated during the pour to adequately distribute aggregate and eliminate air pockets or other surface imperfections.

Exposed concrete shall be smooth finish, without form marks or discolouration. Exposed edges shall be even.

- .3 Metal reinforcement shall be steel bars or wire as engineered by the sign fabricator and as shown on the Shop Drawings.
- .4 Install inserts as required for anchorage of sign units and cast in conduit as indicated, in conformance with the requirements of Section 03 30 00.

2.10 **ALUCOBOND**

- .1 Provide Alucobond signs or Owner-approved equivalent Aluminum Composite Material (ACM) of specified thicknesses and finishes where specified or shown on Drawings.
- .2 Alucobond material manufactured by Alcan Composites USA, Inc. 208 West 5th Street Benton, KY 42025 (800 626-3365 270 527-4200). Items of the same function and performance, which have received prior approval from the Owner, shall be allowed for this Project. Approval shall be based on documentation submitted showing adequacy of the material.
- .3 Thickness 3 mm sheet. All cut ACM edges to be covered and smooth. All surfaces are to be smooth. All joints to be uniformed.
- .4 Finish to be silver metallic, #A3001-DXLE with a ten (10) year coating warranty for outdoor weather exposure at forty-five degree angle facing south Florida exposure. Maximum colour change of 5 Delta E units as calculated in accordance with ASTM D 2244. Maximum chalk rating of eight in accordance with ASTM D 4214. No checking, crazing, adhesion loss.
- .5 Plans, elevations, details, characteristics, and other requirements indicated are based upon standards by one manufacturer. It is intended that other manufactures, receiving prior approval, may be acceptable, provided their details and characteristics comply with size and profile requirements, and material/performance standards.
- .6 Fasteners (concealed/non-corrosive): Fasteners as recommended by panel manufacturer. Do not expose fasteners.
- .7 Install panels plumb, level and true. Anchor panels securely per engineering recommendations and in accordance with approved Shop Drawings to allow for necessary thermal movement and structural support. Do not install component parts that are observed to be defective, including warped, bowed, dented, abraded, or broken members. Do not cut, trim, weld, or braze component parts during erection in a manner which would damage finish, decrease strength, or result in visual imperfection or a failure in performance. Return component parts that require alteration to shop for re-fabrication, if possible, or for replacement with new parts. Separate dissimilar metals and use fasteners with gaskets where needed to eliminate the possibility of corrosive or electrolytic action between metals.
- .8 Remove masking (if used) as soon as possible after installation. Masking intentionally left in place after panel installation shall become the responsibility of the Owner. Make sure weep holes and drainage channels are unobstructed and free of dirt and sealants.

2.11 **ICETRON**

- .1 ICETRON manufactured by Osram Sylvania, 18725 N. Union Street, Westfield, IN 46074 (Phone 800 762-7191, Canada 800 265-2852) Items of the same function and performances, which have received prior approval from the Owner shall be allowed for

this Project. Approval shall be based on documentation submitted showing adequacy of the Product.

- .2 System shall be 150W ICETRON inductively coupled electrodeless lamp and ballast system (or Owner-approved equivalents) having 12,000 rated lumens. System shall have an average rated life of 100,000 hours.
- .3 System and components shall be covered for up to sixty months (five years) with a comprehensive system warranty on ICETRON lamp and QUICKTRONIC ballast systems (or Owner-approved equivalents). The warranty is valid for lamp operation cycles up to, and including, continuous operation.
- .4 Hardware
 - .1 Hardware shall be as required by manufacturer. Use stainless steel and aluminum tamper-proof nuts, bolts and screws. Mountings shall be of such a material as to prevent anodic/cathodic corrosion. Where different metals would otherwise meet (i.e. steel and aluminum), the surface of one metal must be primed and painted to prevent direct contact with the other.

2.12 **ACCEPTABLE MANUFACTURERS**

- .1 Acceptable manufacturers are:
 - .1 A. S. I. Sign Systems
 - .2 APCO Company
 - .3 Andco Industries, Inc.
 - .4 System 2/90
 - .5 Visual Entities
 - .6 Howard Industries

2.13 **FABRICATION**

- .1 The work shall be shop fabricated.
- .2 Sign content, including messaging, must be provided to the Owner and approved by the Owner before signage is fabricated.
- .3 Fastenings shall be concealed where possible. Exposed fastenings shall occur only where concealed fastenings are not specified and shall be finished to match the surrounding surface.
- .4 Touch-up of artwork for photographic enlargement, and quality of artwork for finished signage shall be the responsibility of the Contractor. The Owner reserves the right to reject artwork if it fails to meet the standards of quality established.
- .5 Edges and corners of finished letter forms and symbols shall be photographically precise, crisp, clean; tick marks, rounded corners, discontinuous curves, line wave, cut or ragged edges, edge build-up, bleeding, surface pinholes or other imperfections will not be accepted.
- .6 Letterforms and symbols shall be aligned to maintain a base line parallel to the sign format. Letterforms and symbols shall conform to the prescribed letter from proportions.

- .7 Message copy, unless otherwise specified, shall be GM sans regular and bold as indicated. Alternate letterforms shall not be accepted. Message copy colours shall be as indicated on the Drawings.
- .8 Message copy on Drawings is for layout purposes. Actual copy for signs shall be as scheduled.
- .9 Fabrication of acrylic plastic sheet shall be in accordance with approved Shop Drawings and with techniques and recommendations of the manufacturer.
- .10 Remove protective paper from acrylic sheet only as required during fabrication. Exercise care in handling and fabrication to avoid scratching, chipping or crazing of the acrylic plastic sheet.
- .11 Panel signs: Fabricate panel signs to comply with the requirements indicated for materials, thickness, finishes, colours, designs, shapes, sizes and details of construction. Produce smooth, even, level sign panel surfaces, constructed to remain curved or flat (as specified in the Design Intent Drawings) under installed conditions within a tolerance of plus or minus 1.5 mm measured diagonally.
- .12 Brackets: Fabricate brackets and fittings for bracket-mounted signs from flat aluminum to suit sign panel construction and mounting conditions indicated.
- .13 Graphic image process: Provide sign copy to comply with the requirements indicated for sizes, styles, spacing, content, positions, materials, finishes and colours of letters, numbers, symbols and other graphic devices.
- .14 Graphics shall be executed in such manner that edges and corners are true, clean and photographically precise. Graphics with rounded corners, cut or ragged edges or edge build-up will not be accepted.
- .15 Apply pressure-sensitive vinyl graphics to clean surface; surface and air temperature shall be 16°C (60°F) minimum.
- .16 Substrates shall be considered dirty and shall be wiped with a solvent recommended by the acrylic manufacturers prior to the application of vinyl film or sheeting. Dry the surface with a lint-free cloth before the solvent evaporates from the surface.
- .17 ACM Alucobond curved sign panels; approximate size and proportions as shown on the Design Intent Drawings. All signs of same size shall be totally uniform in size, proportions, and colour.
- .18 Fabricate signs with adequately sized stiffener channels and mounting brackets: Front of structure - recessed, rear of structure - surface mounted.
- .19 Field verify dimensions of surface before preparing signs. Coordinate with masonry or wall Contractor for correctly sized sleeves and recessed boxes.
- .20 Coordinate necessary adjustments in signs with the Owner's Representative.
- .21 Contractor shall review the Design Intent Drawings and their relevant graphics, fonts, format, colours and shades in preparing his/her Bid.

2.14 **FINISHES**

- .1 Metal finishes: Comply with NAAMM (National Association of Architectural Metal Manufacturers) "Metal Finishes Manual" for finish designations and applications recommendations.
- .2 Aluminum finishes: Aluminum shall be pretreated as recommended by the paint manufacturer. Prime surfaces to be painted with paint manufacturer's recommended primer.
- .3 Paints and inks shall be made of other surface material on which they are to be applied and as recommended by the manufacturer of the paint or ink. Identification of paint or ink shall be noted on Shop Drawings with method of application. Prime coats or other surface pre-treatments, where recommended, shall be included in the Work. Coating shall be even over entire surface to be painted, without voids, runs, sags, brush or roller marks.
- .4 In general, paint application shall be by brush or airless spray. Paint applied by brush shall be free of objectionable brush marks and meet the approval of the Owner.
- .5 Interior paint finishes shall be acrylic polyurethane, semi-gloss on aluminum substrates, matte finish on plastic substrates.
- .6 Acrylic polyurethane finish shall be applied at the rate of 2.5 mils per coat by air or airless spray.
- .7 Acceptable manufacturers include:
 - .1 Matthews Paint Co.
 - .2 Akzo Coatings Inc.
- .8 Sign colours shall match approved samples and shall be exactly as specified. Sign colours shall be consistent in chroma and in value, shall maintain even opacity and be free of any imperfections.

2.15 **SIGN GRAPHICS AND COMPONENTS**

- .1 Paint colour for exterior sign types is identified as silver/metallic on Design Intent Drawings. Colour to match Alucobond exterior signage panels.
- .2 Identity Signs (Series 100-1400):
 - .1 Aluminum framing with ACM Alucobond sign panels, painted, constructed to create frameless box with curved sign faces as specified. Sign type is internally illuminated, with routed out graphics with Day/Night Casocryl acrylic back up.
 - .2 Provide Icetron lamps, 120/240 volts, for even illumination with no halation. Provide electrical shut-off switch inside sign box.
- .3 Guide Signs (Series 1600-2100):
 - .1 Aluminum framing and faces, painted, constructed to create an exposed frame with curved sign faces as specified.
 - .2 Sign type is non-illuminated, with applied vinyl graphics.

- .3 Aluminum plate of various thicknesses with removable panels, painted. Aluminum extruded square profile posts, various thicknesses, painted, with aluminum caps, designed to accept curved sign panels on a custom bracket.
- .4 Sign type is non-illuminated, with surface applied vinyl graphics.
- .4 Orientation Signs (Series 2200-2400):
 - .1 Aluminum fabricated cabinets and brackets, various thicknesses, painted. Single aluminum post, square with diamond profile, custom brackets to accept directory cabinet, various thicknesses, painted, with custom aluminum caps.
 - .2 Sign type is non-illuminated, with surface applied vinyl graphics.
- .5 Regulatory Signs (Series 2700-4100):
 - .1 Aluminum sign panels, .090 minimum thickness, painted. Single aluminum post, square profile, with sign panel centered on post, fastened mechanically through sign panel, various thicknesses, painted, with extruded aluminum caps.
 - .2 Sign type is non-illuminated, with surface applied vinyl graphics. Stop symbol signs have reflective graphics.
- 3 Execution
- 3.1 **INSPECTION**
 - .1 Before installation of signs, examine site conditions and Work of others in so far as it affects Work of this section and report immediately in writing to Owner's Representative all conditions which interfere with installation and its electrical service.
 - .2 Begin installing signs only after deficiencies have been corrected in an acceptable manner.
 - .3 Commencement of installation implies acceptance of related Work performed by others.
- 3.2 **PREPARATION**
 - .1 Verify sleeves and recess sizing for proper alignment and service to an acceptable sign installation.
 - .2 Protect surrounding areas from Work of this section.
- 3.3 **DEMOLITION**
 - .1 The Contractor is responsible for the removal and disposal of certain existing freestanding signs and sign elements as identified in the sign Drawings. Existing sign demolition and/or renovation is not to commence until new signage is fabricated and ready for immediate installation.
 - .2 The Contractor shall at all times keep the Owner's premises and the adjoining premises, driveways and streets clean of rubbish caused by the demolition operations, and the job site shall be left safe, neat and clean at the completion of each day's operation. All rubbish and debris shall be deposited off the Owner's property in an approved sanitary landfill site.
 - .3 At the completion of the Work, the Contractor shall remove all the rubbish, tools, equipment, temporary work and surplus materials, from and about the premises, and

shall leave the Site graded level with new sod. Again, all rubbish and debris shall be disposed of off the Owner's property in an approved sanitary landfill site.

3.4 **INSTALLATION**

- .1 Install sign units level, plumb and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
- .2 Use of power-propelled fasteners to install signs is prohibited unless the Contractor receives written permission from the Owner.
- .3 Locate sign units and accessories where shown or scheduled, using mounting methods of the type described and in compliance with the manufacturer's instructions. Exact position of exterior directional signs shall be field located.

3.5 **CLEANING AND PROTECTION**

- .1 Keep the premises free of rubbish and debris caused by this Work, and upon completion of the Work leave the area included in the Contract broom clean. Remove waste materials and debris from the site and dispose of at legal disposal area away from the site.
- .2 Provide adequate protection for sign units from damage to materials or finish due to handling, storage, assembly and installation, until acceptance from Owner.
- .3 In the event of damage, be responsible to immediately make repairs and replacements to the approval of the Owner, at no cost to the Owner.
- .4 Use only those cleaning materials and methods recommended by manufacturers of surface materials to be cleaned.
- .5 At completion of installation, clean soiled sign surfaces in accordance with material manufacturer's instructions.
- .6 All installed sign units shall be free of tape, dirt, smudges and other foreign material.

End of Section

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- 1 General
- 1.1 **SUMMARY**
 - .1 Section Includes
 - .1 Labour, Products, equipment and services necessary to complete the Work of this section.
- 1.2 **RELATED SECTIONS**
 - .1 Refer to Drawings, and examine the nature and extent of structural steel, siding, and Work of other trades which are related to the sign and swing stage construction and which cause interference on the roof.
- 1.3 **REFERENCES**
 - .1 Conform to the latest edition of the following:
 - .1 AODA - Accessibility for Ontarians with Disabilities Act
- 1.4 **INTERFERENCE**
 - .1 Investigate and ascertain the nature and extent of work of other trades on the roof that will cause interference with sign Work and swing stage construction and operation.
 - .2 A continuous running track to support sign maintenance and erection swing stage is not suitable or practical due to interference caused by obstruction lights and photo cell, etc. Make necessary arrangements, design the Work and execute installation to suit existing and designed work of other trades.
- 1.5 **SHOP DRAWINGS**
 - .1 Submit in accordance with Section 01 33 00.
 - .2 Describe all items, dimensions, erection details, anchors, fastenings and electrical components and connections on Drawings.
 - .3 Indicate on Shop Drawings and/or brochures, the materials and/or equipment being supplied, all details of construction, finish, accurate dimensions, capacities and performance.
 - .4 Indicate swing stage design and details.
- 1.6 **CODES, PERMITS AND INSPECTION**
 - .1 Obtain and pay for all licenses, permits, fees and inspections required for construction and installation of the signs and related Work of this section.
 - .2 The equipment and installation shall comply with all local and provincial laws, and with the requirements of the Canadian Standards Association when mandatory. Be responsible for compliance of the installation with all such laws and regulations, and all changes or alterations required by the authorized inspector of the authority having jurisdiction shall be made without increase in Contract Price.
 - .3 Supply and install all warning signs and nameplates as required by the inspection authority.

- .4 Unless specifically directed otherwise, submit all required documents and Shop Drawings to the authorities having jurisdiction in order to obtain approval for the Work.
- .5 After completion of the Work, furnish to the Consultant a Certificate of Final Inspection Approval from the inspection authorities having jurisdiction.

1.7 **EXAMINATION**

- .1 Visit the Site and take all necessary measurements required for this Work. Examine existing work of other trades upon which work of this section is dependent. Examine existing conditions which must be accepted for completion of the Work. Notify the Consultant in writing of all conditions which may prejudice the proper installation of this Work.

1.8 **COOPERATION**

- .1 Cooperate with other trades. Provide all items to be installed by them in time to prevent delays in their work.

1.9 **DELIVERY, STORAGE AND HANDLING**

- .1 Handle and store metal materials at job site in such a manner to prevent damage to other materials, to existing buildings or to property.
- .2 Handle components to avoid permanent distortion.
- .3 Handle components with care, and provide protection for surfaces against marring or other damage. Ship and store members with cardboard or other resilient spacers between surfaces. Use lifting chokers of material which will not damage surface of members.
- .4 Provide adequate protection for floors and walls and Owner's property during erection. Any damage caused by this trade shall be made good to the satisfaction of the Consultant at no additional cost to the Owner.

1.10 **MAINTENANCE PROGRAM**

- .1 Quote separately with Tender, a separate price for execution of sign maintenance program for a period of five years following expiration of the normal one year Warranty Period for the Work.
- .2 Such program shall include for periodic sign cleaning, electrical checking and maintenance including parts replacement and installation when required, together with written report to the Owner after each inspection.
- .3 Submit detailed maintenance for review.

2 Products

2.1 **ACCEPTABLE MANUFACTURERS**

- .1 Forward Signs Inc.
- .2 Approved alternative

2.2 MATERIALS - GENERAL

- .1 Structural shapes, plates, bolts, washers, etc.: New material conforming to CSA Standard G40.21M, Grade 300W, general purpose structural steel.
- .2 Sheet metal: 0.76 mm (22 ga) minimum base steel thickness, zinc coated to ZF075(2) (wiped coat) conforming to ASTM specification A653/A653M, Grade A.
- .3 Letters and Logo
 - .1 Open channel style.
 - .2 Letters to have five tubes per stroke width.
 - .3 Logo surround four tubes.
 - .4 Maple leaf to have five continuous rows of tubes.
 - .5 All neon tubing shall be 15 mm size.
 - .6 All neon to be red in colour.
 - .7 Stroke interior, red in colour.
 - .8 Remainder of signage, colour as later selected.
- .4 Coatings (sign steel): International Paints "Interprime" VTA528/VTA529 etch yellow, "Interguard" EPA046/EPA047 primer yellow and "Interthane" PA series finish (red) and in selected colour elsewhere. Equivalent by Sherwin Williams or CPI are acceptable.

2.3 MATERIALS - ELECTRICAL

- .1 Raceway Materials
 - .1 Electrical Metallic Tubing (EMT): Galvanized cold rolled steel tubing with fittings meeting the same requirements for finish and materials as EMT. Connectors, couplings, etc., as manufactured by Thomas and Betts Series 5123 and Series 5120 respectively. NOTE: SET SCREW CONNECTORS NOT ACCEPTABLE.
 - .2 Liquid-tight flexible conduit: Use for connection of conduits (or boxes) inside the facility to the exterior sign lights. Conduits shall be complete with extruded polyvinyl covering with watertight connectors. The flexible connection shall be of sufficient length to allow a drip loop in the exterior liquid tight to prevent ingress of water into the installation. Liquid-tite flexible raceway shall also be used for connection of all transformers to conduit stubs, etc. Connectors for liquid-tite flexible conduit shall be as manufactured by Thomas and Betts Ltd., Series 5331 or Crouse-Hinds Series LT38 with nylon insulated throat. Where the fittings are brought into an enclosure with a knockout, Thomas and Betts "Sealing O Rings" Series 5262 or Crouse-Hinds Series SG1 shall also be installed.
 - .3 Anti-seize compound: As manufactured by Thomas and Betts (Kopr-sheld) or Crouse-Hinds STL.
- .2 Wire: Stranded copper.
 - .1 Do not use size smaller than No. 12 AWG for lighting or power circuits. For 120 volt receptacle or lighting circuits, where the TOTAL conduit distance between

- the panel and the outlet exceeds 50 ft., use No. 10 AWG or larger. Limit voltage drop at any lighting fixture at full load on the circuit to 3% maximum.
- .2 Do not use sizes smaller than No. 14 AWG for control or signal circuits.
- .3 For all applications above grade, use Type RW90 (X-Link).
- .4 All wire and cable insulation shall be rated not less than 600 volts.
 - .1 Compression connectors: Sta-Kon series by Thomas and Betts.
 - .2 Colour keyed compression connectors: Series 54000 (for copper conductors) by Thomas and Betts. Tools shall be by same manufacturer.
 - .3 Wrap-around type markers: Thomas and Betts E-Z Code Series Brady "Perma-Code" wire markers of solid colours.
- .3 Panelboard
 - .1 Circuit breaker panel (120/208 V, 3 phase, 4 wire): ITE NLAB panelboard complete with all necessary bolt-on breakers, integral 3 phase magnetic contactor all in an EEMAC 4 enclosure.
 - .2 Provide two sets of keys and a typed directory.
- .4 Transformer
 - .1 Dry-type enclosed in an EEMAC 4 enclosure and complete with four 2-1/2% full capacity taps (two below and two above normal). Insulation class shall be "H".
 - .2 Sound level rating shall not exceed decibel rating listed in the EEMAC standards for specific kVA sizes.
 - .3 Transformer shall be manufactured by Westinghouse, GE, Pioneer, Ferranti Packard, Polygon, Marcus, Hammond.
 - .4 Make conduit connections to transformer case using a short length of liquidtight flexible conduit to reduce vibration and noise transmission. Mount transformer on approved vibration eliminators. Connect conduits to transformer case on termination plates provided by the transformer manufacturer.
- .5 Photocell: Powerlite Catalog 5946 complete with mounting bracket.
- .6 Electrical Equipment Identification
 - .1 Nameplates: Lamacoid white with engraved letters to show black. Provide nameplates on ALL pieces of electrical equipment such as, but not limited to, transformers and distribution panelboard.
 - .1 Nameplates to clearly describe the function or use of the particular equipment involved. Nameplates for panelboard shall include the panel designation, voltage and phase of the supply. For example, "Panel 'A', 600 V, 3-phase, 3-wire". Nameplates for transformers shall indicate the transformer designation, primary and secondary voltage. Where, in the opinion of the Consultant, the inscription is inadequate, the Contract shall replace with a newly inscribed nameplate at no increase in Contract Price.

- .2 Securely fasten nameplates to the equipment with No. 6 Phillips round-head cadmium plated steel self-drilling screws.
- .2 Colour coding: Use the following colour coding throughout and for all terminations and connections:
 - .1 Red - Phase A
 - .2 Black - Phase B
 - .3 Blue - Phase C
 - .4 Green - Ground
 - .5 White - Neutral
 - .6 Yellow - Control

2.4 **FABRICATION**

- .1 General
 - .1 Use only workers skilled in the Work of this section. Do Work to best standard practice.
 - .2 Fit and assemble Work in shop where possible. Execute Work in accordance with details and reviewed Shop Drawings. Where shop fabrication is not possible, make trial assembly in shop.
 - .3 Workmanship shall be of best grade modern shop and field practice known to recognized manufacturers specializing in this Work. Fit joints and intersecting members accurately. Make Work in true planes with adequate fastenings.
 - .4 Conform to CSA S16, Steel Structures for Buildings, latest edition for the design of details and execution of structural Work, except as otherwise shown on the Drawings.
 - .5 Carefully make and fit details and take special care so that finished Work presents a neat and workmanlike appearance.
 - .6 Perform shop welding to CSA W59. Welding firm to be FULLY certified to CSA W47 for steel and/or aluminum Work. All welders employed in the field shall be qualified as Class "O" as defined in CSA W47.
 - .7 All welding operations shall conform to the safety requirements of CSA Standard W117.
 - .8 Thoroughly clean welded joints and the cleaned steel exposed for a sufficient space to properly perform the welding operation. Neatly finish all welds. Continuously weld and grind smooth welds which will be exposed to view and finish painted.
 - .9 Assemble all members true and without twists or open joints.
 - .10 Provide properly sized holes for connecting the Work of other trades. Show such holes on Shop Drawings.
 - .11 Do not cut holes in building structural steel without Consultant's approval.

- .12 Provide weathertight removable panels for access to transformers.
- .13 Provide adequate drain holes in letters to prevent moisture build-up.
- .14 Provide necessary safety hoops for installation and maintenance of the Work.
- .15 Fabricate supporting steel for electrical equipment similarly of welded construction where practicable, with bolted joints allowed for field assembly. Use high strength steel bolts. Chip all welds to remove slag and ground smooth.
- .2 Cleaning, Shop Painting
 - .1 Degrease all sign steel to SSPC No. SP1 Solvent Cleaning. Remove white corrosion Products by hand cleaning. Shop paint steel with one coat of etch - yellow to 0.5 mils dry film thickness, followed by one coat primer - yellow to 2.0 mils dry film thickness, followed by two coats finish - red in tube channels, to 1.5 mils dry film thickness per coat.
 - .2 Clean miscellaneous steel for electrical equipment by scraping, wire-brushing or other effective means to remove scale, rust, oil, dirt or other foreign matter to SSPC SP3 and prime with (specify primer used for building steel, plus a finish coat) (specify same primer and finish used for sign steel).
 - .3 Apply two coats primer on surfaces which will be inaccessible after erection.
 - .4 Paint all items under cover and leave under cover until primer is dry. Follow paint manufacturer's recommendations regarding application methods and equipment and temperature and humidity conditions.
- .3 Hot-Dip Galvanizing
 - .1 Hot-dip galvanize all angle supports and fasteners and items noted on the Drawings and called for herein as follows.
 - .2 Apply zinc hot galvanized coatings in accordance with CSA - G164 with the exception that the mass of the zinc coating of actual surface shall average not less than 687 g/m² and no individual specimen shall show less than 610 g/m².
 - .3 Repair damage to any galvanized surface (this also applies to drilled holes) using "Galvicon" manufactured by Galvicon Corporation. Perform surface preparation and application in accordance with Galvicon Corp. printed instructions. Apply two brush coats allowing a minimum of twelve hours drying time between coats. After a minimum of forty-eight hours drying time the second coat shall be wire-brushed to a bright finish. The final regalvanized surface shall present a continuous galvanized appearance with all areas sealed and protected.
- 3 Execution
 - 3.1 **GENERAL**
 - .1 Erect Work plumb, true, square, straight and level free from distortion or defects detrimental to appearance or performance.
 - .2 Installation of structural sections shall conform to CSA Standard S16. Provide all temporary bracing and remove on completion. Bolt connections using high tensile strength bolts to ASTM A325.

- .3 Provide necessary washers, rubberized fabric seal type washers and fasteners and neatly fit all Work to the building in a manner to be thoroughly waterproof and weathertight throughout.

- .4 Thoroughly remove all foreign matter from Work on completion of erection.

3.2 **FIELD PAINTING**

- .1 Paint all bolt heads, washers, nuts, field welds, drilled holes and previously unpainted items. Touch up with matching paint system, all shop coatings damaged during transit and installation.

3.3 **ELECTRICAL WORK**

- .1 General: This Work includes but not limited to the following:

- .1 Provide 600 volt 3 phase service from existing panelboard DP-2 (located near column Ex 69 in Electrical Room, see Drawing EL120) to the catwalk area near column G70, see Drawing EL109. The existing panelboard is equipped with spare 60A and 30A 3 pole breakers as required.

- .2 At the catwalk location, provide a 3 phase step-down transformer 600-120/208 volt, a 120/208 volt 3 phase 4 wire circuit breaker panelboard complete with an integral contactor.

- .3 Provide all branch wiring and raceways to sign lights.

- .4 Provide photocell to automatically control the sign light.

- .2 Transformers for neon shall be high power factor type, one every 15.24 m of tube length.

- .3 Raceways: In areas where electrical surfaces are mated and also where threaded joints are mated on raceways, use conductive anti-seize compound specified.

- .4 Where raceways pass through exterior walls, provide sleeves flashed through walls. Make joints watertight by using silicone sealant.

- .5 Where they enter panelboard, pull boxes, or outlet boxes secure raceways in place by watertight connector.

- .6 Separation: Maintain a minimum separation of 150 mm between raceways and all surfaces over 37.78°C (100°F).

- .7 Inserts, Hangers, Sleeves and Supports

- .1 Provide all hangers, inserts, sleeves and supports required to hang, support or accommodate the equipment and materials of this section. Do not use high velocity powder activated fastenings in any section of the building. Low velocity powder activated fastenings may be used but only with written approval of the Consultant.

- .2 SUSPENSION OF ANY ELECTRICAL APPARATUS TO THE ROOF DECK, VENTILATION DUCTS AND PIPING IS ABSOLUTELY PROHIBITED UNLESS SHOWN OTHERWISE ON THE DRAWINGS.

- .3 Support raceways at intervals as outlined in the C.E.C.

- .8 Outlet boxes: Where conduit is exposed, use cast conduit boxes with electro-galvanized finish and weatherproof gaskets.
- .9 Pullboxes: Furnish and install EEMAC 4 pullboxes, where necessary in the raceway system, to facilitate conductor installation. In general, install a pullbox for conduit runs of more than 30.5 m, or with more than three right-angle bends, at a convenient intermediate location.
- .10 Junction boxes: Where necessary to terminate, tap-off or redirect multiple conduit runs, furnish and install appropriate EEMAC 4 boxes.
- .11 Wiring Methods
 - .1 Install all wiring in raceways.
 - .2 Do not install wiring until all Work of any nature that may cause damage to the wire is completed. Do not use mechanical means in pulling in wires No. 8 or smaller. Lubricants shall be approved.
 - .3 Splice conductors No. 10 AWG or smaller with specified compression connectors.
 - .4 Terminate and splice conductors No. 8 and larger with specified colour keyed compression connectors.
 - .5 Connect all circuit conductors of the same colour to the same ungrounded feeder conductor throughout the installation.
 - .6 For No. 6 AWG or smaller, use a colour code to match the insulating covering. Accomplish colour coding of wire larger than No. 6 AWG and other types of wire by means of specified wrap-around type markers.

3.4 **CLEANING**

- .1 Promptly as Work proceeds and upon completion, clean up and remove from Site on a daily basis, all rubbish and surplus materials resulting from Work under this section.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- | | | | |
|-----|-----------------------|---|--|
| .1 | ASTM A653/A653M | - | Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process |
| .2 | CAN/CSA-G40.20/G40.21 | - | General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels |
| .3 | | - | Aluminum Association Designation System for Aluminum Finishes |
| .4 | CAN/CSA-G164 | - | Hot Dip Galvanizing of Irregularly Shaped Articles |
| .5 | CSA W47.2 | - | Certification of Companies for Fusion Welding of Aluminum |
| .6 | CSA W59-M | - | Welded Steel Construction (Metal Arc Welding) |
| .7 | CAN/CGSB-1.108 | - | Bituminous Solvent Type Paint |
| .8 | CGSB 41-GP-6M | - | Sheets, Thermosetting Polyester Plastics, Glass Fiber Reinforced |
| .9 | SSPC | - | Steel Structures Painting Council, "Steel Structures Painting Manual, Vol. 2" |
| .10 | AODA | - | Accessibility for Ontarians with Disabilities Act |

1.3 **DESIGN**

- .1 Design signs to withstand wind loading equal to 1.67 kPa without failure of sign faces or connections to structures.

1.4 **SUBMITTALS**

.1 Shop Drawings

- .1 Submit in accordance with Section 01 33 00.
- .2 Show material information, thicknesses, sizes, finishes, colours of materials scheduled to be exposed in finished work, construction details, removable components showing letter typeface, joint quality, and schedule of signs.

.2 Samples

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

- .2 Submit sample of each type sign, sign image and mounting method.

1.5 **QUALIFICATIONS**

- .1 Manufacturer of signs shall be specialist in this field having minimum five years proven experience in sign manufacturing and installation of type of signs specified.

1.6 **MAINTENANCE DATA**

- .1 Provide maintenance data for signs for incorporation into manual specified in Section 01 33 00.

2 Products

2.1 **MATERIALS**

- .1 Acceptable Manufacturers
 - .1 Forward Signs Inc.
 - .2 Approved alternative
- .2 Source sign fabrication made by one manufacturer from one of the following:
 - .1 Neon Products Ltd.
 - .2 Steel Art Signs Ltd.
 - .3 Imperial Sign Ltd.
- .3 Aluminum extrusions: Aluminum Association alloy AA 6063-T5, minimum 2 mm thick, free from scratches and surface blemishes.
- .4 Sheet aluminum: Aluminum alloy AA6063-T5, minimum 0.75 mm thick for exposed Work requiring finish to match extruded sections.
- .5 Prefinished sheet aluminum: Plain sheet with manufacturer applied baked enamel finish to Aluminum Association designation AA-M22-C22-A41 (clear) or AA-M22-C22-A42 (black) 0.25 mm thick on face and 0.0076 mm thick on back.
- .6 Prefinished sheet steel: Conforming to Canadian Steel Sheet Building Institute Bulletin finished with Z275 zinc coating in accordance with CSSBI Standards and prepainted as follows:
 - .1 Finish: Coil coated, baked-on, 70% Kynar 500 or Hylar 5000 based fluoropolymer enamel, 10000 Series by Stelco Inc., or Dofasco Inc. on exposed surfaces as applied by Baycoat. Coil coated surfaces pretreated and primed prior to application of coating. Paint colour: As selected by Consultant.
- .7 Galvanized steel sheet: Commercial quality to ASTM A653/A653M, Grade A, with zinc coating designation.
- .8 Acrylic sheet: Polymethylmethacrylate (PMMA) cast sheet suitable for intended use in sign fabrication, (translucent white) (transparent clear) (colours as indicated).
- .9 Fiberglass sheet: To CGSB 41-GP-6M, flat sheet, smooth finish, colours as indicated.
- .10 Welding materials: To CSA W59.

- .11 Solder: To ASTM B32.
- .12 Adhesives, paints, sealants and solvents for acrylic and fiberglass sheet: Type recommended by sheet manufacturer for applicable condition.
- .13 Fasteners: Hardened aluminum or stainless steel or of type that will not permit galvanic action.
- .14 Acrylic topcoat: Clear, non-yellowing, exterior grade, satin finish, acrylic polyester resin protective coating, compatible with (acrylic) (fiberglass) (metal) surface of type recommended by sheet manufacturer.
- .15 Sign poles: 150 mm x 150 mm x 5 mm hollow steel section conforming to CAN/CSA-G40.20-M and CAN/CSA-G40.21-M, to height indicated on Drawings. Pole shall be complete with welded base plate 300 mm x 250 mm x 19 mm thick and drilled four holes for anchor bolts. Cover plate formed of 1.6 mm thick (16 gauge) sheet steel or aluminum with welded corners.
- .16 Bituminous paint: To CAN/CGSB-1.108, Type 2.

2.2 **FINISHES**

- .1 Anodized Aluminum
 - .1 Clear finish: Conform to Aluminum Association designation AA-M22-C22-A41 in uncoloured anodized finish with film thickness of 0.25 mm.
- .2 Galvanized finish: On irregular shaped articles, 600 g/m² zinc coating to CAN/CSA G164.
- .3 Prefinished metals: As specified herein.
- .4 Prepared steel pole surface in accordance with SSPC SP3 and shop prime coated with rust inhibitive alkyd primer, make ready for finish painting by Section 09 91 00.

2.3 **GENERAL FABRICATION REQUIREMENTS**

- .1 Sign Box
 - .1 Fabricate signs in accordance with details on Drawings, Specifications and Shop Drawings to present a safe and rigid installation.
 - .2 Build units square, true, accurate to size, free from visual or performance defects.
 - .3 Accurately fit and securely join sections to obtain tight, closed joints.
 - .4 Make casing continuous without intermediate joints. Mitre corners to close tolerances, with attachments and fixing devices completely concealed.
 - .5 Pole mounted sign boxes to be equipped with sign face both sides.
 - .6 Sign box to be capable of interchanging sign face.
 - .7 Internally reinforce case to maintain maximum horizontal and vertical deflection to 1/360 of clear span under OBC loading requirements. Ensure maximum water resistance of case. (Provide back to wall mounted signs).
 - .8 Design casing to ensure free thermal movement between dissimilar materials.

- .2 Do not use exposed fasteners unless indicated otherwise on Drawings; fasteners shall be inconspicuous and same finish and colour as base metal on which they occur.
- .3 Polish exposed edges of plastic and metal to smooth, slightly convex profile. Ground exposed welds to a smooth invisible joint.
- .4 Do steel welding to CSA W59 aluminum welding to CSA W47.2. Finish exposed welds flush and smooth.
- .5 Apply bituminous paint to aluminum in contact with dissimilar metals, concrete or masonry.
- .6 Do not locate manufacturer's nameplates on sign surface locations visible in completed work.
- .7 Sign Faces
 - .1 Fabricate sign faces in one piece to pole mounted signs.
 - .2 Installed face to present rigid surface with minimal distortion.
 - .3 Make facing to wall mounted signs in two pieces with facing name a separate face.
- .8 Sign graphics: Apply by (silk screen) (cut and spray) (self-sticking vinyl film) (decals) (cut-out acrylic letters).
- .9 Sign back: Minimum 0.80 coated sheet steel.
- .10 Letters shall be as indicated otherwise on Drawings, and shall be clear cut and free from ragged or indistinct edges.

2.4 **SIGN GRAPHICS**

- .1 Sign graphics to be well defined, arranged for balanced appearance, and properly word and letter spaced. Acceptable manufacturers for computer cut graphics:
 - .1 System Graphics
 - .2 Alpine Graphics Productions
 - .3 Autograph Trim
 - .4 Canada Decal Inc.
- .2 Silk screen process: Apply colour photographic produced silk screen printed images to (face) (back) side of transparent sign faces; face side of opaque sign faces.
- .3 Self-stick vinyl film: Individual letters, numerals and symbols cut from 0.1 mm thick matte finish, exterior grade PVC film, with self-stick adhesive backing. Colour selected by Consultant from manufacturer's standard range.
- .4 Decals: Silk screened or printed images on minimum 0.025 mm, clear matte finish, PVC film, with self-stick adhesive backing. Protect image subject to abuse with laminated film overlay of same material as decal base.

2.5 **CUT-OUT LETTERS**

- .1 Cut letters and symbols from (opaque) (translucent) (coloured acrylic) (plain) (embossed) (aluminum sheet).
- .2 (Helvetica) typeface, upper (and lower) case; sizes and thicknesses as indicated. Make corners (cutter radius) (square cut).
- .3 Fabricate aluminum with (clear) (colour) anodizing) (baked enamel) finish.

3 Execution

3.1 **INSTALLATION**

- .1 Build and erect signs plumb true, square, straight level and accurate to sizes detailed on reviewed Shop Drawings, free from distortion or defects detrimental to appearance and performance.
- .2 Comply with sign manufacturer's installation instructions and approved Shop Drawings.
- .3 Install wall mounted sign(s) in the locations indicated on Drawings. Bolt through sign framing to hollow masonry Work or other structure using lag bolts with lead sleeves.
- .4 Install pole mounted sign on prepared foundation using stainless steel anchor bolts, washers and shims. Pole shall be plumb and sign box shall be mounted with face plane on same axis as pole. Install cover plate over anchor bolts.

3.2 **CLEANING**

- .1 Leave signs clean and polish all exposed surfaces.
- .2 Touch up any damaged finishes.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- | | | | |
|----|-----------------------|---|--|
| .1 | ASTM A653/A653M | - | Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process |
| .2 | CAN/CSA-G40.20/G40.21 | - | General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels |
| | | - | Aluminum Association Designation System for Aluminum Finishes |
| .3 | CAN/CSA-G164 | - | Hot Dip Galvanizing of Irregularly Shaped Articles |
| .4 | CSA W47.2 | - | Certification of Companies for Fusion Welding of Aluminum |
| .5 | CSA W59-M | - | Welded Steel Construction (Metal Arc Welding) |
| .6 | CAN/CGSB-1.108 | - | Bituminous Solvent Type Paint |
| .7 | AODA | - | Accessibility for Ontarians with Disabilities Act |

1.3 **DESIGN**

- .1 Design signs to withstand wind loading equal to 1.67 kPa without failure of sign faces, posts or connections.

1.4 **SUBMITTALS**

.1 Shop Drawings

- .1 Submit in accordance with Section 01 33 00.
- .2 Show material information, thicknesses, sizes, finishes, colours of materials, construction details, letter typeface, posts and concrete bases.

.2 Samples

- .1 Submit samples in accordance with Section 01 33 00.
- .2 If requested, submit sample of each type sign, sign image and mounting method.

1.5 **QUALIFICATIONS**

- .1 Manufacturer of signs shall be specialist in this field having minimum five years proven experience in sign manufacturing and installation of type of signs specified.

2 Products

2.1 **MATERIALS**

.1 Acceptable Manufacturers

.1 Forward Signs Inc.

.2 Approved alternative

.2 Sign blanks: Steel sign blanks fabricated from galvanized/galvalume steel made from sheets. Galvanized steel shall conform to ASTM A653/A653M, regular type, coating designation Z-275.

.1 Galvalume steel shall conform to ASTM A 792, coating designation AZ-150.

.2 The coated steel shall be minimum 1.5 mm thick.

.3 Fasteners: Hardened aluminum or stainless steel or of type that will not permit galvanic action.

.4 Sign posts: Breakaway installed, 50 mm square posts fabricated from 14 ga galvanized steel tube with pre-punched holes on 25 mm centers on all four sides. Posts, spacers, bolts, nuts and lock washers shall be galvanized after fabrication conforming to ASTM A-123.

.1 All holes shall be punched or drilled cleanly prior to galvanizing and shall be freed of excess deposits of zinc.

.2 Design posts to allow removal and replacement without breaking out concrete.

.5 Sign anchors: Direct buried minimum 609.6 mm and 50-75 mm above finish grade. Hammered down anchor for concrete and asphalt complete with non-shrink grout. Hammered down omni-directional anchor for soil.

.6 Sign graphics: Self-sticking UV resistant, premium quality vinyl film by 3M.

.7 Bituminous paint: Henry 410-02.

.8 Concrete bases: Air entrained 20 MPa concrete at 28 days, conforming to Section 03 30 00.

.9 Concrete base forms: "Sonotube".

2.2 **PROJECT INFORMATION SIGNAGE FOR PUBLIC**

.1 Refer to Section 10 14 00.01 City of Toronto Construction-Improvement Signs for information on the standard template to be used for projects accessible to the public.

2.3 **SIGN SCHEDULE**

.1 Refer to accompanying sheet following this section.

2.4 **GENERAL FABRICATION REQUIREMENTS**

.1 Fabricate signs in accordance with details on Drawings, Specifications and Shop Drawings to present a safe and rigid installation.

.2 Build units square, true, accurate to size, and free from visual or performance defects.

- .3 Accurately fit and securely join sections to obtain tight, closed joints.
- .4 Do steel welding to CSA W59 and aluminum welding to CSA W47.2 Finish exposed welds flush and smooth.
- .5 Apply bituminous paint to aluminum in contact with dissimilar metals, concrete or masonry.
- .6 Sign Faces
 - .1 Fabricate sign faces in one piece.
 - .2 Installed face to present rigid surface with minimal distortion.
 - .3 Degrease sign blanks before applying vinyl.

3 Execution

3.1 **EXCAVATION AND CONCRETE WORK**

- .1 Excavate post holes to suit depth of concrete bases, cleanly cut to diameters as specified, ready to receive posts set in concrete fill. Remove excavated earth from the site.
- .2 Form the top 200 mm of the concrete bases with specified form.
- .3 Mix concrete with a minimum amount of water and ram solidly into the excavations and around posts.
- .4 Unless Drawings show otherwise, concrete bases shall be of diameter as specified below and approximately 50 mm above grade with tops pitching away from posts and finished smooth and even.
 - .1 For all posts: 300 mm diameter, 1200 mm deep

3.2 **INSTALLATION**

- .1 Build and erect signs plumb true, square, straight level and accurate to sizes detailed on reviewed Shop Drawings, free from distortion of defects detrimental to appearance and performance.
- .2 Comply with sign manufacturer's installation instructions and approved Shop Drawings.
- .3 Install poles in concrete foundation. Refer to and comply with Section 03 30 00 for concrete requirements.

3.3 **CLEANING**

- .1 Leave signs clean and polish all exposed surfaces.
- .2 Touch up any damaged finishes.

End of Section

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- 1 General
 - 1.1 **SUMMARY**
 - .1 Section Includes
 - .1 Labour, Products, equipment and services necessary to complete the Work of this section.
 - 1.2 **REFERENCES**
 - .1 Conform to the latest edition of the following:
 - .1 AODA - Accessibility for Ontarians with Disabilities Act
 - 1.3 **SUBMITTALS**
 - .1 Shop Drawings
 - .1 Submit in accordance with Section 01 33 00.
 - .2 Show toilet compartment and screen layout, dimensions, finishes, and other pertinent information.
 - .2 Samples: Submit two 300 mm x 300 mm corner samples of partition.
 - 1.4 **DELIVERY, STORAGE AND HANDLING**
 - .1 Deliver materials in sequence to meet installation schedule. Provide protection from marring or other damage.
 - .2 Carefully unload materials; handle and store in a manner to prevent damage. Remove unsatisfactory materials and replace to Consultant's satisfaction at no cost to Owner.
- 2 Products
 - 2.1 **MATERIALS**
 - .1 Toilet compartments:
 - .1 Ceiling Hung: Hadrian "Century", General Storage System "Citation", AAMCO Type "C/H", Shanahan "C.H." or ASI Group Global "Ceiling Hung" baked enamel or powder coating finished, sheet metal construction.
 - .2 Floor Mounted: Hadrian "Academy", General Storage System "Epic", Shanahan "O.B.", or ASI Group Global baked enamel or powder coating finished, sheet metal construction.
 - .2 Hardware: Heavy duty type, as follows:
 - .1 Panel-to-wall connection: Heavy duty aluminum "U" flanged brackets with two holes for connection to wall and four holes for connection to panel.
 - .2 Urinal screen-to-wall connection: Heavy duty aluminum "U" flanged brackets with two holes for connection to wall and four holes for connection to screen.
 - .3 Panel-to-pilaster connection: Heavy duty full height continuous aluminum channel.
 - .4 Latching device: Surface slide latch.

- .5 Hinges: Gravity type hinge sets; top hinge consisting of a pintle and opposing nylon gravity acting cam allowing door to be set in various positions. The bottom hinge shall be a nylon cam inserted into a nylon sleeve.
- .6 Accessories: Provide brackets and combination coat hook/bumper in regular compartments. Equip barrier-free compartments with door pull, and coat hook on side wall, projecting 25 mm maximum.
- .7 Screws: Long-life coated, theft-proof head sheet metal screws. Use shields designed for the wall to which panels and screens are connected to, so as to achieve a rigid installation.
- .3 Urinal screens: 450 x 1219 mm same construction as partitions.
- .4 Colours: Selected by Consultant from manufacturer's standard colour range.

3.2 **FABRICATION**

- .1 Visit Site and take necessary measurements required before fabrication.
- .2 Accurately follow methods of fabrication reinforcement and anchorage shown on reviewed Shop Drawings.
- .3 Cut, shear, straighten and work steel in a manner to prevent disfigurement of finished Work.
- .4 Use metal end caps only, in colour to match panels.
- .5 Reinforce doors, partitions and screens for hardware and for partition mounted tissue dispensers.
- .6 Ensure finished Work is free of warp, open seams, buckles and other surface defects detrimental to appearance.

4 Execution

4.1 **INSTALLATION**

- .1 Install compartments and screen plumb and square to building lines and according to manufacturer's printed directions. Secure to wall with continuous channel. Use two brackets per urinal screen. Mechanically fasten with screws and shields so that panels and screens are firmly attached.
 - .1 Set compartments 300 mm above finished floor.
 - .2 Set urinal screens 300 mm above finished floor.
- .2 Perform drilling of steel, masonry or concrete necessary to install the Work.
- .3 Install hardware and ensure it is visually aligned.
- .4 Maintain uniform consistent width between panels and pilasters, between panels and walls and between pilasters and walls such that persons using the compartments cannot be seen.
- .5 Test and adjust hinges and latches for ease of operation. Set hinges so doors stay open thirty degrees when compartment is not in use.
- .6 Touch up damaged shop paint to match original finish.

4.2 **CLEANING**

- .1 Remove factory installed strippable protective coating from metal panels.
- .2 Clean and make good surfaces soiled or damaged. Replace materials that cannot be satisfactorily cleaned and restored as determined by Consultant.

End of Section

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1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the Work of this section.
- .2 Furnish Products of one manufacturer to extent possible.

.2 General Requirements

.1 The following products will be supplied by NEXT Plumbing Supply (NPS):

- .1 Toilet Tissue Dispensers, Double Roll
- .2 Paper Towel Dispensers (Barrier Free)
- .3 Soap Dispensers – Wall Mounted
- .4 Soap Dish – wall mounted
- .5 Hand Dryers
- .6 Napkin Disposal Bins
- .7 Unit Mirrors
- .8 Mirror Shelf
- .9 Grab Bars:
 - .1 Straight
 - .2 L-shaped grab bar:
 - .3 Folding grab bar
 - .4 Stainless steel grab bar with padded back rest
- .10 Folding Shower Seats
- .11 Baby Change Table

.2 As part of the Shop Drawing submittal, Contractor is to submit a by-building order form to the Consultant and Owner listing the items and quantities for each building the equipment is to be installed. Refer to the Appendices for the Plumbing and Accessories Order Form.

.3 Once the Shop Drawings are reviewed and the order form quantities are verified by the Consultant and Owner, the Owner will submit the order form to NPS for processing as well as pay NPS for the order directly.

.4 Contractor is to coordinate delivery of supplied items with NPS and store on site as needed prior to installation.

- .5 Material defects of the products and equipment are the responsibility of NPS and the Contractor to coordinate and replace as required with no extra expense to the Owner.
- .6 Replacement of any equipment or appurtenances listed in section 1.1.2.1 of this specification will be at the expense of the Contractor.

1.2 REFERENCES

- .1 Conform to the latest edition of the following:
 - .1 CAN/CGSB-12.5-M - Mirrors, Silvered
 - .2 AODA - Accessibility for Ontarians with Disabilities Act
 - .3 TADG - Toronto Accessibility Design Guidelines
 - .4 ETL - Electrical Testing Laboratories

1.3 SUBMITTALS

- .1 Shop Drawings
 - .1 Submit in accordance with Section 01 33 00.
 - .2 Submit Shop Drawings in the form of catalogue cuts and fully illustrating specified materials with description of components, surface finishes, hardware and securement devices.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in sealed cartons and containers with manufacturer's name and Product description clearly marked thereon.

1.5 WARRANTY

- .1 Warrant the following Work against defects and deficiencies for the period specified from date Work is certified as substantially performed in accordance with the general conditions of the Contract:
 - .1 Deterioration of mirror silvering: Ten years
- .2 Promptly make good defects and deficiencies which become apparent within the Warranty Period by replacing defective Work satisfactory to the Consultant and at no expense to the Owner.

2 Products

2.1 TOILET TISSUE DISPENSERS, DOUBLE ROLL (TPD)

- .1 Surface mounted, type 304, stainless steel with satin finish, double roll type, non-controlled delivery, tumbler key locking mechanism, and wide viewing slot:
 - .1 Bradley, Model No. 5425 (Product No. 5425000000)

2.2 PAPER TOWEL DISPENSERS AND WASTE RECEPTACLE (PTD)

- .1 Surface mounted, type 304, 18 gauge stainless steel with all welded construction, satin finish door with full-length piano-hinge, stainless steel cable door-swing limiter, rounded

towel tray with hemmed opening, multifold towel dispensing mechanism, and removable leak-proof plastic waste container:

- .1 Bradley, Model No. 2442-11 (Product No. 2442110000)

2.3 **PAPER TOWEL DISPENSERS AND WASTE RECEPTACLE (PTD/WR)**

- .1 Surface mounted, type 304, 22 gauge stainless steel with all welded construction, satin finish door with full-length stainless steel piano-hinge, multifold paper towel dispensing mechanism, and heavy gauge removable waste receptacle:

- .1 Bobrick, Model No. 3699

- .2 Or accepted equal

- .2 Recessed: Type-304, heavy-gauge stainless steel. Welded construction. Exposed surfaces with satin-finish, stainless steel door with double-pan-back construction, semi-concealed tumbler lock keyed and removeable waste receptacle.

- .1 Bobrick, Model No. 3940

- .2 Or accepted equal

- .3 Semi-recessed: Type-304, heavy-gauge stainless steel with satin finish. All-welded construction, rounded towel tray, piano hinge, flush lock & key and removeable waste receptacle:

- .1 Bobrick, Model No. 38032

- .2 Or accepted equal

2.4 **SOAP DISPENSERS - WALL MOUNTED (SPD/SD)**

- .1 Wall mounted, automatic stainless steel housing with satin finish, clear acrylic refill-indicator window and key lock, refillable plastic container with liquid type 850 ml capacity container with no touch, sensor-activated valve:

- .1 Bradley, Model No. 6A00-11 (Product No. 6A00110000)

- .2 Counter Mounted: Touch free, one piece, cast brass construction above deck, single mount foam soap dispenser with adjustable sensor and vandal resistant below deck box.

- .1 Moen, Model No. 8559

- .2 Or accepted equal

2.5 **SOAP DISH (S-DISH)**

- .1 Surface mounted soap dish, stainless steel, type 304 flange, chrome-plated, support arm and concealed wall plate, one-piece seamless construction.

- .1 Bradley Model No. 901 (Product No. 901-000000)

- .2 Recessed mounted soap dish, heavy-duty stainless steel, one-piece seamless construction.

- .1 Bradley, Model No. SA16

- .2 Or accepted equal

2.6 **HAND DRYERS (HNDR)**

- .1 "Airblade V" by Dyson Canada Limited, Model HU02 Nickel finish, or accepted equal. Low voltage option: 307174-01. High voltage option: 307172-01. Polycarbonate casing with anti-microbial molded additive. Anti-microbially integrated external plastics and seals with anti-tamper M4 exterior pin-hex screws. Water ingress protection to IP24.
 - .1 Operation: Touch free capacitive sensor activation.
 - .1 Hand dry time: 12 seconds.
 - .2 Airspeed at nozzle: 675 km/h
 - .3 Operating airflow: up to 28 l/s.
 - .4 Rated operating noise power: 79 db(A)
 - .2 Motor: Dyson Digital Motor (DDM), V4 switched reluctance brushless DC type; 83,000 rpm motor speed.
 - .3 Electrical requirements: 100-110V, 50/60Hz, 1000W, 9.01-10A 120V, 60Hz, 100W, 8.33A.
 - .4 Operating temperature range: 0-40°C
 - .5 Standby power consumption: Less than 0.5 W.
 - .6 Supply ten spare HEPA filters, turn over to the Owner upon Substantial Performance of the Project.
- .2 Hand dryer back panel: Dyson Canada Limited, made of stainless steel, satin finish to protect walls from water droplets. 800 mm x 400 mm x 0.5 mm.

2.7 **NAPKIN DISPOSAL BINS (ND)**

- .1 Surface mounted stainless steel all welded construction, satin finish, incorporating integral finger depression for opening cover:
 - .1 Bradley, Model 4781-11 (Product No. 4781110000)

2.8 **UNIT MIRRORS (MIR)**

- .1 6 mm float glass, selected for silvering, electrolytically copper-plated by galvanic process. Furnish units in type 430 stainless steel framing, channel return at rear with snap locking design and 16-gauge galvanized sheet steel backing.
 - .1 Bradley, Model No. 781-1830

2.9 **GRAB BARS (GB)**

- .1 Straight grab bar type: Stainless steel, 609.6 mm or 914.4 mm long, Type 304 stainless steel, 18-gauge tubing with satin finish, peened gripping surface, 38 mm minimum clearance from the wall, and complete with standard mounting plates, concealed flanges and accessories.
 - .1 Bradley, Model No. 812 001-24 (Product No. 8122001240), 600 mm
 - .2 Bradley, Model No. 812 001-36, 914 mm

- .2 L-shaped grab bar: Type 304 stainless steel, 18-gauge stainless steel tubing, satin finish with peened gripping surface. Complete with standard mounting plates, concealed flanges and accessories.
 - .1 Bradley, Model No. 812-057 (Product No. 8122057000), 762 x 762 mm
 - .2 Bradley, Model No. 812-057, customized size for 914 x 914 mm
- .3 Folding grab bar: Swing-up, Type 304, 18-gauge 1.2 mm stainless steel tubing with satin finish with peened gripping surface, 32 mm outside diameter. 5 mm thick backplate, satin finish stainless steel with four screw holes for attachment to wall.
 - .1 Bradley, Model No. 8370-107 (Product No. 8372107000), 762 mm x 762 mm
- .4 Stainless steel grab bar with padded back rest: Type 304, 18-gauge, concealed mounting flange, snap flange cover. Complete with 360 x 160 x 40 mm backrest, white polyurethane integral foam secured to grab bar with stainless steel C-clamps.
 - .1 Franke, Model No. CM-16104

2.10 **FOLDING SHOWER SEATS (SHWS)**

- .1 Constructed of reversible, solid phenolic seat slats, integrated slots for water drainage, stainless steel carriage bolts and acron nuts, stainless steel with stain finish frame, flange, and base plate.
 - .1 Bradley, Model No. 9569 (Product No. 9569000000)

2.11 **SHOWER BENCH - WOOD**

- .1 Bench Seat: Construct of laminated birch or similar hardwood standard with the manufacturer, 35-40 mm thick, of widths and lengths shown, with rounded exposed corners and edges, and smoothly sanded surfaces. Finish wood tops with two coats of clear polyurethane varnish or other clear finish system standard with the manufacturer. Size as indicated on Drawings.
- .2 Bench Supports: Provide steel pedestals for benches, of minimum 33 mm O.D. steel pipe or tubing, with top and bottom steel flanges welded thereto and pre-drilled for expansion bolting to floor. Provide stainless steel anchor bolts.

2.12 **BABY CHANGE TABLE (B-CT)**

- .1 Surface mounted, Type 304 stainless steel with molded grey polyethylene interior. 100 mm depth when closed.
 - .1 Bradley, Model No. 962-11 (Product No. 962110000)

2.13 **CLOTHES HOOK (VANDAL-RESISTANT) (CTH)**

- .1 Exposed mounting, stainless steel, 14- gauge auto-release clothes hook, satin finish, faceplate with sloped edges.
 - .1 Bobrick, Model B-983
 - .2 Or approved equivalent
- .2 Double hook type, stainless steel, satin finish, supplied with backplates and screws:
 - .1 Bobrick, Model No. B-6727

- .3 Concealed mounting, heavy duty clothes hook, stainless steel, one-piece casting with stain finish.

Bobrick, Model B-2116

- .4 Single groove, solid bar with hanger screws, satin finish. Refer to hardware schedule.

- .1 GSH 390 by Gallery Specialty Hardware

2.14 **SHOWER CURTAIN RODS (SHWC – ROD)**

- .1 Stainless steel, satin finish, Type 304, 25 mm diameter minimum 0.9 mm (20 gauge) wall thickness, complete with satin finish stainless steel end flanges and with curtain hold back hook and chain:

- .1 Bobrick, Model No. B6107

- .2 ASI Group Canada, Model No. 1214

- .3 Or approved equivalent

2.15 **SHOWER CURTAIN (SHWC – CURTAIN)**

- .1 Waterproof, mildew-proof, non-combustible white vinyl, minimum 7 gauge thick shower curtain, 900 mm x 1800 mm or as indicated on Drawings:

- .1 Bobrick, Model No. B-204

- .2 ASI Group Canada, Model No. 1200-V36

2.16 **STAINLESS STEEL SHELF (SHLF)**

- .1 Stainless steel, 18-8, type-304, 18-gauge (1.2mm) stainless steel with satin finish and all welded corners.

- .1 Gamco, Model MS-18

- .2 Bobrick, Model B-295

- .3 Or accepted equivalent

3 Execution

3.1 **INSTALLATION**

- .1 Install miscellaneous washroom and shower room accessories as per manufacturer's printed installation instructions. Provide exposed screws of stainless steel or chrome plated steel to match units, with theft proof heads.

- .2 Coordinate with Consultant and fill units with necessary supplies before final acceptance of building. Clean and polish exposed surfaces.

- .3 Adjust accessories for proper operation and verify mechanisms function smoothly.

- .4 Install grab bars to withstand minimum 1112 N (250 lb. pound-force) downward pull.

End of Section

- 1 General
- 1.1 **SUMMARY**
 - .1 Section Includes
 - .1 Labour, Products, equipment and services necessary to complete the Work of this section.
- 1.2 **REFERENCES**
 - .1 Conform to the latest edition of the following:
 - .1 AODA - Accessibility for Ontarians with Disabilities Act
- 1.3 **SUBMITTALS**
 - .1 Submit Shop Drawings in accordance with Section 01 33 00.
 - .2 Shop Drawings shall contain detailed description, and bear item numbers, marked to show quantity, colour, model numbers, fabrication details, and installation instructions.
- 1.4 **DELIVERY, STORAGE AND HANDLING**
 - .1 Deliver packaged materials in original, undamaged containers with manufacturer's labels and seals intact. Handle and store materials in accordance with manufacturer's and Supplier's recommendations to prevent damage thereto.
- 1.5 **PROTECTION**
 - .1 Protect the Work of this section from damage of any kind. Protect other work from damage resulting from Work of this section. Replace damaged work which cannot be repaired, cleaned or restored.
- 2 Products
- 2.1 **COLUMN PROTECTORS**
 - .1 "Column Sentry" sizes to fit columns, and complete with filler to close column webs, as distributed by Econo-Rack Storage Equipment, Ottawa, telephone (613) 592-6625.
 - .2 Allow for the use of half units, extension pieces, and if necessary, addition of miscellaneous steel frame with 100 mm x 100 mm x 6 mm miscellaneous steel angles fixed to the steel columns to allow the bumpers to be secured around columns.
- 2.2 **CORNER GUARDS (CORRIDORS AND PUBLIC AREAS)**
 - .1 16 gauge Type 304 stainless steel, #4 satin finish, 50 mm or 65 mm wide wings with radiused edges and pre-drilled for countersunk screws (4 staggered long-life coated screws per 1200 mm lengths), supplied in longest lengths possible.
- 2.3 **EXPANSION JOINT**
 - .1 Fire-rated Connections: 1-hour fire-rated, watertight, non-staining, sound-attenuating, energy-efficient primary seals for structural expansion joints in vertical-plane applications. Use for joints from 12 mm up to 100 mm as indicated on Drawings. Fire-retardant-impregnated foam is factory pre-coated on both facing sides with a coat of waterproof silicone.

- .1 Acceptable Manufacturer:
 - .1 "Emshield WFR1" by Emseal
 - .2 Or accepted equivalent
- .2 Wall and Roof: pre-coated, preformed, pre-compressed, self-expanding, low-modulus, factory applied silicone sealant system with an open-cell polyurethane foam infused with a water based, non-drying acrylic dispersion.
 - .1 Acceptable Manufacturer:
 - .1 "Seismic Colorseal" by Emseal
 - .2 Or accepted equivalent
- .3 Foundation: heavy-duty, double-cell, extruded thermo-plastic rubber gland with integral side flashing flanges, termination bars and anchors.
 - .1 Acceptable Manufacturer:
 - .1 "BG System" by Emseal
 - .2 Or accepted equivalent

2.4 **EXPANSION JOINT COVERS**

- .1 Extruded sections fabricated from aluminum alloy AA6063 T6C satin finish, clear anodized (colour anodized) (baked enamel finish) (primed for field painting).
- .2 Expansion joint covers shall be manufactured by Construction Specialties or K.N. Crowder, as follows:
- .3 Wall to wall: CS "SM-1" or K.N.C. "Xpanda WC-1", surface mounted, continuous for the length of the joint; covers with continuous vinyl seal on one side.
- .4 Wall to ceiling: CS "SMC" or K.N.C. "Xpanda CC-1", surface mounted, continuous for the length of the joint; covers with continuous vinyl seal on one side.
- .5 Floor to floor, floor to wall: CS Model "ELY" or Permaquik "FG" for floor to floor, and "FX2R" for floor to wall, recessed type.

2.5 **PORTABLE WASHROOM TRAILERS**

- .1 Provide a portable washroom trailer with 4 individual unisex washroom and 1 unisex accessible washroom with ramp in accordance with TADG requirements.
- .2 The trailer will be comprised of the following:
 - .1 Warm and cold running water
 - .2 Fresh water holding capacity: 160 gallons
 - .3 Waste water holding capacity: 240 gallons
 - .4 Laminated wood flooring
 - .5 Formica walls and countertops

- .6 Heated and air conditioned
- .7 Each washroom shall be fully enclosed.
- .3 Each washroom shall include the following:
 - .1 1 porcelain toilet
 - .2 1 china sink
 - .3 1 mirror
 - .4 Grab bars at rear and side of toilet (for the accessible washroom)
- .4 Trailer power requirements:
 - .1 2 x 110V/15 amp power supply for pumps and lights and for warm months
 - .2 4 x 110V/15 amp power supply for cold months
 - .3 Power supply shall be on separate circuits
- .5 Contractor shall be responsible for cleaning and maintenance of the washroom trailer.
- 2.6 **SECURITY/TRAFFIC MIRRORS**
 - .1 Vandal and shatter resistant, convex, circular mirror, 635 mm diameter, 160° wide angle view, complete with adjustable mounting bracket. Include all required mounting hardware. Model 53922 by Seton, PLXR by C.R. Laurence or approved equal by Global Industrial.
- 2.7 **FULL LENGTH MIRRORS**
 - .1 Refer to Section 08 80 00 Glazing.
- 2.8 **PRECAST BUMPER CURBS**
 - .1 35 MPa compressive strength at twenty-eight days, air entrained, smooth finished with chamfered edges, 140 mm x 250 mm x 2400 mm 5½" x 10" x 8 ft long sections, with two anchor holes.
 - .2 Grout: Pre-mixed, non-shrink, flowable type, Euclid "Euco NS", Master Builders "Construction Grout", Sika "Grout 212" or "M-Bed Standard", W.R. Meadows "CG 86", CPD "Non-Shrink" or Dayton Superior "1107 Advantage Grout"; without aggregate fillers.
- 2.9 **PUSH PLATE SWITCH**
 - .1 Refer to ADO requirements in appendices, hardware schedules and Section 10 00 00.
- 2.10 **TACTILE WARNING SURFACE**
 - .1 Tactile Walking Surface Indicators (TWSI): Detectable from surrounding or surface by raised tactile profile. Tile configuration in accordance with Contract Drawings and conforming to manufacturer's printed instruction for accurate, secure installation.
 - .1 Acceptable Manufacturers:
 - .1 Access Tile

- .2 Armor-Tile
 - .3 Eon Tile
 - .4 Elan Tile
 - .5 Advantage Tactile Systems
- .2 Types:
- .1 Surface Applied Composite Polymer Tile (TA-1a):
 - .1 Engineered polymers truncated dome tile with beveled edges, surface mounted and secured with adhesive and fasteners matching the colour of the tile, slip resistant, corrosion resistant, and abrasion resistant.
 - .2 Use: Interior and exterior applications
 - .3 Sizes: 300 mm x 300 mm, 300 mm x 1200 mm, 1200 mm x 1200 mm, unless indicated otherwise.
 - .4 Colour: Yellow or as selected by Consultant
 - .2 Replaceable Cast In Place Polymer Tile (TA-1b)
 - .1 Replaceable cast in place tiles, reinforced top and bottom flange, corrosion resistant.
 - .2 Use: Exterior application (only), curbs, stair landing, platform edges, curb ramps.
 - .3 Sizes: 300 mm x 300 mm, 300 mm x 900 mm, 300 mm x 1500, unless indicated otherwise.
 - .4 Colour: Yellow or as selected by Consultant
 - .3 Surface Applied Fire-Rated Composite Polymer Tile (TA-1c)
 - .1 Truncated dome or wayfinding bar tiles with texture surface. Adhesive or adhesive and fastener application.
 - .2 Use: Interior and exterior applications, preferred use in existing exterior application for low traffic areas. Fire rated tiles for higher than 5 floors interior applications.
 - .3 Sizes: 300 mm x 300 mm, 300 mm x 1200 mm, 1200 mm x 1200 mm, unless indicated otherwise.
 - .4 Colour: Yellow or as selected by Consultant
 - .4 Surface Applied Vitrified Polymer Tile (TA-2a)
 - .1 Beveled edges diamond-hard vitrified polymer composite, surface applied truncated dome tiles, with tamper proof stainless-steel fasteners.
 - .2 Use: Interior and existing exterior use, curbs ramps, stairs, ramps, or platform edged.

- .3 Sizes: 600 mm x 600 mm, 600 mm x 900 mm, 600 mm x 1200 mm, 600 x 1500 mm, 900 mm x 1500, or unless indicated otherwise
- .4 Colour: as indicated on Drawings or selected by Consultant
- .5 Cast in Place Vitrified Polymer Composite Tile (TA-2b)
 - .1 Cast in Place truncated domes with integral embedment flanges
 - .2 Use: Exterior use – new concrete application, curbs, ramps, stairs and platform edges.
 - .3 Sizes: 600 mm x 600 mm, 600 mm x 900 mm, 600 mm x 1200 mm, 600 x 1500 mm, 900 mm x 1500, or unless indicated otherwise
 - .4 Colour: Yellow or as selected by Consultant
- .6 Resilient Polymer Flooring Tile (TA-3)
 - .1 Flexible, polymer tiles, in tactile attention indicator truncated dome pattern or tactile directional wayfinding bar variations, 3mm or 5mm thick,
 - .2 Use: Interior surface applied application, VCT flooring
 - .3 Sizes: 300 mm x 300 mm, unless indicated otherwise
 - .4 Colour: as indicated on Drawings or selected by Consultant
- .7 Porcelain Tactile Tile (TA-4)
 - .1 Truncated dome and wayfinding bars variations, tile pattern parallel to principal direction of travel, 10 mm thick, stain or chemical resistant.
 - .2 Use: For porcelain or tiled floor applications
 - .3 Sizes: 300 mm x 300 mm, unless indicated otherwise
 - .4 Colour: as indicated on Drawings or selected by Consultant
- .8 Permanent Cast-in-Place Cast-Iron Tactile Tile (TA-5)
 - .1 Cast Iron plates, highly durable, embedded in concrete, bolted connections for two or more plates.
 - .2 Use: Exterior – new concrete applications, high traffic areas, curbs ramps, parking areas, top of stairs.
 - .3 Sizes: 450 mm x 600 mm, 600 mm x 600 mm, unless indicated otherwise
 - .4 Colour: as indicated on Drawings or selected by Consultant
- .9 Replaceable Cast-in-Place Cast-Iron Tactile Tile (TA-6)
 - .1 Individual stainless steel plates, dome pattern, grid pattern, highly durable material.
 - .2 Use: Exterior and interior areas, high aesthetic finish applications

- .3 Sizes: 300 mm x 300mm, 600 mm x 600 mm, unless indicated otherwise
 - .4 Finish: stainless steel, unless indicated otherwise
 - .10 Individual Metallic Tactile Domes and Bars (TA-7)
 - .1 Truncated Domes
 - .1 Individual marine grade stainless steel, brass, bronze or aluminum dome, or as selected by Owner. Drilled or adhered into ground.
 - .2 Use: Interior or exterior application. High aesthetic finish applications, non-heritage designated stair, curbs ramps, escalators, parking areas.
 - .3 Sizes: 22 mm x 600 mm, unless indicated otherwise
 - .2 Guidance Bars
 - .1 Wayfinding, individual stainless steel, brass, bronze or aluminum carborundum non-slip or linear groove pattern.
 - .2 Sizes: 280 x 20, unless indicated otherwise
 - .3 Finish: Stainless steel, unless indicated otherwise
 - .3 Adhesives: As applicable for type of installation. Acceptable manufacturers Mapei, Bostik, Sika, Tactile Bond & Seal.
- 2.11 **TEXTURAL AND COLOUR CONTRAST WARNING STRIP AND NOSING**
 - .1 Slip resistance, weather resistance, UV resistance, stain resistance textural warning surfaces for edge and pathway marking with photoluminescent powder and non-slip materials. Configuration in accordance with Contract Drawings and conforming to manufacturer's printed instruction for accurate, secure installation Colour: as indicated on Drawings or selected by Owner.
 - .1 Acceptable Manufacturer:
 - .1 "Ecoglo" by Kinesik
 - .2 Or accepted equivalent
 - .2 Non- Photoluminescent Non-Slip Strips (TA-11)
 - .1 Hard-wearing silicon carbide, integrally bonded to aluminum substrate, anti-slip protection for step edge,
 - .2 Indoor and outdoor use
 - .3 Sizes: 37.3 mm or 51 mm x 1.8 mm thick, unless indicated otherwise
 - .4 Collection: "N-20/30 Series" by Ecoglo

- .3 Cast-In-Place Inserts (TA-12)
 - .1 Photoluminescent nosings installed in wet concrete, clear anodized aluminum finish, hard-wearing silicon carbide non-slip material integrally bonded to the aluminum substrate.
 - .2 Indoor and outdoor use on concrete stairs, concrete filled steel pan stairs, pre-cast concrete stairs.
 - .3 Sizes: 51 mm or 54.6 mm x 9.5 mm thick, unless indicated otherwise
 - .4 Collection: "S-1 Series" by Ecoglo
- .4 Stair Nosing
 - .1 Flat Stair Nosing (TA-16)
 - .1 Photoluminescent anodized right-angled aluminum flat step nosing, clear anodized aluminum finish.
 - .2 Indoor and outdoor use on concrete, timber, tiles, steel, checker plate and thin carpeted stairs.
 - .3 Sizes: 68.8 mm x 19.1 high, unless indicated otherwise
 - .4 Collection: "F4 or F5B" Series by Ecoglo
 - .2 Tile Stair Nosing (TA-17)
 - .1 Photoluminescent tile nosing, anodized aluminum profile, integrated anti-slip contrast strips, all-weather slip resistance.
 - .2 Indoor and outdoor use on tiled stairs that are between 5mm and 8.5mm thick
 - .3 Size: 86.9 mm x 19.5 mm high, unless indicated otherwise
 - .4 Collection: "M4 Series" by Ecoglo
 - .3 Carpet Stair Nosing (TA-18)
 - .1 Photoluminescent anodized carpet stair nosing with integrated anti-slip contrast strips, all-weather slip resistance, anodized aluminum finish.
 - .2 Indoor use on public stairways, exit ways and all other applications
 - .3 Size: 68 mm x 33.3 high, unless indicated otherwise
 - .4 Collection: "C4 or RC4 Series" by Ecoglo
 - .4 Poured Concrete Nosing (TA-19)
 - .1 Integrally extruded, heat treated extruded, aluminum alloy 6063-T-6, filled with a mixture of virgin aluminum oxide and silicon carbide abrasive granules in an epoxy binder.
 - .2 Outdoor use in poured concrete, terrazzo stairs or non-heritage designated stairs.

- .3 Size 53.9 mm, 79.4 mm or 101.6 mm x 9.5 thick, unless indicated otherwise
 - .4 Collection: "FA-211D", FA-311D or FA-411D by American Safety Tread.
 - .5 Adhesives: polyurethane adhesive, mechanically fastened or as recommended by the manufacturer.
 - 3 Execution
 - 3.1 **INSTALLATION**
 - .1 Install miscellaneous specialties perfectly rigid in accordance with manufacturers' printed directions.
 - .2 After installation, test-operate and adjust operable parts as required for ease of operation.
 - .3 Precast Bumper Curbs
 - .1 Compact grade and secure bumper curbs in place with 600 mm long x 12 mm diameter anchor bar pins. Drive top of pins to slightly below top of curb. Grout holes with non-shrink grout.
- End of Section

- 1 General
- 1.1 **SECTION INCLUDES**
 - .1 Labour, Products, equipment and services necessary to complete the Work of this section.
- 1.2 **QUALITY ASSURANCE**
 - .1 Workmanship shall be of highest quality, in accordance with best standard practice for installation of this type of furniture. Execute Work in accordance with drawings, Specifications, and manufacturer's printed directions.
- 1.3 **SUBMITTALS**
 - .1 Shop Drawings
 - .1 Submit Shop Drawings for the fabrication and installation of Work of this section for review in accordance with Section 01 33 00.
 - .2 Show and describe items, dimensions, finishes, installation details, anchors and fastenings, details of furniture construction and related work. and location of each furniture unit.
- 1.4 **DELIVERY, HANDLING AND STORAGE**
 - .1 Handle components with care and provide protection for surfaces against marring or other damage. Ship and store members with cardboard or other resilient spacers between surfaces. Use lifting chokers of material which will not damage surface of steel members.
- 1.5 **ASSIGNED FURNITURE WORK**
 - .1 The City of Toronto's furniture vendors shall supply, deliver to Site and install furniture based on "generic" furniture layouts and a furniture and equipment schedule.
 - .2 The City's furniture vendor will be assigned to the Contractor. It will be the Contractor's responsibility to:
 - .1 Confirm orders
 - .2 Schedule and coordinate deliveries of various furniture items
 - .3 Provide supervision and oversee installation
 - .4 Store as required
 - .5 Provide security
 - .6 Provide all required voice/data/power connections
 - .7 Clean and polish furniture
- 1.6 **UNASSIGNED FURNITURE WORK**
 - .1 Any furniture not supplied by the City of Toronto's furniture vendors and shown on the Drawings are to be Provided by the Contractor.
 - .2 The City of Toronto may supply stored furniture to be installed by the Contractor.

- .3 In addition to the above, it will be the Contractor's responsibility to:
 - .1 Confirm orders
 - .2 Schedule and coordinate deliveries of various furniture items
 - .3 Provide supervision and oversee installation
 - .4 Store as required
 - .5 Provide security
 - .6 Provide all required voice/data/power connections
 - .7 Clean and polish furniture.

2 Products

2.1 **OUTDOOR FURNITURE**

- .1 Picnic Table: 1828.8 mm long accessible picnic table with a 2438.4 mm extended table top to allow for accessible seating. Frame shall be black zinc-plated powder coated steel. The frame shall comply with AODA standards. Finish of table top shall be walnut.
 - .1 Acceptable Manufacturer: "Accessible V Frame" by Classic Displays
 - .2 Or accepted equal.
- .2 Outdoor Bench with Center Arm: 1778 mm long x 846 mm high and a total width of 648 mm. Seat height shall be 457 mm. Made of IPE wood slats machined and grooved with a preservative oil. Front and back boards shall be rolled. Bench components are hot dip galvanized with black, metallic silver or metallic grey powder coat finish.
 - .1 Acceptable manufacturer: "2300 Series" by Maglin Site Furniture.
 - .2 Or accepted equal.

2.2 **INDOOR FURNITURE**

- .1 Furniture shall come with attachments, brackets, hardware, etc required to be fully assembled and functioning per the manufacturer's instructions.
- .2 Colour chart and finishes for all items specified shall be submitted to the Consultant for selection in accordance with 1.3 Submittals.
- .3 Reception Seating: Fixed base wall-mounted seat. Finish: Birch plywood with a fixed silver metal base. Fabric shall be anti-microbial vinyl, "Whisper Series WHI-2157 FOG" (light grey).
 - .1 Acceptable Manufacturer: "Jumpseat 90" by Sedia Systems.
 - .2 Or accepted equal.
- .4 Reception Seating: Fixed base floor-mounted seat. Finish: Birch plywood with a fixed silver metal base with armrests. Fabric shall be anti-microbial vinyl, "Whisper Series WHI-2157 FOG" (light grey).
 - .1 Acceptable Manufacturer: "Jumpseat" by Sedia Systems.

- .2 Or accepted equal.
- .5 Height adjustable Desks: Table with seamless laminate finish, electric height adjustable base display with up/down memory, undersurface cable management with 3 dual plastic trays and power bar. Sizes as indicated on Drawings.
- .6 Filing Cabinets: Freestanding standard 3-drawer full extension filing cabinet with laminate finish and shall include hanging file bars, counterweight and lock and keys. Drawer configuration shall be made to be changed or retrofitted at any time. Sizes and finishes to be approved by the Owner.
- .7 Workstations – Option #1:
 - .1 Table: 29" d x 58" w table with straight corners and seamless laminate finish, electric height adjustable base, display with up/down memory, undersurface cable management with 3 dual plastic trays and power bar and diamond shaped rectangular cutout in the center of the table for grommet.
 - .2 Lateral Screen: 10 mm tempered glass lateral screen attaching to the worksurface. 42" h x 29" d with frost finish.
 - .3 Desk Edge Screen: 10 mm etched tempered glass with frost finish, 13" h x 58" w. Total height of the screen is 19" and bracket shall be mounted so that 6" sits below the worksurface and 13" is above the worksurface.
 - .4 Monitor Arm: Fully adjustable single arm, monitor mounting hardware and wire management to support 5-12 pounds. Height adjustment range of 10", tilt adjustment of 135°, monitor swivel of 180° and positions in landscape or portrait. Arm reach and clamp shall include integrated wire management.
 - .5 Power Station: Desk edge clamped, 2 power, 2 USB ports and 1 data port. Plug-in type with 10' cord.
 - .6 Pedestal: 2- drawer mobile solid storage cabinet with laminate finish, 18" d x 22" h. Pedestals shall be keyed alike.
 - .7 Task Chair: Dual upholstery tilt task chair, no headrest, width and height adjustable T-arms on caster wheels, fully assembled.
- .8 Workstations – Option #2:
 - .1 Table: 29" d x 58" w table with straight corners and seamless laminate finish, electric height adjustable base, display with up/down memory, undersurface cable management with 3 dual plastic trays and power bar and diamond shaped rectangular cutout in the center of the table for grommet.
 - .2 Lateral Screen: User-adjustable framed fabric lateral screen, 51" h x 29" d.
 - .3 Framed Desk Edge Screen: Upholstered framed fabric screen, to match the width of the worksurface. Partial modesty height of 23", datum height 51" and 58" wide.
 - .4 Monitor Arm: Fully adjustable single arm, monitor mounting hardware and wire management to support 5-12 pounds. Height adjustment range of 10", tilt adjustment of 135°, monitor swivel of 180° and positions in landscape or portrait. Arm reach and clamp shall include integrated wire management.

- .5 Power Station: Desk edge clamped, 2 power, 2 USB ports and 1 data port. Plug-in type with 10' cord.
- .6 Pedestal: 2- drawer mobile solid storage cabinet with laminate finish, 18" d x 22" h. Pedestals shall be keyed alike.
- .7 Task Chair: Dual upholstery tilt task chair, no headrest, width and height adjustable T-arms on caster wheels, fully assembled.

2.3 **CUSTOM MILLWORK**

- .1 Custom fabricated millwork in accordance with the Drawings.

- .1 Acceptable Manufacturers:

- .1 Svend Nielsen
 - .2 Spectrum
 - .3 Ell-Rod
 - .4 Or accepted equal.

2.4 **GENERAL FABRICATION REQUIREMENTS**

- .1 For shop welding conform to the requirements of CSA W59.1. Have work done by a firm fully certified according to CSA W47. All welders employed in the field shall be qualified as Class "O" as defined in CSA W47.
- .2 Make Work in true planes with adequate fastenings. Build and erect Work plumb, true, square, straight, level and accurate to sizes detailed, free from distortion or defects detrimental to appearance or performance. Grind exposed welds flush and smooth to match adjacent surfaces.

3 Execution

3.1 **INSTALLATION**

- .1 Install furniture in accordance with manufacturer's instructions.
- .2 Use only workers skilled in the Work of this section. Do Work to best standard practice.
- .3 Fit and assemble Work in shop where possible. Execute Work according to details and reviewed Shop Drawings. Where shop fabrication is not possible, make trial assembly in shop.

3.2 **CLEANING**

- .1 Promptly as Work proceeds and upon completion, clean up and remove from the site on a daily basis, all rubbish and surplus materials resulting from Work under this section.
- .2 On completion, touch up marred or abraded finished surfaces.
- .3 Wipe down surfaces to remove fingerprints and markings and leave in clean conditions to the satisfaction of the Consultant. To prevent damage to finishes, clean surfaces of furniture with cleaners recommended by the manufacturer.

End of Section