LCBO

STANDARD REQUIREMENTS FOR RETAIL STORES

LCBO STORE #438

Prepared by;

STORE PLANNING DEPARTMENT #835

55 Lakeshore Blvd. East, 2nd Floor,
Toronto, Ontario M5E 1A4

Revision #17: 2019, 1st Quarter

BID SPECIFICATIONS

PROJECT

LCBO RETAIL STORE #438
3050 Wonderland Rd. South
London, ON

OWNER

LIQUOR CONTROL BOARD OF ONTARIO
55 LAKESHORE BLVD. EAST, 2ND FLOOR,
TORONTO, ONTARIO
M5E 1A4

CONSULTANT

DUPON CONSULTING GROUP INC.
1185 FRANKLIN BLD. – UNIT 7
CAMBRDIGE, ONTARIO
N1R 7Y5

Issued for Bid: Aug 11, 2021

1.01 OWNER:

LIQUOR CONTROL BOARD OF ONTARIO
55 Lakeshore Blvd. East, 2nd Floor,
Toronto, Ontario
M5E 1A4

James Lau, LCBO Construction Coordinator
Tel: 416-864-6389

1.02 PROJECT:

LCBO RETAIL STORE #438
3050 Wonderland Rd. South
London, ON

CONSULTANTS:

PROJECT CONSULTANT	**DUPON CONSULTING GROUP** **1185 Franklin Blvd. – Unit 7** **Cambridge, Ontaio** **N1R 7Y5** **Tel: (519) 267-2268**
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STRUCTURAL	**ATKINS & VAN GROLL** **130 Bridgeland Avenue, Suite 101** **Toronto, ON** **M6A 1Z4** **Tel: (416) 489 7888**
MECHANICAL	**WSP GROUP** **600 Cochrane Drive,** **Markham, Ontario** **L3R 5K3** **Tel: (905)-475-7270**
ELECTRICAL	**WSP GROUP** **600 Cochrane Drive,** **Markham, Ontario** **L3R 5K3** **Tel: (905)-475-7270**
REFRIGERATION	**NEELANDS GROUP LTD** **4131 Palladium Way,** **Burlington, Ontario** **L7M 0V9** **Tel: (905) 332-4555**

COMMISSIONING CONSULTANT	**Energy DM** **Energy Consulting & Commissioning** **74 Romance Drive,** **Richmond Hill, Ontario** **L4S 2R8** **Daryoush Marandi – CEM, Principal** **Cell: 647-234-6646** **daryoush@energydm.ca**

END OF DOCUMENT

1.01 CONTRACT DOCUMENTS

.1 Work will be performed under one Contract; the Contract will be in the form of the Agreement between Owner and Contractor.

1.02 GENERAL CONDITIONS

.1 The General Conditions and Supplementary Conditions of the Contract will govern the performance of each Section of the Specifications.

.2 The following general notes outline expectations of the Owner for the Contractor and subcontractors during the performance of their work at any of Owner's renovation projects.

.3 These general notes will be considered as part of the overall project requirements, specifications and contract documents, the Contractor must take these requirements into account in their submitted bid and the requirements must be acknowledged by the Contractor prior to the start of any renovation project. Failure to comply with any or all of these requirements may result in a fail report and subsequent restriction of future participation in Owner's construction program by the Contractor. No claims for extra costs resulting from compliance requirements of the listed general notes will be considered by the Owner post tender.

.4 The Contractor is to renovate the existing retail store as outlined on the plans (contract drawings), while the store remains open for business. Note that the Contractor is to review architectural, mechanical, electrical and structural drawings together as a whole and to consider the entire work and to coordinate all trades accordingly. Special attention is required by the Contractor to compare and evaluate the existing plan and the proposed plan and to have a solid understanding of the scope of work and its impact on the project and the retail operation and the method by which the Contractor intends to implement the project. The Contractor is required to bring any errors, omissions or discrepancies on the drawings to the attention to the Owner prior to submitting a fixed price. Post tender change order requests will not be considered if it could be determined during the tender period by careful review of the drawings that such a discrepancy, error or omission existed or that best construction practices would include as a matter of course.

.5 For the purpose of identifying on the drawings that a multi phased renovation approach to the project implementation is required, the Consultants have included a phasing plan. Note that this is for reference and information only and that the Contractor is required to submit a revised phasing proposal at the construction kick-off meeting, which will be reviewed by the Owner, manager of renovations and the district manager, and must be approved by them prior to start of construction.

.6 The Contractor is expected to coordinate and complete the project in as little time as possible to minimize disruption to the retail sales operation. The Contractor is

required to schedule work around the retail operation which will remain open during the project and is priority. All systems installed or altered during a renovation are expected to be disrupted for the minimum amount of time possible, using best practices of schedule coordination, project management and procurement and that all retail systems must be up and running during the normal hours of business for the specific store.

.7 An overall renovation project schedule, must be submitted by the Contractor at the kick off meeting and will be reviewed by the Owner, manager of renovations and the district manager, and must be approved by them prior to start of construction.

.8 A weekly schedule is to be submitted during the construction work to the Owner with milestone targets, daily updates and recovery plans if necessary.

.9 During a renovation, the store must be accessible by all persons that require special assistance (ex. People in wheel-chairs).

.10 Contractor is responsible for all tipping charges.

.11 All notes apply to all drawings. No drawing is to be issued by itself to sub-contractors. Contractor is responsible to coordinate all information to all sub-trades.

.12 Standard of performance of work – in performing the work, the Contractor agrees to exercise the degree of care, skill and diligence that would normally be exercised by an experienced skilled and prudent Contractor supplying similar services for similar projects in a first class and expeditious manner, and further agrees that the Contractor's obligations, duties and responsibilities shall be judged, evaluated and interpreted in accordance with this standard.

.13 Assignment and subcontracting – the Contractor agrees not to assign or subcontract any portion of its obligations under this contract without the prior written consent of the Owner. The Contractor shall designate in writing to the Owner all subcontractors and shall not subsequently change such subcontractors without the Owner's prior written approval.

.14 The Owner may appoint a consultant with authority to act on the Owner's behalf, including, but not necessarily limited to, payment approval, review of the work and rejection of non-conforming work.

.15 Quality of work and materials – work and materials rejected by the Owner as failing to conform to the contract, whether incorporated into the work or not, shall upon notice from the Owner, be immediately removed by the Contractor. Failure of the Owner to immediately reject any work or materials as incorporated shall not in any way waive the Owner's right to reject such defective work or materials at any subsequent time.

.16 Control of the work – the Contractor shall have total control of the work and shall direct and supervise the work so as to ensure conformity with the contract. The Contractor shall be solely responsible for construction means, methods, techniques,

sequences, and procedures and for coordinating the various parts of the work under the contract.

.17 Subcontractors – the Contractor agrees that it will incorporate the terms and conditions of this contract into agreements it enters into with its subcontractors.

.18 Shop drawings – the Contractor agrees to furnish shop drawings, field testing and final selection of materials and other specified items for approval by the Owner so as not to delay progress of the project.

.19 Materials – materials delivered by or for the Contractor and intended to be incorporated into the work shall remain at the place of work and shall become the property of the Owner upon payment; but the Contractor may repossess itself of any surplus materials at the completion of the contract upon the written permission of the Owner. All scaffolding, apparatus, ways, works, machinery and plant brought upon the premises by the Contractor shall remain its property, but in case of its inability to perform, and where the completion of the work is done by or on behalf of the Owner, the Owner or its agents shall be entitled to use the said scaffolding, apparatus, ways, works,

.20 Damage to property – damage caused by the Contractor to work or property other than his own shall be reported immediately to the Owner, and the Contractor shall be responsible for its repair and for all consequential losses arising from the damage.

.21 All salvageable material to be coordinated with the Owner. Owner's facility coordinator has the first right of refusal on all salvageable material.

1.03 SPECIFICATIONS

.1 The provisions of all Sections of Division 01 shall apply to each Section of Divisions 03 to 28, inclusive, which are included in the Specifications.

.2 Division 01, General Requirements, of the Specifications generally specifies work and co-ordination that is the direct responsibility of the Contractor, but shall not be interpreted to define absolutely the limits of responsibility that must be established between the Contractor and his Subcontractors by their separate agreements.

.3 Ensure that Subcontractors understand that the General Conditions of the Contract, Supplementary Conditions, and Division 01, General Requirements, apply to Sections of the Specifications governing their work.

.4 Work in the Specifications is divided into descriptive Sections which are not intended to identify absolute contractual limits between Subcontractors, nor between the Contractor and his Subcontractors. The Contractor shall organize division of labour and supply of materials essential to complete the Project in all its parts and provide a total enclosure and protection from weather of interior spaces, as established in the General Conditions of the Contract.

.5 It is intended that Work supplied under these Contract Documents shall be complete and fully operational in every detail for the purpose required. Including materials not herein

mentioned, but which may be found necessary to complete or perfect any portion of Work in accordance with the Contract Documents.

.6 Specifications, Schedules and Drawings are complementary and items mentioned or indicated on one may not be mentioned or indicated on the others.

.7 Mention in the specifications or indication on the drawings of materials, Products, operations, or methods, requires that the Contractor Provide each item mentioned or indicated of the quality or subject to the qualifications noted; perform according to the conditions stated each operation prescribed; and provide labour, materials, Products, equipment and services to complete the Work.

.8 Where the singular or masculine is used in the Contract Documents, it shall be read and construed as if the plural, feminine or neuter had been used when the context or the statement so requires and as required to complete the Work, and the rest of the sentence, clause, paragraph, or Article shall be construed as if all changes in grammar, gender or terminology thereby rendered necessary had been made.

.9 Work designated as "N.I.C." is not included in this Contract.

.10 Wherever in the Contract Documents the word "include" is used in any form, the item of Work listed following shall not be interpreted to be restricted to only those items that are listed.

.11 Wherever in the Contract Documents the words "indicated" or "shown" are used they shall apply as meaning "indicated on Drawings" or "shown on Drawings" unless the context expresses another meaning.

.12 Wherever in the Specifications it is specified that work to which reference is made shall proceed or shall meet approval, direction, selection or request of jurisdictional authorities or others, such approval, direction, selection or request shall be in writing.

.13 Wherever in the Specifications it is specified that work shall be repaired, made good or replaced, it shall be performed without any additional cost to the Owner.

1.04 CONSTRUCTION SCHEDULE

.1 Submit a construction schedule utilizing critical path method within ten (10) working days of notification of bid acceptance, for approval.

.2 Correct, revise, update, and otherwise maintain schedule during progress of construction. Supply each corrected, revised and updated schedule to Owner, Consultant, and Subcontractors.

.3 Prepare schedule in approved format, on standard form of Owner.

1.05 SUPERINTENDENCE

.1 A designated site superintendent having no less than 5 years of experience must be provided by the Contractor to oversee the Work.

.2 The Site Superintendent is required to be on site at all times when work forces are present, work is being executed or deliveries are being made.

.3 The Contractor shall provide the Superintendent with a pager, cell phone or other means by which the Consultant or Owner can make contact during hours of work.

1.06 SITE PROGRESS RECORDS

.1 Maintain at site a permanent written record of progress of the Work. Make the record available at all times with copies provided when requested. Include in record each day:
- .1 Commencement and completion dates of the work of each trade in each area of Project.
- .2 Attendance of Contractor's and Subcontractor's work forces at Project and a record of the work they perform.
- .3 Visits to site by Owner, Consultant, jurisdictional authorities, testing companies, Contractor Subcontractors, and suppliers.

.2 Maintain a progress chart in a format approved from sample submitted. Show on chart proposed construction schedule and the progress achieved by Contractor and each Subcontractor.

1.07 WORK BY OTHERS

.1 The Contractor shall be the "Constructor", within the meaning of the Occupational Health and Safety Act (Ontario) ("OHSA"), solely responsible for construction safety at the Place of the Work and for compliance with the rules, regulation and practices required by the OHSA except only where other contractors or Owners' own forces have their own defined, physically partitioned and segregated work areas with separate access/egress from the Work being completed by the Contractor and may therefore be themselves considered Constructors as provided by OHSA.

In cases where other contractors (including the base building contractor, or Owners' own forces and suppliers hired and paid for by the Owner, do not have separate defined work areas the Contractor will, as a specific term and condition of this contract, assume all the Duties and Responsibilities of the Constructor as set out in OHSA over any and all aforementioned "other contractors", "Owners forces" and suppliers hired and paid for by the Owner". The Contractor agrees to assume full responsibility and oversight authority as the Constructor over each and will ensure strict compliance to the Contractor's own Occupational Health and Safety Policy and Program. In every case, the Contractor will assume the role of Constructor over each such supplier (added from last paragraph). The Contractor, as Constructor, is responsible for all work done within the Place of Work, will have the right to remove the other contractors and Owners' own forces from the Place of the Work should they not comply with the Contractor's Health and Safety Program and safety instructions.

1.08 EXAMINATION

.1 Site: Examine site, and ensure that each Section performing work related to site conditions has examined it, so that all are fully informed on all particulars which affect Project Work.

.2 Ensure by examination that all physical features at the Work, and working restrictions and limitations which exist are known, so that the Owner is not restricted in use of the premises for their needs.

.3 Previously Completed Work:

.1 Where dimensions are required for proper fabrication, verify dimensions of completed work in place before fabrication and installation of work to be incorporated with it.

.2 Verify that previously executed work and surfaces are satisfactory for installation or application, or both, and that performance of subsequent work will not be adversely affected.

.3 Ensure that work installed in an unsatisfactory manner is rectified by those responsible for its installation before further work proceeds.

.4 Commencement of work will constitute acceptance of site conditions and previously executed work as satisfactory.

.5 Rejected work resulting from application to, or installation on, or incorporation with, unsatisfactory previous work will be considered the responsibility of those performing the later work.

.4 Construction Measurements:

.1 Before commencing installation of work, verify that its layout is accurately in accordance with intent of Drawings, and that positions, levels, and clearances to adjacent work are maintained.

.2 Before commencing any work, verify that all clearances required by jurisdictional authorities can be maintained.

.3 If work is installed in wrong location, rectify it before construction continues.

.5 Review the entire site prior to any work. Should evidence be found of asbestos or any other hazardous substance, contact the Consultant prior to proceeding with any work. Should evidence of a hazardous substance be found during the work, contact the Consultant immediately on discovery of such evidence.

1.09 USE OF SITE

.1 Accept full responsibility for assigned work areas from the time of Contract award until Substantial Performance of the Work.

.2 Check means of access and egress, rights and interests which may be interfered with. Do not block lanes, roadways, entrances of exits. Direct construction traffic and locate access to site as directed by municipality.

.3 Where encroachment beyond property limits is necessary make arrangements with respective property owners.

1.10 PROTECTION OF WORK, PROPERTY AND PERSONS

.1 Provide necessary methods, materials, and construction to ensure that no damage or harm to work, materials, property and persons results from the Work of this Contract. Construction facilities relating to protection are specified in Section 01 50 00.

.2 Keep excavations, and pits free of water. Pump dry as required.

.3 Remove snow and ice immediately from interior of building.

.4 Protect adjacent private and public property from damage and, if damaged, make good to match in all details.

.5 Keep surfaces, on which finish materials will be applied, free from grease, oil, and other contamination which would be detrimental in any way to the application of finish materials.

.6 Do not apply visible markings to surfaces exposed to view in finished state or that receive transparent finishes.

.7 Protect surfaces of completed work exposed to view from staining, disfigurement and all other damage by restriction of access or by use of physical means suitable to the material and surface location. Establish with each Subcontractor the suitability of such protection in each case.

.8 Schedule finish work at end of construction when interference from tradesmen is at a minimum.

.9 Brace and shore masonry walls until their designed lateral support is incorporated at both top and bottom. Do not permit backfilling at masonry walls below grade until floor systems are installed and lateral bracing is thus achieved.

.10 Enforce fire prevention methods at site. Do not permit bonfires, open flame heating devices or accumulation of debris. Use flammable materials only if proper safety precautions are taken, both in use and storage.

.11 Do not store flammable materials in the building. Take necessary measures to prevent spontaneous combustion. Place cloths and other disposable materials that are a fire hazard in closed metal containers and remove them from the building every night.

.12 Where flammable materials are being applied, ensure that adequate ventilation is provided, spark-proof equipment is used, and smoking and open flames are prohibited.

.13 Ensure that volatile fluid wastes are not disposed of in storm or sanitary sewers or in open drain courses.

.14 Ensure that precautions are taken to prevent leakage and spillage from plumbing and mechanical work that may damage surfaces and materials.

.15 To prevent soiling or damage to finish flooring where pedestrian traffic occurs after the flooring has been installed, install and maintain 0.152 mm polyethylene membrane or reinforced kraft paper temporary protection, secured in place and with joints sealed by reinforced pressure sensitive tape.

.16 Install plywood panels of minimum 6mm thickness over completed finish flooring materials on which further construction work is performed or delivery of products is made, or both. Seal joints between panels with reinforced pressure sensitive tape.

.17 Protect metal deck on which construction personnel work, and on which materials are stored, with substantial planking.

.18 Prevent spread of dust beyond the construction site by wetting, or by other approved means, as it accumulates.

.19 Do not damage root systems of existing trees which are to remain, and future landscaped areas, by piling of surplus soil over them, by dumping of plaster or cement flushings or other debris over them, or by cutting of roots when excavating and grading. Do not use trees for anchorage of rigging cables.

1.11 SECURITY

.1 Contractor to be responsible for security of all areas affected by Work of this Contract until taken over by Owner. Take steps to prevent entry to the Work by unauthorized persons and guard against theft, fire and damage by any cause.

.2 Contractor to take acceptable precautions to guard Work site, premises, materials and the public during and after working hours due to the Work of this Contract.

.3 Any security service provided by the Owner is for the protection of the Owner's interest in the Work on the Site and shall not relieve the Contractor of the responsibility to protect the Site and the Work of the Contract.

1.12 SALVAGE

.1 Unless otherwise specified, materials on the site at the time of signing of Contract shall remain property of Owner.

.2 Unless otherwise specified, salvaged material resulting from construction, and surplus materials and construction debris shall become property of Contractor, who shall dispose of it away from site.

.3 Treasure, such as coins, bills, papers of value, and articles of antiquity, discovered during digging, demolition and cutting at the site shall remain property of Owner, and shall be delivered immediately into his custody.

1.13 OWNER OCCUPANCY

.1 The Owner reserves the right to occupy and use portions of the premises, whether partially or entirely completed, or whether completed on schedule or not, provided such occupancy does not interfere with the Contractor's continuing work.

.2 Partial occupancy or installation by the Owner of his equipment shall not imply acceptance of the Work in whole, or in part, nor shall it imply acknowledgement that terms of the Agreement are fulfilled.

1.14 SETTING OUT

.1 Before commencing work, verify lines, levels and dimensions shown on the drawing and report discrepancies in levels or dimensions to the Consultant. Be responsible for work done prior to the receipt of the Consultant’s decision regarding reported discrepancies.

1.15 WASTE AUDIT/PLANS FOR WASTE REDUCTION

.1 Comply with requirements of authorities having jurisdiction.

.2 Prepare and submit waste audit and waste reduction plan in accordance with Ontario Regulation 102/94 Waste Audits and Waste Reduction Workplans.

.3 Prepare and submit source separation plan in accordance with Ontario Regulation 103/94 Industrial, Commercial and Institutional Source Separation Programs.

.4 Deliver to nearest appropriate depot all materials accepted for recycling by the region or municipality having jurisdiction over the Place of Work, including but not limited to cardboard, paper, plastic, aluminum, steel, and glass. Deliver to nearest appropriate depot all scrap and excess gypsum wallboard for recycling of this material. Pay all costs for this work.

1.16 QUALITY CONTROL AND COMMISSIONING

.1 Owner requires that the Contractor, all sub trades and manufacturers follow a quality control process which has been identified in section 01 45 00. This will include the Contractor's commissioning process.

.2 The start-up of the roof top air condition units will be conducted by the Landlord's Contractor. Documentation for the units and the start-up will be provided to the Owner coordinator during the turn-over of the space to Owner. When the Contractor has completed the HVAC installation they shall coordinate with the Landlord's Contractor who will arrange for the unit manufacturer to commission the units. The Landlord's Contractor will pay for the cost of the unit commissioning

1.17 HEALTH & SAFETY REQUIREMENTS

.22 No openings are to be left unguarded during the entire construction period.

.23 The Contractor shall be responsible for construction safety at the place of the work and for compliance with the rules, regulations, and practices required by the Occupational Health and Safety Act (Ontario) and shall perform all obligations of the constructor under the act.

.24 Hazardous Substances – prior to the Contractor commencing the work, the Owner shall provide the Contractor with notice of any toxic or hazardous substances or materials that are present at the place of work and shall take all reasonable steps required by law to ensure no person suffers injury, sickness or death and that no property is injured or destroyed as a result of exposure to or the presence of the substances or materials. If the Contractor (i) encounters toxic or hazardous substances or materials at the place of work or (ii) has reasonable grounds to believe that toxic substances or materials are present at the place of work, which were not disclosed as required, the Contractor shall take all reasonable steps, including the stopping of the work to ensure that no person suffers injury, sickness or death and that no property is injured or destroyed as a result of exposure to or the presence of the substances or materials and shall immediately report the circumstances to the Owner and the consultant in writing.

.25 Phasing plan: the Contractor is required to submit a detailed phasing plan for Owner /Consultant review at the construction kick-off meeting. The phasing plan must take into account all aspects of demolition and new construction as well as coordinating with the store manager for the relocation of Owner product. The phasing plan must adhere to all safety requirements outlined within Owner specifications and local jurisdictions and codes. After hours work is the responsibility of the Contractor and the Contractor must ensure the project deadlines are met and target completion dates are met.

.26 Contractor is responsible for the coordination of hoarding and safety barriers. Hoarding and workplace safety are the responsibility of the Contractor at all times. The Contractor is required to ensure the retail work area and warehouse is kept clean and dust free during store business hours and all clean-up is to be completed 1 hour before store opening. Work place must be cleaned and dust free prior to each store opening. Contractor is required to ensure that plastic enclosures are completely sealed at all times and must check dust enclosures on a continual basis during all phases of work.

.27 All hoarding on site to comply with specification.

.28 Noisy work to commence after or before store hours only. Contractor to inform/verify with LCBO construction coordinator and must comply with municipal by-laws with time of work.

.29 Contractor to supply, erect barricades, protective hoarding, guards and lighting as required by local jurisdictions and authorities to protect workers and protect store occupants. Refer to specifications.

.30 Construct and maintain dustproof partitions as required to prevent spread of dust, fumes and smoke to other parts of the building. On completion, remove partitions and make good damaged surfaces to match adjacent surfaces.

.31 Not cease operations and notify consultant immediately if any asbestos is encountered or suspected on site.

.32 Use of solvent strippers shall be performed when the building is not occupied. Ensure that proper ventilation procedures are followed.

.33 All the hoarding for this renovation as per the hoarding details is to be supplied and installed by the Contractor at the Contractor's cost, at all phases of construction. The plywood is to be installed at 8'-0" a.f.f., the Contractor is to use ½" plywood and (2"x4") min. Studs at 2'-0" o/c. See hoarding details.

1.18 CONSTRUCTION SCHEDULE & TIME MANAGEMENT

.1 Contractor to coordinate all sub-contractors and ensure that the "construction schedule" is followed.

.2 Scheduling – the Contractor shall prepare and submit to the Owner within 7 days upon contract award a construction schedule that indicates the timing of the major activities of the work and provides sufficient detail of the critical events and their inter-relationship to demonstrate that the work will be performed in conformity with the start and completion dates. The Contractor agrees to perform the work in accordance with the schedule. The Contractor shall cooperate with the Owner and other parties. The Contractor hereby agrees to be bound by the provisions, if any, elsewhere in the

contract documents for liquidated damages and shall pay such liquidated damages to the extent caused by the Contractor.

.3 The Contractor is required to schedule after business hours work in advance with the Owner to organize for Owner's security to be present during after hours work. The Contractor is required to work after hours if required to maintain the project schedule and target completion dates. Contractor to carry costs for after hours work to ensure project schedule. Scheduled after hours work that is not utilized by the Contractor will be charged back to the Contractor for incurred security costs provided by the Owner. The Contractor is required to include after-hours work and outline such work within the phasing plan.

.4 Contractor will be required to work days and evenings after normal store operations. Contractor to confirm store hours of operation with the store manager. All after hours work is to be coordinated with the Owner.

.5 There will be day and night shift work during the renovation period. There will be no extra funds ($) paid out to the Contractor for any additional incurred expenses for work after hours. This is solely the responsibility of the Contractor.

1.19 PAYMENT

.1 Payments – it is a condition of the contract that prior to receiving payments hereunder the Contractor shall submit to the Owner an invoice or invoices in a form satisfactory to the Owner. Subject to the Construction Lien Act (Ontario), and in accordance with the provisions of this contract, the Contractor shall be paid progress payments for work from the date of the Contractor's last progress billing date to the last day of the next scheduled payment period. The release of holdback monies shall become due and payable on the day following the expiration of the statutory lien period stipulated in the Construction Lien Act (Ontario), provided that no claims against the work, the place of the work or the Contractor exist and the Contractor has submitted to the Owner a sworn statement that all accounts for labour, subcontract, products, tools, construction machinery and equipment and any other indebtedness which may have been incurred by the contractor in the performance of the work and for which the Owner might in any way be held responsible have been paid in full except holdback monies properly retained. Progress payments shall be deemed advances and are subject to adjustment at any time prior to fine payment for errors, overpayment or where the Owner has made the determination that the remaining balance of payments may be insufficient to ensure completion of the contract work in accordance with its terms or to pay lien, holdback or bond claims. The Contractor may invoice for materials delivered to the place of the work but not yet incorporated in the work and receive payment therefor as outlined above; provided however, that all such stored materials shall be at the risk of the Contractor until completion of the work, and that

the application for payment be supported by such evidence as the Owner may require to establish the value and delivery of the materials.

.2 Deduction from payments – partial payments for work performed under this agreement will equal the value of the work done by the Contractor at the agreed price, less the sum of previous payments and less the holdback amounts as required by relevant legislation; provided that if the Contractor is indebted to the Owner for labour, benefits, taxes, supplies, materials equipment, rental or other proper charges against the work covered by this contract the amount of such indebtedness may be deducted by the Owner from any payment or payments made under this provision. Provided, further, that the Owner may from time to time require, and the Contractor shall promptly provide, a sworn statement in writing setting forth what amounts, if any, are due or payable by the Contractor to third parties for labour, benefits, taxes, materials, equipment, or supplies in connection with or arising out of the performance of this contract and the Owner may withhold from any payment, partial or final, otherwise due under this contract, such sums as the Owner reasonably may determine are necessary to secure and protect the Owner from claims or liens that may be asserted by such third parties. Notwithstanding any other provision in this contract the Owner may withhold any payment or payments otherwise due to the Contractor upon completion until the Contractor provides satisfactory evidence to the Owner that a required inspections by authorities having jurisdiction have been made and the work has passed all such inspections.

1.20 APPROVALS, AUTHORIZATION, AND LANDLORD

.1 All construction shall conform to federal, provincial, municipal, standards, bylaws and amendments and is to follow good construction practices.

.2 All work shall be performed in accordance with all regulations governing trades and be performed by qualified trades persons certified in their respected fields.

.3 Existing building components are to be protected during all construction by Contractor.

.4 All new equipment to meet requirements of CSA, authorities having jurisdiction and Owner.

.5 Coordinate activities with landlord and obtain approval when necessary for special demolition activities causing disturbance to occupants and neighboring tenants.

.6 Contractor to coordinate locations of roof access with the landlord prior to any works on the roof. All landlord protocols and Contractor procedures for roof maintenance/work must be followed at all times. Contractor is required to obtain such protocols from the landlord and coordinate as required in advance of any roof work.

.7 E.S.A certificate required for all electrical work.

.8 The building permit will be submitted by Consultant and paid by the Owner. The building permit will be picked up by the Contractor. The ESA permit is by the Contractor, not the Owner.

1.21 REFRIGERATION AND BEER COLD ROOM

.1 Contractor to provide new refrigeration lines to new condensing units, sump pumps and discharge pipes to existing floor/hub drains. As shown on drawings.

.2 Contractor to provide roof curbs to required length for new condensing units.

.3 Contractor to provide insulated dog house c/w roof opening and steel framing for condensing lines to roof directly over new beer area. Roofing work to be performed by landlord's roofer, if indicated on the drawings and tender documents. If not, Contractor is to carry the cost of all roofing work in there tender bid. Structural steel supports to be designed by a structural engineer. Contractor is to provide engineer stamped shop drawings.

.4 Contractor to supply and install new condenser units for all new refrigerators, including all electrical supply and control.

.5 For all refrigeration unit disposals: remove and dispose existing perimeter refrigerator, condensate drain, power supply and roof top condenser unit. Electrical wiring to be removed back to source. Drain to be removed and floor drain capped at floor level and flush with floor finish. Contractor to remove and dispose existing roof top condenser unit and all refrigerant connections/lines and all electrical connections to roof top unit. This work shall include removal and disposal of existing roof top sleepers. Contractor is responsible to ensure that existing roof opening is completely weather sealed/waterproof after removal of roof top connections. Contractor is to repair existing roof after removal of existing roof top sleepers to match existing/as per landlord roofing requirement. Contractor to advise Owner if existing sleepers are resting on top of existing roof membrane. If this is the case, sleepers should be removed/disposed and Contractor is required to inspect the roof to ensure there is not damage to existing roof surfaces and repair if required. All roof work to be completed by landlord roofer if indicated on the drawings and tender documents. If not Contractor is to carry the cost of all roofing work in there tender bid and work must conform to landlord roofing requirements.

.6 Contractor is required to patch all existing metal roof deck openings that are no longer required after removal of existing refrigerators. Refer to roof plan to determine which existing roof cones are/or dog houses will be re-used. Unless otherwise noted all roof openings are to be patched and weather sealed. New roofing to match existing roof construction.

.7 Contractor to submit shop drawings for walk in cold room prefabricated walls and ceiling panels for Owner review and approval cold room shop drawings must include a

detail confirming connection of new cold room ceiling panels to existing open web steel joists above. All connections to existing OWSJ structural members must be made using unistruts. No connections to existing roof metal deck will be allowed/accepted by the Owner or the landlord. Contractor and cold room vendor are responsible for verifying existing site dimensions. Confirming overall clear dimensions and required clearances in warehouse area prior to cold room installation. Contractor is required to coordinate all related rough openings for openings as shown. Contractor will confirm all site measurements and dimensions of cold room wall panels with cold room supplier/manufacturer. Contractor to provide reinforcement at dairy door openings and at sliding door opening. All cold room shop drawings c/w with reinforcement at panel openings must include a structural engineer's stamp and seal.

.8 Contractor to refer to cold room consultant drawings for all roof penetration locations and specifications. Vent locations are approximate. Coordinate work and review these drawings in conjunction with all engineering drawings, cold room consultant's drawings and cold room manufacturer shop drawings. Any discrepancies between these drawings should be brought to the Owner's attention immediately.

1.22 CLEANING DURING AND AFTER CONSTRUCTION

.1 The Contractor shall regularly and promptly remove all waste and debris produced by its operation. Refuse waste shall not be permitted to accumulate to the extent that it interferes with free access to the work site. In the event the Contractor fails or refuses to meet these requirements, refuse waste removal may be done by the Owner and 150% of the disposal cost deducted of the amount otherwise payable to the Contractor. In addition, at the direction from Owner, the Contractor shall remove old or used materials from the place of work at his own expense and any such materials shall be used by the Contractor for his own business purposes only.

.2 Contractor to use professional industrial floor restoration/cleaners. Wash and clean all floors within scope of work and surrounding areas. Rebuff, polish, wax and seal floors at project completion.

.3 Demolition materials and debris/waste to be removed from the site on a daily basis during the course of the entire project.

1.23 STORE OPERATIONS DURING CONSTRUCTION

.1 Work is not to interfere with truck deliveries or clientele. Contractor to coordinate all work/loads with Owner.

.2 The store will be open for business during the renovation. The store will receive loads as usual. The Contractor will be provided with a schedule of all loads. The Contractor is not to schedule any delivers during store scheduled load/deliveries. All deliveries/loads is to be confirmed at the weekly schedule renovation meetings.

.3 Work is not to be performed during the following holidays/long weekends unless otherwise authorized by the Owner:
   a. Christmas holiday season
   b. New years
   c. Family day
   d. Easter holiday
   e. Victoria day
   f. Canada day
   g. Civic holiday
   h. Labour day
   i. Thanksgiving holiday
   j. Remembrance day

.4 The working hours will be the regular store hours of operation. Weekend work is permitted in the hoarded off sections only and no work will be permitted in the retail area and warehouse area during the weekends. Any other overnight work will be scheduled in advance (1 week) with the Owner and a security guard will be hired and paid by the Owner. Loud noise will not be permitted during store operation (example: jack hammer). This type of work will be done over night when the store is closed.

1.24 SITE CONDITIONS

.1 Contractor is responsible for all locates as required.

.2 All dimensions are to be verified on site by Contractor and any variances reported to the Owner.

.3 Contractor shall examine the site and existing conditions before commencement of work and report to the Owner any defects or interferences affecting the completion of work or the warranties for this work.

.4 Contractor is to verify existing site conditions and coordinate with other trades for proper installation of all work.

.5 Contractor is responsible to relocate all thermostats, timers & emergency switches that are affected by this plan, outside and inside retail area.

.6 All architectural drawings and specifications to be read in conjunction with engineering and consultant drawings and specifications. Contractor and its sub-trades are required to thoroughly review all specifications as noted on this drawing in conjunction with the engineering drawings, engineering specifications, consultant drawings/specifications and the tender documents. This drawing is part of a complete contract document package and must be read and referred to in tandem with all other contract documents. Contractor is to advise the Owner immediately of any discrepancies between engineering and consultant drawings/specifications and architectural drawings/specifications during the tender period.

.7 Do not interfere with any use of adjacent building premises. Maintain free and safe passage to and from all entrances and exits at all times.

.8 If replacement or installation of cash desks, customer service desks or merchandisers are in the Contractor's scope of work, the Contractor is to remove and dispose existing cash desks, merchandisers and existing customer service desk. Contractor to temporarily disconnect existing electrical and Owner's vendors to disconnect voice & data cabling and power down equipment at time of demolition. All equipment to be powered down and taken off line during evening or early morning hours (store will be closed for this work). Contractor to carry cost for night time work. Contractor is required to coordinate with Owner's vendor to schedule vendor work. Refer to engineering drawings for new electrical, voice and data requirements.

.9 Contractor to coordinate with the Owner and Owner's security company for the disconnection of all existing security cameras, audio speakers, security motion sensors within area of work.

.10 Disconnect unused electrical switches and outlets at source. Typical throughout entire scope of work.

.11 Contractor to remove and dispose existing fixture and/or metal shelving.

.12 Make good repairs to existing disturbed surfaces to match surrounding finishes. Contractor is responsible for all damages to existing surfaces, equipment and structures that is outside the scope of work. Contractor will repair/replace damaged items at Contractor's expense.

.13 Contractor to coordinate with Owner the removal of shelving as indicated in drawings. Store staff only to remove product from shelving.

.14 Carry out demolition work in a manner to cause as little disruption/inconvenience to the adjacent occupied areas as possible. Typical throughout entire store.

.15 Repair all demolition performed in excess of that specified within the scope of work, at no cost to the owner.

.16 Leave substrate surfaces in a smooth, sound condition, suitable to receive new finishes as specified.

.17 Patch all damaged floor slab areas with suitable concrete filler or grout depending upon extent of damage. Fill and level floor slab to the tolerances specified by the landlord. Apply sealer to the concrete slab were affected to floor areas affected by repair work or new work.

.18 Where existing ceilings remain provide addition new ceiling tiles of the same type and size as existing to replace damaged materials.

.19 Replace any T-bar suspension members which are damaged and not level prior to painting of existing ceiling grid.

.20 Remove all debris, tools and equipment from site. Floors shall be left broom clean. The job site must be left in a condition acceptable to the consultant and Owner.

.21 Refer to engineering drawings for modifications to electrical, HVAC, security, plumbing services and sprinkler systems.

.22 Any work to be done in manager's office is to be coordinated in advance with Owner. All work in this area is to be done after hours unless instructed otherwise by Owner.

.23 New pin on letters supplied by the Owner and installed by the Contractor. Templates for pin on letters will be supplied by the Owner. Contractor to coordinate final locations with Owner.

.24 Contractor to remove any installed item to allow for painting. Including the removal of pot light trims/faceplates and HVAC diffuser/grilles. Reinstall upon completion.

.25 Patch all damaged concrete and depressions in existing concrete floor slab with suitable concrete filler or grout depending upon extent of damage. Fill and level floor slab to the tolerances specified by the landlord. Apply sealer to the concrete slab were affected to floor areas affected by repair work or new work.

.26 Contractor to coordinate with Owner and store manager the removal of shelving as indicated in drawings. Store staff will remove product from existing fixtures prior to demolition and re-stock all new/relocated fixtures.

1.25 CLOSE-OUT AND WARRANTYS

.1 Repair all defects in a manner to prevent recurrences.

.2 The warranty period with regard to the contract is one year from the date of substantial completion of the work, as defined in the Construction Lien Act (Ontario), or such other periods specified in the contract. The Contractor shall promptly correct defects or deficiencies in the work which appear prior to and during the warranty periods specified, and where applicable, enforce the warranty obligations against subcontractor. The Contractor shall arrange to have all product warranties in excess of one year issued to the Owner.

.3 Closeout documentation retainage - $20,000.00 of the final payment and an additional amount equal to outstanding deficiencies, as recorded by the consultant, will be retained until all closeout documents are received by Owner.

.4 All closeout documents and operation manuals, including as-built drawings are to be submitted promptly at the end of each renovation project.

.5 Provide a guarantee for a period of one year from the date of substantial completion or such other periods specified in the contract.

1.25 LCBO VENDORS

.1 Vic store fixtures will supply all the material for the metal shelving to the Contractor and the Owner will pay Vic store fixtures directly. All installation of metal shelving will be by Vic store fixtures and paid for by the Contractor (installation only). All

coordination of metal shelving with Vic store fixtures is the responsibility of the Contractor. Vic store fixtures contact: Ashley Penning – 905-568-1444 ext.#2.

.2 Archmill House Inc. (millwork vendor) will supply all the material for the millwork to the Contractor and the Owner will pay Archmill House Inc. directly. All installation of the millwork will be by Archmill House Inc. and paid for by the Contractor (installation only). All coordination of millwork with Archmill House Inc. is the responsibility of the Contractor. Archmill house Inc. Contact: Andy Fraser – 905-648-7330 .

.3 (E.N.S.) Energy Network Services will supply all the light bulbs/lamps and LCBO will pay the LCBO vendor directly. Installation of all the light bulbs/lamps to be by the Contractor unless directed otherwise by the LCBO. All coordination and delivery of the light bulbs/lamps with the LCBO vendor is the responsibility of the Contractor. Contractor to confirm the approved LCBO vendor with the LCBO construction coordinator.

.4 Contractor to coordinate with the Owner and Owner's security company for the disconnection and reconnection of all existing and new security cameras, audio speakers, security motion sensors within area of work. All work noted above is by Owner's vendor. Contractor is required to coordinate all work with Owner. The Contractor is not to touch any security alarm equipment and wiring. All this work will be done by Owner's security alarm company.

.5 Any delays of Owner's vendors caused by incomplete work/scheduling by Contractor shall be paid for by the Contractor directly to Owner's vendor.

.6 Contractor is to contact evergreen lifesafety after the completion of the renovation. Evergreen lifesafety will perform a detailed lifesafety inspection of the newly renovated store. Evergreen fire and lifesafety services will be paid for by the Contractor. Please contact Mr. Tony Gerace at tel:905-727-1299 for all fire and safety services.

.7 All Owner's vendors are to become the Contractor's sub-trade. Form 1000 to be completed by Contractor and Owner's vendor.

.8 Forward signs will supply the exterior and interior signs to the Contractor and the Owner will pay forward signs directly (supply/material only). All installation of exterior & interior signage will be by forward signs and paid for by the Contractor (installation only). All coordination of the exterior and interior signs with forward signs is the responsibility of the Contractor. Forward signs contact info.: Krystle Yeung (416)291-4477 ext. 292 or Melodie Du (416)291-4477 ext. 401. Below is a summary of the interior and exterior signs that will be supplied and installed by Forward Signs:

Interior Signs: customer service, vintages, let's get together, led transparency boxes, pin-on letters, our wine country large cut-out letters,

beer cold room wall paper and sliding door graphics, open & cold beer signs.

Exterior signs: channel letters, awnings, box signs, pylon signs, opening package, blade signs, community signage.

.9 All Owner's vendors are the sub-contractors of the Contractor.

1.26 MERCHANDISES CARTS

.1 The price of merchandise carts have been included in Vic store fixtures installation cost. The Contractor will carry this installation cost in their bid price. The Contractor will pay Vic store fixtures directly for the cost of merchandise carts. Vic store fixtures will supply, install and deliver the merchandise carts. The Contractor will coordinate all work and deliveries of the merchandise carts. The merchandise carts belong to the Owner and have been paid for by the Owner. The Contractor will not purchase new merchandise carts, unless noted otherwise.

END OF SECTION

1.01 REGULAR SCHEDULED WORKING HOURS

.1 Confirm with LCBO Project Coordinator for Regular Scheduled Working, as LCBO Regular Hours of Operation may be different.

.2 Perform Work during regular scheduled work hours.

.3 Maintain existing exits and ensure proper and safe means of egress from all parts of the building to open spaces are cleared at all times to approval of authorities having jurisdiction.

1.02 WORK OUTSIDE OF REGULAR SCHEDULED WORKING

.1 If the Contractor is required to work on a designated statutory holiday, or carry out scheduled work at night or on weekends, notify the LCBO Project Coordinator in writing not less than 72 hours prior to such time.

.1 Do not proceed with Work outside of regular scheduled work hours without prior written approval from LCBO. Work completed outside of regular scheduled work hours without prior written approval will be rejected. Contractor to repair or remove such rejected Work, to the satisfaction of, and at no cost to LCBO.

.2 Should cancellation of Work outside of regular scheduled work hours be necessary for any reason, minimum of 48 hours notice is required. Failure to provide this notice will result in the Contractor being charged at a rate of $800.00 per night, for one supervisor's shift. The stated charge will be made against the Contractor's progress payment.

.3 Work undertaken outside of regular working hours shall not contravene the requirements of local Noise By-Laws or any other regulatory requirements.

END OF SECTION

1.01 GENERAL REQUIREMENT

.1 Provide labour, instruments and materials to conduct the commissioning process as outlined in this specification section.

1.02 RELATED DIVISIONS

.1 Division 01: General Requirements.
.2 Division 11: Equipment.
.3 Division 20: Basic Mechanical Requirements.
.4 Division 21: Fire Suppression.
.5 Division 22: Plumbing.
.6 Division 23: HVAC.
.7 Division 26: Electrical.

1.03 PRODUCTS

.1 The commissioning process is an integral part of the quality control that shall be provided by the Contractor, the Sub Contractors and the System Manufacturers. The commissioning process shall have a monetary value of the overall contract price as described in this section. The Contractor shall be able to draw from this allocation on a monthly basis as work is completed and approved by the Consultants.

.2 LCBO has hired a Commissioning Consultant (CC) who will assist the Consultants and will coordinate with the Contractor to verify that the commissioning process has been completed to the requirements of the contract documents

1.04 THE COMMISSIONING PROCESS

.1 The commissioning process consists of:
  .1 Preparing a commissioning plan
  .2 Shop drawings review and comments
  .3 Scheduling and conducting tests
  .4 Inspection of building and mechanical installations
  .5 Documenting and distributing reports
  .6 Testing of Equipment and Systems
  .7 Demonstration of systems operation
  .8 Operating and maintenance manuals and as-built documentation
  .9 Training
  .10 Systems demonstration (this is not training) and turnover
  .11 Seasonal commissioning
  .12 Warranties

1.05 PREPARING A COMMISSIONING PLAN

.1 A draft commissioning plan has been included with the contract documents. The Contractor shall complete the plan at the beginning of the construction process. Update the plan on a monthly basis and report to the Architect. Finalize the commissioning plan

at the end of the commissioning process and include all reports and completed test forms.

1.06 SHOP DRAWINGS AND RECORD DRAWINGS

.1 Conform to Section 01 33 00 for requirements for shop drawings and record drawings.

1.07 SCHEDULING AND CONDUCTING TESTS

.1 The Contractor shall provide a construction schedule which shall include the commissioning schedule. The commissioning schedule shall identify all tests required by the specification and dates when the tests will occur. The Contractor will identify who will conduct the tests and what trades are required to coordinate with the testing process. Sample test forms have been included with the specification, however, the Contractor may choose to utilize their own forms but they must be approved by the Consultant.

.2 Commissioning schedule shall be submitted within two weeks of contract award date.

1.08 DOCUMENTING AND DISTRIBUTING REPORTS

.1 The Contractor shall be responsible for completing all test forms and arranging for a witnessing authority when it has been specified. The Contractor shall submit the completed forms and any other commissioning reports monthly/as it occurred, to the Architect as part of the commissioning plan update.

1.09 INSPECTION OF BUILIDNG, MECHANICAL AND ELECTRICAL INSTALLATIONS

.1 The Contractor shall coordinate with the Consultants and Commissioning Consultant who will inspect the installation of the building systems and the electrical systems. The Consultants and the Commissioning Consultant shall issue reports to the LCBO Project Coordinator. The Contractor shall correct any deficiencies associated with the contract documents.

1.10 TESTING OF EQUIPMENT AND SYSTEMS

.1 The Contractor shall hire the services of the manufacturer's technicians to test the equipment and associated systems. The technician shall record the results of the tests on the testing forms. The tests shall be witnessed by the Consultant or the Commissioning Consultant. When the tests have been completed satisfactorily the technician and witnessing authority shall sign the forms. A copy of the forms shall be forwarded to the Consultant. The original shall be inserted into the operating and maintenance manual.

.2 Should equipment or systems fail a test, the test shall be repeated after repairs or adjustments have been made. The additional tests shall be witnessed.

.3 Tests which have not been witnessed shall not be accepted and shall be repeated.

.4 The equipment and systems to be tested shall include:

- .1 Plumbing and Drainage Systems
- .2 Rooftop heating and air conditioning systems
- .3 Mechanical systems

.4 Cold room structure and associated mechanical and electrical systems
.5 HVAC Controls and Building Automation System
.6 Power distribution system
.7 Lighting and Lighting Control
.8 Refrigeration Units
.9 Life Safety System

1.11 DEMONSTRATION OF SYSTEMS OPERATION

.1 The requirements for the final systems operational demonstration have been included in the specification. The Contractor shall be responsible for completing all tests identified in the specification and obtaining sign off documentation from all sub- contractors, testing agencies and manufacturers. When all testing has been completed the Contractor shall request that the Consultant and Commissioning Consultant attend systems operational demonstration of all systems associated with the project. The Contractor will arrange for the necessary persons to perform the demonstrations.

1.12 OPERATING AND MAINTENANCE MANUAL & AS-BUILT DOCUMENTATION

.1 Conform to section 01 33 00 for requirements for the O&M Manuals & as-built documentation.

.2 The Contractor shall be responsible for providing the as built documentation as identified in this specification. The as built shop drawings shall be delivered to the Architect prior to the substantial performance date. The as built drawing shall be delivered within one month of the substantial performance date.

1.13 TRAINING

.1 The Contractor shall be responsible to provide the training identified in this specification.

.2 The equipment and systems to be trained, as minimum, shall include:
.1 Plumbing and Drainage Systems
.2 Rooftop heating and air conditioning systems
.3 Mechanical systems
.4 Cold room structure and associated mechanical and electrical systems
.5 HVAC Controls and Building Automation System
.6 Power distribution system
.7 Lighting and Lighting Control
.8 Refrigeration Units
.9 Life Safety System

.3 Training to be conduction onsite

.4 Reviewed by Consultant operating and maintenance manuals shall be available prior to schedule the training

.5 Each training session shall be structured to cover:
.1 The operating and maintenance manual
.2 Operating procedures

.3 Maintenance procedures
.4 Trouble-shooting procedures
.5 Spare parts required
.6 Warranty details

.6 Submit a course outline to the Consultant before training commences. Provide course documentation for up to eight people.

.7 The training sessions shall be scheduled and co-ordinated by the Commissioning Consultant.

.8 Contractor shall allocate 50 hours for training. Training shall occur is multiple sessions. Owner will decide the sessions.

.9 When each training session has been completed The Owner or the Commissioning Consultant shall sign the associated form to verify completion

1.14 SYSTEM DEMONSTRATION AND TURNOVER

.1 The Contractor shall be responsible for conducting and providing the documentation identified in this specification for the turn over process to LCBO. All deficiencies and work not completed shall be identified.

.2 The system demonstration and turnover to The Owner shall occur when:
.1 The installation is complete and all deficiencies have been completed.
.2 The acceptance test conducted by the Consultant has been completed successfully
.3 The Commissioning Consultant system functional testing has been completed successfully for the mechanical and electrical systems including the cold room system
.4 Training has been completed
.5 Operating and Maintenance Manuals have been accepted
.6 Shop-drawings have been updated
.7 As-built drawings have been completed

.3 The systems demonstration shall be conducted by the Contractor and the manufacturers. The demonstration shall cover a demonstration of equipment installation and operation.

1.15 SEASONAL COMMISSIONING

.1 The Contractor shall be responsible for conducting seasonal testing on equipment not tested prior to the substantial performance date. This work shall be scheduled with the LCBO and the Architect. When the work has been completed the Contractor shall demonstrate the operation of the systems to the Consultants and the Commissioning Consultant.

1.16 WARRANTIES

.1 Equipment and system warranties shall not begin until the system demonstration and turnover has been conducted successfully and accepted by The Owner.

.2 The Contractors shall fill out the warranty form listing the equipment and systems and the start and finishing dates for warranty.

.3 Refer to the general conditions specification section for the requirements during the warranty period.

1.17 COMMISSIONING CONSULTANT

.1 A Commissioning Consultant (CC) reports to the Owner.

.2 The CC responsibilities shall include:

- .1 preparing the commissioning plan
- .2 co-ordinating with the Contractor to schedule tests
- .3 preparing a test form manual
- .4 witnessing selected tests
- .5 receiving all test forms
- .6 witness Contractors system demonstrations
- .7 conducting functional and performance tests as applicable
- .8 co-ordinating the Contractors training

.3 The Contractor shall co-operate with the CC.

.4 The Contractor shall provide assistance to the CC and have personnel available during the functional tests. Each system shall be tested in the operational mode.

.5 Performance testing shall begin when all systems have been completed, tested by the Contractors and the Consultant has completed their final review.

1.18 COMMISSIONING PROCESS ALLOCATION

.1 The commissioning process shall be allocated a value equal to 8% of the mechanical contract price, 5% of the electrical contract price, 5% of the refrigeration contract price.

.1 Mechanical 8%

HVAC	1.75
Plumbing	1.75
BAS	1.75
Performance Tests (Functional Testing)	2.25
Training	0.5
Total	**8.0%**

Electrical 5%	
Electrical Distribution	1.25
Lighting Distribution	1.25
Performance Tests (demonstrate lighting Circuited according to the drawings)	2.0
Training	0.5
Total	**5.0%**

Cold Room 5%	
Equipment Startup	3.0
Performance Test	2.0
Total	**5.0%**

.2 The Contractors shall submit all test and verification forms. The Consultant may use these forms to compile deficiency lists.

END OF SECTION

1.01 GENERAL

.1 Allowances included herein are for items of Work which could not be fully quantified prior to Bidding.

.2 Expend each allowance as directed by the Consultant in writing. Work covered by allowances shall be performed for such amounts and by such persons as directed by Consultant.

.3 Each allowance will be adjusted to actual cost as defined hereunder and the Contract Price will be amended accordingly by Contract Change Order.

.4 Progress payments for Work and Products authorized under allowances will be made in accordance with the payment terms set out in Conditions of the Contract.

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

.6 Where a Cash Allowance is for work performed under a Subcontract, the Contractor shall Bid the work involved and submit the Bids received, with the Contractor's recommendations, for approval.

1.02 CASH ALLOWANCE(S)

.1 Cash allowances, unless otherwise specified, cover the net cost to the Contractor of services, Products, construction machinery and equipment, freight, handling, unloading, storage, installation where indicated, and other authorized expenses incurred in performing the Work. Cash allowances shall not be included by a Subcontractor in the amount for their Subcontract work.

.2 Supply only allowances shall include:

- .1 Net cost of Products.
- .2 Delivery to Site.
- .3 Applicable taxes and duties, excluding HST.

.3 Supply and install allowances shall include:

- .1 Net cost of Products.
- .2 Delivery to Site.
- .3 Unloading, storing, handling or Products on Site.
- .4 Installation, finishing and commissioning of Products.
- .5 Applicable taxes and duties, excluding HST.

.4 Inspection and testing allowances shall include:

- .1 Net cost of inspection and testing services.
- .2 Applicable taxes and duties, excluding HST.

.5 Other costs related to work covered by cash allowances are not covered by the allowance but shall be included in the Contract Price.

.6 Where costs under a cash allowance exceed the amount of the allowance, the Contractor will be compensated for any excess incurred and substantiated plus an allowance for overhead and profit as set out in the Contract Documents.

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

.8 Submit, before application for final payment, copies of all invoices and statements from suppliers and Subcontractors for work which has been paid from cash allowances.

.9 Include in the Stipulated Total Price quoted, the following cash allowances:

.1 Miscellaneous Site Conditions - **$ 20,000.00**

END OF SECTION

1.01 GENERAL

.1 Co-ordination of the work of all Sections of the Specifications as required to complete the Project is the responsibility of the Contractor.

.2 The Contractor will be deemed to possess the necessary technical skills to carefully evaluate all requirements of the Contract, and to have included in the Stipulated Price all project co-ordination and supervision for the proper implementation of these requirements.

.3 Entry by the Owner's own forces and by Other Contractors shall not mean acceptance of the Work and shall not relieve the Contractor of their responsibility to complete the Contract.

.4 Placing, installation, application and connection of work by the Owner's own forces or by Other Contractors on and to the Contractor's Work shall not relieve the Contractor of his responsibility to provide and maintain the specified warranties.

.5 Coordinate with removals/installations specified in other Divisions and Other Contracts.

1.02 RELATED MECHANICAL AND ELECTRICAL WORK

.1 Co-ordination of the installation of systems specified in Divisions 22, 23, 26 and 28, including the interrelating operation and functioning between components of a system and between systems, is the responsibility of those performing the work of Divisions 22, 23, 26, and 28, with final co-ordination the responsibility of the Contractor.

.2 Conceal pipes, ducts, control systems and electrical distribution systems within wall, floor and ceiling construction except where indicated otherwise.

.3 Ensure that service poles, pipes, conduit, wires, fill-pipes, vents, regulators, meters and similar Project service installations are located in inconspicuous locations. If not indicated on Drawings, verify location of service installations with Consultant before commencing installation.

1.03 QUALITY ASSURANCE

.1 Requirements of Regulatory Agencies:
Co-ordinate requirements of jurisdictional authorities.

.2 Quality Control:

.1 Ensure that the Work meets specified requirements.

.2 Schedule, supervise and co-ordinate inspection and testing as specified in Section 01 45 00. REN.

.3 Schedule, supervise and co-ordinate the commissioning process as specified in Section 01 45 00 REN.

.3 Job Records:
Maintain job records and ensure that records are maintained by Subcontractors.

1.04 SUBMITTALS

.1 Schedule and expedite submission of specified submittals.

.2 Review submittals and make comments as specified in Section 01 33 00.

.3 Ensure that each original submission, and their subsequent revisions and re-submissions are made on schedule.

.4 Consultant to provide submittals schedule, and keep updated submittals log to be reviewed at site meetings.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

.1 Ensure that conditions within the building are maintained and that the Work proceeds under conditions meeting specified environmental requirements.

.2 Ensure that protection of adjacent property and the Work is adequately provided and maintained to meet specified requirements.

1.06 WARRANTIES

.1 Ensure that warranties are provided as specified. All warranties to start on the date of Substantial Completion.

.2 Co-ordinate warranty conditions of interconnected work to ensure that full coverage is obtained.

1.07 CO-ORDINATION

.1 Review Contract Documents and advise the Consultant of possible conflicts between parts of the Work before preparation of shop drawings, ordering of products or commencement of affected work.

.2 Co-ordinate all work in each area and work on which subsequent work depends to facilitate mutual progress, and to prevent conflict between parts of the Work.

.3 Ensure that each Section makes known, for the information of the Contractor and other Sections, the environmental and surface conditions required for the execution of its work; and that each Section makes known the sequence of others' work required for installation of its work.

.4 Ensure that each Section, before commencing its work, knows requirements for subsequent work and that each Section is assisted in the execution of its preparatory work by Sections whose work depends upon it.

.5 Concealment of Supports and Services:

.1 Unless otherwise indicated on Drawings, and/or approved, conceal from view supports, braces, pipes, ducts, tubing, conduit and wiring by construction in finished areas.

.2 Clarify with Consultant the intent of concealment wherever it is in doubt.

.3 Ensure that concealed supports and services are installed and tested, and approved, in ample time for installation of proper concealing construction in accordance with construction schedule.

.4 Ensure that work to be enclosed within ceiling and/or wall spaces can be so accommodated without interference with other parts of the Work.

.6 Existing equipment shall remain in present locations unless designated otherwise. Protect from damage. Remove, store and reinstall existing fixed equipment, fixtures and components which interfere with construction and which are scheduled for relocation.

.7 Make provision for unrestricted relocation of light fixtures to replace ceiling panels at grid spaces of the same size, without interference or restriction by items located within the ceiling space.

.8 Where supports or openings are to be left for the installation of various parts of the Work furnish the necessary information to those concerned in ample time so that proper provision can be made for such items. Have cutting, drilling and other remedial work, and the subsequent patching or other work required for failing to comply with this requirement, performed at a later date at no additional Cost to Owner.

,9 Properly coordinate the work of the various Sections and trades, taking into account the existing installations to assure the best arrangement of pipes, conduits, ducts and mechanical, electrical and other equipment, in the available space. Under no circumstances will any extra payment be allowed due to the failure by the Contractor to coordinate the work. If required, in critical locations, prepare interference and/or installation drawings showing the work of the various Sections as well as the existing installation, and submit these drawings to the Consultant for review before the commencement of work.

.10 Deliver materials supplied by one Section to be installed by another well before the installation begins.

.11 Ensure that setting drawings, templates, and all other information necessary for the location and installation of materials, holes, sleeves, inserts, anchors, accessories, fastenings, connections, and access panels are provided by each Section whose work requires co-operative location and installation by other Sections, and that such information is communicated to the applicable installer.

.12 Sections giving installation information in error, or too late to incorporate in the Work, shall be responsible for having additional work done which is thereby made necessary.

.13 Remove and replace work installed in error which is unsatisfactory for subsequent work.

1.08 CUTTING AND PATCHING

.1 Before cutting, drilling, or sleeving structural load-bearing elements, obtain approval of location and methods.

.2 Do not endanger the Work or property by cutting, digging, or similar activities. No Section shall cut or alter work of another Section unless such cutting or alteration is approved by the latter Section.

.3 Cut and drill with true smooth edges and to minimum suitable tolerances.

.4 Fit construction tightly to ducts, pipes and conduits to stop air movement completely. The Section performing Work that penetrates a fire, air, vapour, moisture, thermal or acoustic separation of the building shall pack voids tightly with rock wool; seal air, vapour and moisture barriers; and caulk joints as may be required to ensure that no air movement through the penetration is possible.

.5 Cutting, drilling and sleeving of work shall be done only by the Section who has installed it. The Section requiring drilling and sleeving shall inform the Section who has installed the work to be drilled or sleeved of the location and other requirements for drilling and sleeving.

.6 Replace, and otherwise make good, damaged work.

.7 Cutting and Patching for Holes and Chases, Bulkheads and Furring required by Mechanical and Electrical Work:

.1 Perform cutting or provision of holes up to and including 320 sq.cm and related patching by Division 22 or Division 26 as applicable.

.2 Provide holes and other openings larger than 320 sq.cm, and chases, bulkheads, furring and required patching by Section 01 31 13 who shall be responsible for determination of requirements for holes in excess of 320 sq.cm.

.8 Section 01 31 13 shall be responsible for all cutting and patching in addition to that specified for mechanical and electrical installations, and shall directly supervise performance of cutting and patching by other Sections.

.9 Patching or replacement of damaged work shall be done by the Subcontractor who provided it and at the expense of the Subcontractor who caused the damage. The Contractor shall be responsible for the co-ordination of such patching or replacement.

.10 Make patches invisible in final assembly.

1.09 BUILDING DIMENSIONS

.1 Take necessary job dimensions for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions, and for coordination.

.2 Verify that work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent work, as set out by requirements of the Drawings, and ensure that work installed in error is rectified before construction resumes.

.3 Check and verify dimensions referring to the work and the interfacing of services.

.4 Do not scale directly from the Drawings. If there is ambiguity or lack of information, immediately inform the Consultant. Changes through the disregarding of this clause shall be the responsibility of the Contractor.

.5 All details and measurements of any work which is to fit or to conform with work installed shall be taken at the building.

.6 Advise Consultant of discrepancies and if there are omissions on Drawings, particularly reflected ceiling plans and jointing patterns for surfaces finishes, which affect aesthetics, or which interfere with services, equipment or surfaces. Do not proceed with work affected by such items without direction from the Consultant.

.7 Provide written requirements for site conditions and surfaces necessary for the execution of respective work, and provide setting drawings, templates and all other information necessary for the location and installation of material, holes, sleeves, inserts, anchors, accessories, fastenings, connections and access panels. Inform respective contractors whose work is affected by these requirements and preparatory work.

1.10 INTERFERENCE AND COORDINATION DRAWINGS

.1 Coordinate placement of equipment to ensure that components will be properly accommodated within the spaces provided prior to commencement of work.

.2 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the spaces provided. Provide copies of interference drawings to Consultant when requested by Consultant.

.3 Prepare drawings to indicate coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus, and connections are coordinated.

.4 Take complete responsibility for any remedial work that results from failure to coordinate any aspect of the Work prior to its fabrication/installation.

.5 Ensure that accesses and clearance required by jurisdictional authorities and/or for easy maintenance of equipment are provided in the layout of equipment and services.

1.11 EXCAVATION AND BACKFILL

.1 Cutting of existing concrete and pavements, trenching, backfilling, and repair of exiting concrete and pavements for underground mechanical and electrical services will be the responsibility of Division 22 and 26 respectively.

.2 All work shall be performed in accordance with the requirements of Divisions 01, 03, 22, 26.

1.12 ACCESS PANELS

.1 The General Contractor shall co-ordinate the installation of all access and inspection panels supplied by Mechanical and Electrical Contractors for installation by other trades.

END OF SECTION

1.01 PRECONSTRUCTION MEETING

.1 As soon as possible after award of Contract, arrange a meeting between the Consultants, Building Commissioning Consultants (BCC), Subcontractors, Project Superintendents, Inspection and Testing Company Representatives, and Representatives of others whose co-ordination is required during construction.

.2 Discuss at the meeting the means by which full co-operation and co-ordination of the participants during construction can be achieved.

.3 Document the responsibilities and necessary activities of the participants during construction as discussed, and distribute documentation to each participant.

1.02 PROJECT MEETINGS

.1 Hold site meetings at regular intervals during construction in order to co-ordinate the work of Subcontractors. Establish meeting schedule with Consultant at the beginning of construction. Meetings shall fall at the same time of each week in which they are scheduled.

.2 Ensure that responsible representatives, from offices and site forces, of Contractor and Subcontractors attend. Representatives of Owner, Consultant, and consultants shall also be permitted to attend.

.3 Inform Owner, Consultant, consultants, and the others whose attendance is required of the date of each meeting, in sufficient time to enable them to arrange for their presence.

.4 Prepare an agenda for each meeting; and make available, to all those concerned, information required for the resolution of problems to be discussed.

.5 Consultant to chair meeting and to prepare and distribute meeting minutes to all parties involved in project within 48 hours.

.6 Provide a Laptop computer with internet access and printer/scanner in the temporary Site Office for the duration of the project for the Consultants, Contractors, and Owner's use.

.7 At each meeting include a review of the quality control and commissioning process and report on their progress. The BCC will attend some selected meetings.

END OF SECTION

1.01 GENERAL

.1 Provide labour, Products, equipment, services tools and supervision necessary for submittals. Make submittals specified in this Section to Consultant unless otherwise specified.

- .1 Verify accuracy and completeness of submittals prior to submission.
- .2 Verify field measurements, field construction criteria, catalogue numbers and similar data.
- .3 Co-ordinate each submittal with requirements of the Work and the Contract Documents.
- .4 Notify Consultant in writing at time of submission, of any deviation in submittals from requirements of the Contract Documents.

.2 Submit in accordance with dates established under Section 01 11 00 for shop drawings, fabrication, manufacture, erection and installation to provide adequate time for reviews, securing necessary approvals, possible revisions and resubmittals, placing orders, securing delivery and to avoid construction delays.

.3 Accompany each submittal with a letter of transmittal in duplicate containing all pertinent information required for identification and checking of submittals including but not limited to the following:

- .1 Date of initial submission and date of each subsequent submission if required.
- .2 Project title and Consultant's project number.
- .3 Names of:
  - .1 Contractor.
  - .2 Subcontractor.
  - .3 Supplier/manufacturer as applicable.
- .4 Specification section numbers to which submission is related.
- .5 Countersigned stamp of Contractor certifying that they have reviewed the submission.

.4 Allow one week for the Consultant's review of each submission.

.5 When submittals are resubmitted, transmit under a new letter of transmission.

.6 Do not carry out Work until Consultants review of submittals has been completed.

.7 Be responsible for payment of charges for delivery of submissions and resubmission to Consultant.

1.02 CONSTRUCTION SCHEDULES

.1 Submit proposed construction schedule at beginning of Project, as specified in Section 01 11 00.

.2 As construction progresses, submit up-dated construction schedules each month to Owner, Consultant, and to each Subcontractor who is included on Schedule.

1.03 SHOP DRAWINGS

.1 Submit shop drawings for which submission is required in other Sections of the Specifications. Include in final shop drawings submissions detailed information, templates and installation instructions required for incorporation and connection of the work concerned. Submissions of all paint drawdowns and finish samples to be used in the Project for all relevant finishes must be submitted to the LCBO Design Co-ordinator for sign-off approval as a requirement of the Contract.

.2 In addition to shop drawings specified in other Sections, submit shop drawings required by jurisdictional authorities in accordance with their requirements.

.3 The Contractor shall check, sign, and make notations he considers necessary on shop drawings before each submission.

.4 Indicate on each submission changes from the Contract Drawings and Specifications that have been incorporated in the shop drawings. The Contractor shall be responsible for changes made from the Contract Drawings and Specifications that are not indicated or otherwise communicated in writing with the submission.

.5 Shop drawing review by Consultant or consultants is for the sole purpose of ascertaining general conformance with the design concept. This review shall not mean that Consultant and consultants warrant or represent that the information contained on the shop drawings is either accurate or complete, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting design, details and all other requirements of the Contract Documents.

.6 Contract Drawings and Specifications take precedence over shop drawings.

.7 The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for co-ordination of the work of all Subcontractors.

.8 Incorporate only dimensional system utilized for Drawings, except where substitutes are otherwise approved. Make soft conversions from metric system to imperial, or vice versa, when required for incorporation of units of one-dimensional system into construction of the other.

.9 Show on shop drawings:

- .1 Clear and obvious notes of any proposed changes from Drawings and Specifications.
- .2 Fabrication and erection dimensions.
- .3 Provisions for allowable construction tolerances and deflections provided for live loading.
- .4 Details to indicate construction arrangements of the parts and their connections, and interconnections with other work.
- .5 Location and type of anchors, and exposed fastenings.
- .6 Materials and finishes.
- .7 Physical dimensions of materials including thickness and gauges.
- .8 Descriptive names of equipment.
- .9 Mechanical and electrical characteristics when applicable.

.10 Information to verify that superimposed loads will not affect function, appearance, and safety of the work detailed as well as of interconnected work.

.11 Assumed design loadings, and dimensions and material specifications for load-bearing members.

.12 Dimensions and dimensioned locations of proposed chases, sleeves, cuts, and holes in structural members.

.13 All shop drawings of structural components or components that are to withstand dead loads, live loads and/or wind/horizontal loads shall be sealed and signed by a registered professional engineer.

.10 Shop drawing submission procedure:

.1 General contractor to submit one copy of shop drawings on sheets not larger than 280 mm x 430 mm to respective consultants for review and comment as follows:

.1 Submit millwork shop drawings to the interior design consultant.

.2 Submit architectural shop drawings to the architect.

.2 Submit structural, electrical and mechanical shop drawings directly to the respective engineer.

.2 Consultants will forward reviewed shop drawings to the architect either in hardcopy or a scanned copy by email.

.3 Architect will forward reviewed shop drawings to LCBO project coordinator for review and comment.

.4 LCBO project coordinator will review and forward a scanned copy to the general contractor and respective consultants.

.11 Shop drawings which require extensive correction will be sent back for revisions and resubmission. Otherwise, shop drawings will be sent back with review comments only.

.12 Only drawings noted for revision and resubmission need be resubmitted.

.13 Do not add new details or information to shop drawings after they have been finally reviewed, except when approval is given.

.14 Do not proceed with work dependent on shop drawing information until they have been reviewed and accepted by LCBO and LCBO consultants and verification is received from Contractor. Approval shall not relieve the Contractor of his responsibility for execution of the Work in accordance with Contract Documents.

.15 Fabricate work exactly as shown on shop drawings. If shop practice dictates revisions, revise drawings and resubmit.

.16 File one copy of each finally revised and corrected shop drawings at site.

.17 **LIST OF REQUIRED SHOP DRAWINGS TO BE SUBMITTED IN A TIMELY MANNER BY CONTRACTOR TO LCBO DESIGN CO-ORDINATOR, COPIED TO ALL RELEVANT DESIGN CONSULTANTS:**

(This list may not reflect all shop drawings required. It is the responsibility of the contractor to ensure that all requirements for submittals are met as specified.)

Shop Drawings required:
Structural Steel – **Must be engineer-stamped.**
Automatic Doors – Beer Cold Room

Full ht metal stud partitions (engineer stamped)
Beer Cold Room Panels (supplied by Refrigeration vendor)
Entry Security Gates
Hardware

Drains
Plumbing Fixtures and Trim
Plumbing Specialties
Fans
Fire Dampers
Grilles and Diffusers

Smoke Detector (installed in Ductwork)
Controls for A/C Units, Fans, etc.

Relevant Sections for Shop Drawings:
a.. Section 05 50 00, Metal Fabrication
b.. Section 06 20 00, Finish Carpentry (millwork + trim)
c.. Section 08 70 00, Finishing Hardware.
d.. Section 11 40 00, Catalogued Equipment.

Catalogue cuts required:

Drains

Grilles and Diffusers
Controls for A/C Units, Fans, etc.

1.04 PRODUCT DATA

.1 Before delivery of Products to the Site, submit Product data as specified in each section or as requested by the Consultant.

.2 Submit manufacturer's Product data for systems, materials, and methods of installation proposed for use. Such literature shall identify systems, each component, and shall certify compliance of each component with applicable standards.

1.05 SAMPLES

.1 Submit samples for which submission requirement is specified in other Sections of the Specifications.

.2 Submit samples in duplicate of adequate size to represent the material in its intended use on Project. Submit an extreme range of samples when the degree of marking or colour cannot be represented by a single sample.

.3 Label samples with Project name, number, Contractor, and date.

.4 Include in the Work cost of delivery and handling, assembly, and return to supplier of samples.

.5 If sample is disapproved, both samples will be returned. If sample is approved, one sample will be returned, marked "Reviewed".

.6 Reviewed samples shall serve as a model against which the products incorporated in the Work shall be judged.

.7 Each product incorporated in the Work shall be precisely the same in all details as the reviewed sample.

.8 Should any change of material, colour, texture, finish, dimensions, performance, function, operation, construction, joining, fastening, fabrication techniques, service characteristics, and other qualities be made to a product after approval has been given, submit for approval of the revised characteristics in writing and resubmit samples of the product for review if requested.

.9 When samples are very large, require assembly, or require evaluation at the site, they may be delivered to the site, as directed.

Relevant Sections for Samples (This list may not reflect all samples required. It is the responsibility of the contractor to ensure that all requirements for submittals are met as specified.):

a. Section 07 92 00 Sealants
b. Sections 09 21 16 and 09 51 00 Suspended Ceiling Systems.
c. Section 09 21 16, Gypsum Board (trim).
d. Section 09 30 00, Ceramic and Porcelain Tile
f. Section 09 91 00, Paint.

1.06 PROJECT RECORD DRAWINGS

.1 Record, as the Work progresses, work constructed differently than shown on Contract Documents. Record all changes in the Work caused by site conditions; by Owner, Consultant, Contractor, and Subcontractor originated changes; and by site instructions, supplementary instructions, field orders, change orders, addendums, correspondence, and direction of jurisdictional authorities. Accurately record location of concealed structure, and mechanical and electrical services, piping, valves, conduits, pull boxes, junction boxes and similar work not clearly in view, the position of which is required for maintenance, alteration work, and future additions. Do not conceal critical work until its location has been recorded.

.2 White prints will be provided by the Consultant at no cost to the Contractor for each Section in which record drawings are required. Record changes in the Work on these prints in red ink.

.3 Dimension location of concealed work in reference to building walls, and elevation in reference to floor elevation. Indicate at which point dimension is taken to concealed work. Dimension all terminations and offsets of runs of concealed work.

.4 Make records in a neat and legibly printed manner with a non-smudging medium.

.5 Identify each record drawing as "Project Record Copy". Maintain drawings in good condition and do not use them for construction purposes.

.6 Maintain Project record drawings in a state current to Project. Such state will be considered a condition precedent for validation of applications for payment. The Consultant's visual inspection will constitute proof that record drawings are current.

.7 Provide Consultant with accurate, red-marked record drawings for their transfer to AutoCAD with application for Certificate of Substantial Performance. Final acceptance of the Work will be predicated on receipt and approval of record drawings.

1.07 REVISIONS SCHEDULE

.1 Contractor shall provide a Revisions and Miscellaneous Outstanding Items schedule at each site meeting.

1.08 AFFIDAVITS

.1 Submit affidavits which may be required, or which may be requested in other Sections of the Specifications.

.2 Affidavits shall verify that products and/ or methods meet requirements specified in the Contract Documents and shall include test reports of approved testing laboratories to validate claims contained in affidavit.

.3 Submit affidavits in duplicate and signed and notarized by a responsible officer of the certifying company.

1.09 EXTENDED WARRANTIES

.1 Submit the extended warranties as specified in each applicable Section of the Specifications.
.2 Extended warranties shall commence on termination of the standard one year warranty granted in this Contract and shall be an extension of these same provisions.
.3 Submit each extended warranty in an approved uniform format.

1.10 PROJECT CLOSEOUT DOCUMENTATION

.1 Submit one digital copy of Project Data Book at completion of Project on application for Certificate of Substantial Performance to Consultant FTP site for review.
.2 Submit with digital copy of Project Data Book, scanned copies of each final approved shop drawing issued for Project on which have been recorded changes made during fabrication and installation caused by unforeseen conditions.
.3 Submit with Project Data Book together with extended warranties in one digital file.
.4 The Project Data Book digital file shall:
    .1 Have a title sheet, or sheets preceding data on which shall be recorded Project name, date, list of contents, and Contractor's and Subcontractors' names and addresses.
    .2 Contain only typed or printed information and notes, and neatly drafted drawings.
    .3 Contain maintenance and operating instructions on all building, and mechanical and electrical equipment.
    .4 Contain maintenance instructions as specified in various Sections.
    .5 Contain brochures and parts lists on all equipment.
    .6 Contain a list of manufacturers and trade names of finishes and coatings applied.
    .7 Contain sources of supply for all proprietary products used in the work.
    .8 Contain lists of supply sources for maintenance of all equipment in Project of which more detailed information is not included above.
    .9 Contain finished hardware schedule.
    .10 Contain charts, diagrams and reports specified in Divisions 22 and 26.
    .11 Contain final approved shop drawings.
.5 Consultants to review Project Data Book digital file and provide comments to the Contractor once they complete their review.
.6 Contractor to address the outstanding issues with the applicable Consultant, to the Consultant’s satisfaction, before uploading the FINAL Project Data Book to the Consultant FTP site.
.7 Contractor is to submit to Owner one hard copy of the FINAL Project Data Book:
    .1 Bound in a hard-cover, black, vinyl-covered, loose-leaf, letter size binder.
    .2 Be organized into applicable Sections of work with each Section separated by hard paper dividers with plastic covered tabs marked by Section.
    .3 DO NOT include hard copies of approved shop drawings.
.8 Consultant to submit to Owner:
    .1 Two cd/dvd copies of the FINAL Project Data Book, including Consultant’s Record drawings in both CAD and PDF format.
    .2 One full Record drawings set at 11”x17” folded and with three-hole punching.

1.11 EXTRA MATERIALS

.1 Supply extra materials at completion of Project as specified in other Sections of the Specifications.

.2 Deliver extra materials as directed by the Owner to location he designates.

.3 Extra materials submitted as specified will consist of a maximum of one box, carton, crate, unit or tub of the specified material, not exceeding 3% of the overall material used for the project. Confirm with LCBO Project Coordinator final submission of extra material.

1.12 INSPECTION COMPANY REPORTS

.1 Submit copies of test reports as specified in other Sections of the Specifications for "Source Quality Control" and "Field Quality Control" immediately after they are completed.

.2 Submit three (3) copies of each report unless specified otherwise and signed by a responsible officer of the inspection and testing company.

.3 Submit an additional report directly once completed to:

.1 Applicable design engineer.

.2 The Contractor.

.3 Jurisdictional authorities when such reports are required by them.

1.13 COST BREAKDOWN

.1 Submit a complete cost breakdown within ten (10) working days of notification of award of contract.

1.14 PROGRESS BILLING

.1 Co-ordinate progress billing with cost breakdown.

.2 Include gross and net value of work completed during billing period.

.3 Include running total of gross and net value of work completed by the end of the billing period.

1.15 PRICING OF CHANGES TO WORK

.1 Submit with quotations for changes to the work detailed estimate sheets showing initial and revised quantities of labour, materials and equipment, and the related unit costs.

.2 Payment for use of small tools, travelling, out-of-town accommodations and preparation of price change submittals will be considered a part of overhead as specified in Supplementary General Conditions, issued under separate cover.

1.16 COMMISSIONING REPORTS

.1 Submit copies of commissioning reports prior to substantial performance, to Consultant for review. All commissioning reports identified in section 01 45 00 1.11 shall be submitted as part of the project close out documentation.

END OF SECTION

1.01 GENERAL

.1 Provide Labour, Products, equipment, services, tools and Supervision to ensure that Work complies with minimum acceptable standards of materials and performance of Work in accordance with codes and standards referenced in the Specification.

.2 Consider contract forms, codes, Specifications, standards, manuals, and installation and application instructions referred to in these specifications to be the latest published editions at the date of submission of the bid unless otherwise stated in the Specifications or otherwise required by the authorities having jurisdiction.

1.02 JURISDICTIONAL AUTHORITIES

.1 Where reference is made to jurisdictional authorities, it shall mean all authorities who have within their constituted powers the right to enforce the laws of the place of building.

.2 Requirements of jurisdictional authorities shall apply to the Work in precedence to the requirements of the Contract Documents, except that more stringent requirements of the Contract Documents shall take precedence over requirements of jurisdictional authorities.

.3 The Contractor shall carry out all work in full compliance with the requirements of the Municipal, Provincial and National Authorities having jurisdiction.

.4 The General Contractor and all sub-contractors shall adhere to the hours of work, the working conditions and rate of wages paid under prevailing local conditions and/or requirements, paying not less than minimum wages established by customary standard in the locality for the same or similar class of work.

.5 The Owner or Owner’s Designee shall be responsible for obtaining and paying for the Building Permit.

.6 The Contractor shall be responsible for obtaining and paying for all other necessary permits and relative inspection fees and no work shall commence until all permits are obtained.

1.03 FIRE PREVENTION AND SAFETY

.1 Enforce fire protection methods, good housekeeping, and adherence to local and underwriter's fire regulations.

.2 Fires will not be permitted on the site. Remove combustible and non-combustible waste at regular intervals and/or when directed. Precautions shall be taken to avoid fire by spontaneous combustion. Smoking shall be prohibited, post "No Smoking" signs.

.3 Provide ULC approved fire extinguishers, and other fire fighting services and equipment except where more explicit requirements are specified as the responsibility of individual Sections.

.4 Provide and maintain in good working order at least one (1) or as many as required, 2A 10BC fire extinguisher which shall be prominently placed and on the job from commencement of work until completion.

.5 Maintain clear emergency exit paths for personnel at all times.

.6 Use only fire resistant tarpaulins and similar protective covering on site.

1.04 REQUIREMENTS OF REGULATORY AGENCIES

.1 Work shall include protection measures consisting of materials, constructions and methods required by The Occupational Health and Safety Act of the Province of Ontario, and as otherwise imposed by jurisdictional authorities to save persons and property from harm.

.2 Ensure that pollution and environmental control of construction activities are exercised as required during the Work.

.3 Except where special permission is obtained, maintain clear access for roads and sidewalks on private or public property.

.4 Maintain roads and sidewalks clear of construction materials and debris, including excavated material. Clean roads and sidewalks as frequently as required to ensure that they are cleared of materials, debris and excavated material. Ensure that all driveways designated as fire routes by authorities having jurisdiction are kept clear at all times.

.5 Remove snow and ice from sidewalks as required.

1.05 REFERENCE STANDARDS AND CODES

.1 Where edition date is not specified, consider that references to manufacturer's and, published codes, standards and specifications are made to the latest edition (revision) approved by the issuing organization, current at the date of the Specifications.

.2 Reference standards, codes, and specifications are quoted in the Specifications to establish minimum standards. Work of quality or of performance characteristics that exceeds these minimum standards will be considered to conform.

.3 Should the Contract Documents conflict with specified reference standards, codes, or specifications, the more stringent in each case shall govern.

.4 Where reference is made to manufacturer's directions, instructions or specifications they shall include full information on storing, handling, preparing, mixing, installing, erecting, applying or other matters concerning the materials pertinent to their use and their relationship to materials with which they are incorporated.

.5 Have a copy of each code, standard and specification, and manufacturer's directions, instructions and specifications, to which reference is made in the Specifications, always available at construction site.

.6 Standards, specifications, associations, and regulatory bodies are generally referred to throughout the specifications by their abbreviated designations. These are, but not necessarily limited to:

AA	-	The Aluminum Association
AAMA	-	Architectural Aluminum Manufacturers Association
ACI	-	American Concrete Institute
AISI	-	American Iron and Steel Institute
ANSI	-	American National Standards Institute
ASTM	-	American Society for Testing and Materials
AWI	-	Architectural Woodwork Institute
AWMAC	-	Architectural Woodwork Manufacturers Association
CGSB	-	Canadian General Standards Board (designated CAN2)

CISC	-	Canadian Institute of Steel Construction
CPMA	-	Canadian Paint Manufacturers Association
CSA	-	Canadian Standards Association (designated CAN3)
CSSBI	-	Canadian Sheet Steel Building Institute
MTC	-	Ministry of Transportation and Communications,
OAA	-	Ontario Association of Architects
OBC	-	Ontario Building Code
OGCA	-	Ontario General Contractors Association
SAE	-	Society of Automotive Engineers
ULC	-	Underwriters Laboratories of Canada
ULI	-	Underwriters Laboratories Incorporated

1.06 EXISTING PUBLIC SERVICE LINES

.1 Where existing public services are indicated to be removed and/or relocated, perform Work in compliance with authorities having jurisdiction.

.2 Make good public roads, walkways and curbs soiled or damaged due to construction to the requirements of local authorities.

1.07 FIRE RATINGS, ASSEMBLIES AND SEPARATIONS

.1 Where a material, component, assembly, or separation is required to be fire rated, the fire rating shall be as determined or listed by one of the following testing authorities acceptable to the authorities having jurisdiction:

.1 Underwriters' Laboratories of Canada.

.2 Underwriters' Laboratories Inc.

.3 Factory Mutual Laboratories.

.4 The National Research Council of Canada.

.5 The National Board of Fire Underwriters.

.6 Intertek Testing Services.

.2 Where reference is made to only one testing authority an equivalent fire rating as determined or listed by another of the aforementioned testing authorities is acceptable if approved by authorities having jurisdiction. Obtain and submit such approval of authorities, in writing when requesting acceptance of a proposed equivalent rating or test design.

.3 Fire rated door assemblies shall include doors, frame, anchors, and hardware and shall bear label of fire rating authority showing opening classification and rating.

.4 Material having a fire hazard classification shall be applied or installed in accordance with fire rating authorities printed instructions.

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

.6 Construct fire separations as continuous, uninterrupted elements except for permitted openings. Extend fire rated walls and partitions from floor to underside of structural deck above.

.7 Fire separations may be pierced by openings for electrical and similar service outlets provided such boxes are non-combustible and are tightly fitted and sealed with a ULC approved sealant for the assembly being sealed.

.8 Construction that abuts on or is supported by a non-combustible fire separation shall be constructed so that its collapse under fire conditions will not cause the collapse of the fire separation.

.9 Do not use combustible members, fastenings, attachments and similar items to anchor electrical, mechanical or other fixtures to fire separations.

.10 At penetration through fire rated walls, ceilings or floors, completely seal voids with ULC approved firestopping material; full thickness of the construction element. In locations that require a smoke seal, provide appropriate ULC approved system installed in accordance with the manufacturer's recommendations.

END OF SECTION

1.01 GENERAL

.1 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.

.2 Verify by certification that specified products meet the requirements of reference standards specified in the applicable specification sections.

.3 Conduct testing, balancing and adjusting of equipment and systems specified in applicable mechanical and electrical specifications sections by independent testing company.

.4 Related Requirements Specified Elsewhere:

.1 Inspections and testing required by the law, ordinances, rules and regulations of jurisdictional authorities: General Conditions of the Contract.

.2 Verification by affidavits and certification that specified products meet requirements of reference standards: In applicable Sections of the Specifications.

.3 Testing, balancing and adjusting of equipment: In applicable mechanical and electrical Sections of the Specifications.

.4 Cutting and patching: Section 01 31 13.

.5 Submission of inspection and testing reports: Section 01 33 00.

1.02 INSPECTION AND TESTING BY THE OWNER

.1 The Owner may appoint an independent inspection and testing company to carry out inspection and testing of the Work for conformance to the Contract Documents. Such costs for inspection and testing will be paid by the Owner. However, any additional inspection and testing due to non-conformance to the Contract Documents shall be at the Contractor's expense.

.2 Inspections and testing by the Owner will be promptly made. Uncover for examination any Work covered up prior to inspection or without approval of the Consultant. Make good such Work at no cost to the Owner.

.3 The Owner may inspect and test Products during manufacture, fabrication, shop testing, installation, construction and testing phases of the Contract. The Consultant will ascertain the quantity and quality of testing to be performed. Inspection and testing may be performed at the place of manufacture/fabrication, storage, or at the Site as designated by the Consultant. Where inspection and testing is done either during manufacture, fabrication, or at Site, ensure that proper facilities and assistance are provided.

1.03 INSPECTION AND TESTING

.1 Source And Field Quality Control specified in Other Sections:

.1 This Section includes requirements for performance of inspection and testing specified under Source Quality Control and Field Quality Control in other Sections of the specifications.

.2 Do not include in work of this Section responsibilities and procedures that relate solely to an inspection and testing company's functions that are specified in

another Section which is paid for directly by the Owner. Such information is included in this Section for Contractor's information only.

.2 Do not limit responsibility for ensuring that products and execution of the work meet Contract requirements, and inspection and testing required to this end, to specified inspection and testing.

1.04 QUALIFICATIONS OF INSPECTION AND TESTING COMPANIES

.1 Inspection and testing companies to be certified by the Standards Council of Canada.

.2 Companies engaged for inspection and testing shall provide equipment, methods of recoding and evaluation, and knowledgeable personnel to conduct tests precisely as specified in reference standards.

.3 If requested, submit affidavits and copies of certificates of calibration made by an accredited calibrator to verify that testing equipment was calibrated and its accuracy ensured within the previous twelve months.

1.05 RESPONSIBILITIES OF THE CONTRACTOR

.1 Be responsible for quality control methods and procedures to ensure performance of the work in accordance with the Contract Documents.

.2 The Contractor is responsible for the commissioning process in accordance with the specification Section 01 45 00

.3 Co-ordinate with the BCC and their scope of work identified in Section 01 45 00

1.06 RESPONSIBILITIES OF INSPECTION AND TESTING COMPANIES

.1 Determine from specifications and Drawings the extent of inspection and testing required for Work of the Contract. Subcontractors shall notify Consultant of any omissions or discrepancies in the work inspected and/or tested.

.2 Perform applicable inspection and testing described in the Specifications and as may be additionally directed.

.3 Provide competent inspection and testing personnel when notified by the Contractor that applicable work is proceeding. Inspection personnel shall cooperate with the Consultant and Contractor to expedite the Work.

.4 Subcontractors shall notify the Consultant and Contractor of deficiencies and irregularities in the Work immediately when they are observed in the course of inspection and testing.

5 Inspection and testing companies shall not perform or supervise any of the Contractor's work, and shall not authorize:

.1 Performance of work that is not in strict accordance with the Contract Documents.

.2 Approval or acceptance of any part of the Work.

1.07 INSPECTION AND TESTING PROCEDURES

.1 Perform specified inspection and testing only in accordance with specified reference standards, or as otherwise approved.

.2 Observe and report on compliance of the Work to requirements of Contract Documents.

.3 Ensure that inspectors are on site or at fabricator's operations for full duration of critical operations, and as otherwise required to determine that the Work is being performed in accordance with the contract Documents.

.4 Identify samples and sources of materials.

.5 Review and report on progress of the work. Report on count of units fabricated and inspected at fabricator's operations.

.6 Observe and report on conditions of significance to work in progress at time of inspection or at fabricator's operations. Include where applicable and if critical to the work in progress:

.1 Time and date of inspection.

.2 Temperature of air, materials, and adjacent surfaces.

.3 Humidity of air, and moisture content of materials and adjacent materials.

.4 Presence of sunlight, wind, rain, snow and other weather conditions.

.7 Include in reports all information critical to inspection and testing.

.8 Ensure that only materials from the work and intended for use therein are tested.

.9 Determine locations for work to be tested.

1.08 TOLERANCES FOR INSTALLATION OF WORK

.1 Unless acceptable tolerances are otherwise specified in a Section or are otherwise required for proper functioning of equipment, site services, and mechanical and electrical systems:

.1 "plumb and level" shall mean plumb or level within 1mm in 1m.

.2 "square" shall mean not in excess of 10 seconds lessor or greater than 90 degrees.

.3 "straight" shall mean within 1mm under a 1m long straightedge.

.2 Allowable tolerances shall not be cumulative.

1.09 MOCK-UPS

.1 Locate mock-ups where directed by Consultant.

.2 Approved mock-ups will establish the minimum acceptable quality of workmanship and will serve as the standard by which subsequent work will be judged acceptable.

.3 Resubmit mock-ups until approval is given by Consultant. Remove mock-ups that are designated as unsuitable.

.4 Do not proceed with work until mock-up has been approved. Only work which matches approved mock-up in all respects will be acceptable for Project.

.5 Retain each approved mock-up for duration of the Work and protect it from damage. Remove it upon Project completion, or incorporate it in the Project if so directed by Consultant.

1.10 REJECTED WORK

.1 Products and installations found defective; not in accordance with the Specifications; or defaced or damaged through negligence of the Contractor, his employees or Subcontractors, or by fire, weather or any other cause will be rejected for incorporation in the Work.

.2 Remove rejected products and work from the premises immediately.

.3 Replace rejected products and installations with no delay after rejection. Provide replacement products and execute replacement installations precisely as required by the Specifications for the defective products and installations replaced. Previous inspection and payment shall not relieve the Contractor from the obligation of providing sound and satisfactory products and installations in compliance with the Specifications.

1.11 COMMISSIONING

.1 The commissioning process is an integral part of the quality control that shall be provided by the Contractor, the Sub Contractors and the System Manufacturers. LCBO has hired a Building Commissioning Consultant (BCC) who will assist the Architects and Consultants and will coordinate with the Contractor to verify that the commissioning process has been completed to the requirements of the contract documents.

.2 The commissioning process consists of but is not limited to:

- .1 Shop drawing submittal, review and approval
- .2 Updating the commissioning plan
- .3 Scheduling and conducting tests
- .4 Documenting and distributing reports
- .5 Demonstration of systems operation
- .6 Training
- .7 Operations & Maintenance manuals
- .8 As built documentation
- .9 Turn over process to LCBO
- .10 Seasonal commissioning

.3 The shop drawing requirements have been documented in other parts of this specification

.4 A draft commissioning plan has been included with the contract documents. The Contractor shall update the plan at the beginning of the construction process. Finalize the commissioning plan at the end of the commissioning process and include all reports and completed test forms.

.5 The Contractor shall provide a construction schedule which shall include the commissioning schedule. The commissioning schedule shall identify all tests required by the specification and dates when the tests will occur. The Contractor will identify who will conduct the tests and what trades are required to coordinate with the testing process. Sample test forms have been included with the specification, however, the Contractor may choose to utilize their own forms but they must be approved by the Consultant.

.6 The Contractor shall be responsible for completing all test forms and arranging for a witnessing authority when it has been specified. The contractor shall submit the completed forms and any other commissioning reports monthly to the Architect, Consultants and the BCC as part of the commissioning plan update.

.7 The requirements for the final systems operational demonstration have been included in the specification. The Contractor shall be responsible for completing all tests

identified in the specification and obtaining sign off documentation from all sub-contractors, testing agencies and manufacturers. When all testing has been completed the Contractor shall request that the Consultant and the BCC to attend systems operational demonstration of all systems associated with the project. The Contractor will arrange for the necessary persons to perform the demonstrations.

.8 The Contractor shall be responsible to provide the training identified in this specification.

.9 The Contractor shall be responsible to provide the O&M manuals identified in this specification. The manuals shall be delivered to the Architect, one month before the substantial performance date. The test forms and certificates shall be included in the commissioning plan final report.

.10 The Contractor shall be responsible for providing the as built documentation as identified in this specification. The as built shop drawings shall be delivered to the Architect prior to the substantial performance date. The as built drawing shall be delivered within one month of the substantial performance date.

.11 The Contractor shall be responsible for conducting and providing the documentation identified in this specification for the turn over process to LCBO. All deficiencies and work not completed shall be identified.

.12 The Contractor shall be responsible for conducting seasonal testing on equipment not tested prior to the substantial performance date. This work shall be scheduled with the LCBO and the Architect. When the work has been completed the Contractor shall demonstrate the operation of the systems to the Consultants and the BCC.

.13 The Landlord's Contractor will be responsible for the start- up and commissioning of the roof top air condition units. Start- up will be completed before the space is turned over to LCBO. The LCBO Contractor shall complete the HVAC installation and coordinate with the Landlord's Contractor to have the roof top unit manufacturer conduct the commissioning of the units. The LCBO Contractor shall coordinate with the BAS contractor . the Air and Water balancing contractor and the Commissioning Consultant. The Commissioning Consultant shall witness the final functional testing conducted by the unit manufacturer.

END OF SECTION

1.01 GENERAL

.1 Include in the Work construction facilities and temporary controls required as construction aids and by jurisdictional authorities, or as otherwise specified. Install to meet needs of construction as it progresses. Maintain construction facilities and temporary controls during use repair them when damaged, relocate them as required by the Work, remove them at completion of need, and make good adjacent construction and property affected by their installation.

.2 Construct temporary facilities of new materials unless otherwise approved.

.3 Ensure that structural, mechanical, and electrical characteristics of temporary facilities are suitable and adequate for use intended. Be responsible that no harm is caused to persons and property by failure of temporary facilities because of placing, location, stability, protection, structural sufficiency, removal, or any other cause.

.4 Prepare shop drawings and specifications of temporary work, and submit for approval of jurisdictional authorities if so required. Submit duplicate copy to Consultant for his information.

.5 Locate temporary facilities where shown on Drawings or as directed.

.6 Apply two coats of paint, in approved colours, to temporary constructions that are not prefinished, such as storage sheds; offices; supports; bracing and back side of signs; barricades; and where otherwise specified.

1.02 CONSTRUCTION SERVICES

.1 The Contractor will be responsible for the cost of Electrical Power for the contractor's hook-ups of equipment or for the contractor's temporary lighting at construction areas where necessary. The LCBO will provide an invoice to the Contractor for power usage at the contract closeout.

.2 Temporary heat at the construction areas shall be provided by the Contractor.

.3 The existing washrooms may be used by the Contractor during construction. Have toilets maintained in sanitary condition. Clean and disinfect the washrooms upon completion of work. Provide temporary washroom as required.

.4 Maintain fire protection as required by jurisdictional authorities.

.5 The Contractor shall co-ordinate with the Landlord’s representative for connection to all required construction services.

1.03 CONSTRUCTION AIDS

.1 Provide an area near the construction area to store materials and equipment during construction.

.2 Scaffolding:

.1 Erect scaffolds clear of walls, and ensure that they do not interfere with continuing work.

.2 Each user of scaffolding shall be responsible for its examination for sufficiency before using it. He shall make it secure if necessary, or shall notify the Contractor in writing that he will not commence work until it is made secure; otherwise he will be held responsible for, and shall indemnify and save the

Contractor harmless from and against, all damages or injuries sustained as a consequence of its insufficiency.

1.04 BARRIERS AND HOARDING

.1 Install barricades for traffic control, and to prevent damaging traffic over exterior and interior finished areas, as well as safety barricades and otherwise, as may be required.

.2 Erect, maintain and remove at time of completion 9.5 mm minimum plywood good one side panelled hoarding, painted, with 50 x 100 mm to the underside of ceiling, having lockable gates. Polyethylene sheets shall be used in the ceiling space to the underside of the metal deck to prevent the migration of dust.

1.05 PROTECTION

.1 Provide temporary construction as required by the Work to protect it from damage. Provide protection by materials of sufficient thickness to prevent all damage to structure and finish, and to waterproofing qualities of membranes, whenever each of these individual components are exposed. Damage shall include harm resulting from all construction work, such as falling objects, wheel and foot traffic, failure to remove debris, operation of machinery and equipment, and scaffolding and hoisting operations. Positively secure protection to prevent displacement from any cause.

.2 Box with wood or otherwise protect from damage, by continuing construction, finished sills, jambs, corners, and the like.

1.06 CONSTRUCTION SIGNS

.1 Signs other than signs and notices regarding safety and caution of instructions will not be permitted on or near the site. Subcontractor's signs will not be permitted.

1.07 OFFICES, SHEDS AND MATERIAL STORAGE

.1 Provide on the site where approved by the Owner, a temporary office not less than 3050 x 6096 mm for Contractor’s, Owner’s and Consultant’s use.

.2 Provide telephone service for the duration of the project for the Contractor’s, Consultant’s and owners use. Pay all accounts chargeable to the work so long as it is in progress.

.3 Provide a Laptop computer with internet access and printer/scanner in the temporary Site Office for the duration of the project for the Consultants, Contractors, and Owner’s use.

1.08 SERVICE AND UTILITY SYSTEMS

.1 Consult with utility companies and other authorities having jurisdiction to ascertain the locations of existing services on or adjacent to site.

.2 Information as to the location of existing services, if shown on the Drawings, does not relieve the Contractor of his responsibility to determine the exact number and location of existing services.

.3 Give proper notices for new services as may be required. Make arrangements with authorities and utilities for service connections required.

.4 Pay any charges levied by utilities or authorities for work carried out by them in connection with this Contract, unless specified otherwise.

.5 Operate and maintain all utility systems affected by work of this Contract, until the building or specific portions thereof have been accepted by the Owner.

.6 Report existing unknown services encountered during excavation to Consultant for instructions; cut back and cap or plug unused services. Be responsible for the protection of all active services encountered and for repair of such services if damaged.

1.09 PEST CONTROL

.1 Be responsible to provide control measures, restraining procedures, and treatments to prevent infestation and spread of insects, rodents and other pests deemed to be present at Site and/or noticed during course of the Work. Carry out fumigation, pest control procedure, and posting of warning signs, notices including contents of such notices in accordance with requirements of Pesticides Act and any other authorities having jurisdictions. Pesticides used shall be in accordance with Canada Pest Control Products Act, and provincial and municipal regulations.

END OF SECTION

1.01 REFERENCES

.1 Canadian General Standards Board (CGSB)
- .1 CGSB 1.59, Alkyd Exterior Gloss Enamel.
- .2 CAN/CGSB 1.189, Exterior Alkyd Primer for Wood.

.2 Canadian Standards Association (CSA International)
- .1 CSA-O121-M, Douglas Fir Plywood.

.3 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as Of: May 14, 2004.

1.02 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.03 HOARDING

.1 Erect temporary work enclosures as shown on Drawings. Refer to 1.06 Dust Tight Screens, below.

.2 Confirm method of enclosure with Consultant, not less than 3 days prior to installation.

1.04 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades on the exterior to the building and during interior renovations as required, in accordance with Occupational Health and Safety Act - O. Reg. 213/91.

.2 Where renovations require modifications or repositioning of the Retail to Warehouse impact doors, provide a protective 'tunnel' to permit the safe passage of LCBO staff.

.3 Confirm location and arrangement of 'tunnel' with LCBO Project Coordinator.
- .1 Construct tunnel walls using 2" x 4" wood stud, 24" o.c., and ½" plywood sheathing.
- .2 Construct ceiling/top using 2" x 6" wood joists, 24" o.c., and ½" plywood sheathing.
- .3 Submit detailed design drawings for tunnel layout to LCBO for approval. **Do not** proceed with tunnel construction without written approval from LCBO Project Coordinator.

1.05 WEATHER ENCLOSURES

.1 Where existing building interior is exposed to the elements:
- .1 Provide weather tight closures to unfinished door and window openings, and other openings in floors and roofs.
- .2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.

1.06 DUST TIGHT SCREENS – REQUIRED TO SEPARATE ALL AREAS OF CONSTRUCTION

.1 Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.

.2 Short Term Dust Proof Partitions for areas of work to be completed in less than 5 days:

.1 Erect Jack Poles at maximum 24" o.c., or as directed by Owner.

.2 Use 6 mm opaque polyethylene sheet materials, securely fastened on all edges to prevent dust and other particles generated from the Work, from entering into Owner's operation area.

.3 Where ever taping of polyethylene material is required overlap polyethylene material 100 mm. Tape to floor, ceiling, doors, walls, and intersecting sheets, provide a continuous seal.

.4 Use zipper style entryways.

.5 Maintain and relocate protection until such work is complete.

.6 Ensure all appropriate Safety Signage is erected as required by authorities having jurisdiction and Owner.

.3 Long Term Dust Proof Partitions for areas of work to be completed in more than 5 days:

.1 Enclose the area with light weight steel studs at maximum 24" o.c., and polyethylene material, and 5/8" plywood, as per architectural drawings.

.2 Use 6 mm opaque polyethylene sheet materials, securely fastened on all edges to prevent dust and other particles generated from the Work, from entering into Owner's operation area.

.3 Where ever taping of polyethylene material is required overlap polyethylene material 100 mm. Tape to floor, ceiling, doors, walls and intersecting sheets. To provide a continuous seal.

.4 Use zipper style entryways, or plywood door, as required.

.5 Maintain and relocate protection until such work is complete.

.6 Ensure all appropriate Safety Signage is erected as required by authorities having jurisdiction and Owner.

1.07 FIRE ROUTES

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

1.08 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.09 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
.2 Provide necessary screens, covers, and hoardings.
.3 Be responsible for damage incurred due to lack of or improper protection.

END OF SECTION

1.01 GENERAL

.1 Products refer to new materials, manufactured components and assemblies, fixtures and equipment incorporated in the Work.

.2 Use only products of Canadian manufacture unless such products are not manufactured in Canada, are specified otherwise, or are not competitive.

.3 Products for use in the Project and on which the Bid was based shall be in production at time of Contract Document date, with a precise model and shop drawings available for viewing.

.4 Products specified by model, catalogue number, series, etc., and by manufacturer's name, which are incorporated in the Work shall be fabricated of same materials, of same quality, function and performance at the time they are produced for the Work as at date of Contract Documents.

.5 Where equivalent products are specified, or where alternatives are proposed, these products claimed by the Contractor as equivalent shall be comparable in construction, type, function, quality, performance, and, where applicable, in appearance. Where specified equivalents are used in the Stipulated Price for the Work, they shall be subject to final approval.

.6 Incorporate products in the work in strict accordance with manufacturers' directions unless specified otherwise. Manufacturer's directions, instructions and specifications, where reference is made to them, shall include full information on storing, handling, preparing, mixing, installing, erecting, applying, and other matters concerning the materials that are pertinent to their use and their relationship to materials with which they are incorporated.

.7 Products delivered to the Project site for incorporation in the Work shall be considered the property of the Owner. Maintain protection and security of products stored on the site after payment has been made for them.

.8 Do not install permanently incorporated labels, trademarks and nameplates, in visible locations unless required for operating instructions or by jurisdictional authorities.

1.02 APPROVAL OF PRODUCTS AND INSTALLATION METHODS

.1 Wherever in the Specifications it is specified that Products and installation methods shall meet approval of Authorities having Jurisdiction, underwriters, the Consultant, or others, such approval shall be in writing.

1.03 PRODUCT HANDLING

.1 Manufacture, pack, ship, deliver and store products so that no damage occurs to structural qualities and finish appearance, or in any other way detrimental to their function or appearance, or both.

.2 Brace assemblies such as door frames, large window units and similar products to prevent distortion or breakage in handling.

.3 Ensure that products, while transported, stored or installed, are not exposed to an environment which would increase their moisture content beyond the maximum specified.

.4 Schedule early delivery of products to enable the Work to be executed without delay. Before delivery, arrange for receiving at site.

.5 Deliver packaged products, and store until use, in original unopened wrapping or containers, with manufacturer's seals and labels intact.

.6 Label packaged products to describe contents, quantity and other information as specified.

.7 Label fire-rated products to indicate approval of Underwriters' Laboratories.

.8 Product handling requirements may be repeated, and additional requirements specified, in other Sections.

1.04 STORAGE AND PROTECTION

.1 Store products on site or in storage areas with secure protection against all harmful environmental conditions. Prevent damage, adulteration, staining and soiling of materials while stored.

.2 Protect prefinished metal surfaces by protective coatings or wrappings until time of final cleanup specified in Section 01 70 00. Protection shall be easily removable under work of Section 01 70 00 without damage to finishes.

.3 Store manufactured products in accordance with manufacturer's instructions.

.4 Store steel, lumber, masonry units, precast concrete work, and similar products on platforms raised clear of ground.

.5 Store finished products and woodwork under cover at all times.

.6 Storage and special protection requirements may be repeated, and additional requirements specified, in other Sections.

1.05 SPECIFIED PRODUCTS

.1 Products specified by manufacturer's name, brand name or catalogue reference shall be the basis of the bid and shall be supplied for the Work without exception in any detail, subject to allowable substitutions as reviewed.

.2 Where several proprietary products are specified, any one of the several will be acceptable.

.3 For products specified by reference standards, the onus shall be on the supplier to establish that such products meet reference standard requirements. The Consultant may require affidavits from the supplier, as specified in Section 01 33 00, or inspection and testing at the expense of the supplier, or both, to prove compliance. Products exceeding minimum requirements established by reference standards will be accepted for the Work if such products are compatible with, and harmless to, other products with which they are incorporated.

1.06 SCHEDULING OF PRODUCT DELIVERY

.1 Verify that products supplied by all Sections are ordered from suppliers in sufficient time to ensure delivery for incorporation in the Work within the time limits established by approved construction schedule.

.2 Obtain confirmed delivery dates from product suppliers.

.3 Immediately inform the Consultant should supplier's confirmation of delivery dates indicate that Project completion may be delayed.

.4 Submit copies of purchase orders and confirmations of delivery dates for products as may be requested.

1.07 SUBSTITUTION OF PRODUCTS DURING PROGRESS OF WORK

.1 Products substituted for those specified or approved, or both, shall be permitted only if the listed product cannot be delivered to maintain construction and if the delay is caused by conditions beyond the Contractor's control.

.2 Application for substitution will not be considered if caused by ordering of product later than date required by supplier's delivery schedule to ensure completion of the Work on schedule as approved.

.3 A substitution will be allowed only after Contractor's proof of non-availability has been reviewed by the Consultant.

.4 Obtain review of substitutions. Application for approval shall be made only by Contractor. Process proposals for substituted products in accordance with procedures established for Changes in the Work.

.5 Submit, with request for substitution, documentary evidence that substituted products are equal to, or superior to, approved products, and a comparison of price and delivery factors for both specified or approved products, and proposed substitute.

.6 Ensure that substituted products can be both functionally and dimensionally incorporated in the Work with no loss of intended function, performance space or construction time, and that spare parts and service are readily available. The Contractor shall be responsible for additional installation costs, including Consultant and engineering fees, required by incorporation of substituted products, and for adaptations made otherwise necessary to ensure that above requirements are satisfied.

.7 Review of substitutions for specified items will be performed by Consultant or consultants.

1.08 WORKERS, SUPPLIERS AND SUBCONTRACTORS

.1 Assign work only to workers, suppliers, and Subcontractors who have complete knowledge, not only of the conditions of the Specifications, but of jurisdictional requirements, and reference standards and specifications.

.2 Give preference to use of local workers, suppliers, and Subcontractors wherever possible.

1.09 WORKMANSHIP

.1 Unless otherwise specified in a more detailed manner, workmanship shall be of the highest quality recognized by the trade executing the work in accordance with standard practices, by the best methods recommended by the manufacturer of the product, and as approved by the Consultant.

1.10 FASTENINGS

.1 Include in the work of each Section necessary fastenings, anchors, inserts, attachment accessories, and adhesives. Where installation of devices is in work of other Sections, deliver devices in ample time for installation, locate devices for other Sections and co-operate with other Sections as they require.

.2 Do not install wood plugs or blocking for fastenings in masonry, concrete, or metal construction, unless specified or indicated on Drawings.

.3 Do not use fastenings which cause spalling or cracking of materials in which installed. Do not use powder actuated fastening devices unless specified.

.4 Use only approved driven fasteners.

.5 Install metal-to-metal fastenings fabricated of the same metal, or of a metal which will not set up electrolytic action causing damage to fastenings or components, or both. Provide separation of dissimilar metals. Use non-corrosive or galvanized steel fastenings for exterior work, and where attached to, or contained within, exterior walls and slabs. Leave steel anchors bare where cast in concrete.

.6 Install work with fastenings or adhesives in sufficient quantity to ensure permanent secure anchorage of materials, constructions, components, and equipment. Space anchors within limits of load-bearing or shear capacity.

.7 Space exposed fastenings evenly and in an organized pattern. Keep number to a minimum. Provide exposed metal fastenings of same material, texture, colour and finish as metal on which they occur.

.8 For metal shelving, ensure manufacturer/supplier provides necessary support in accordance with "LCBO Standard Details."

1.11 DIMENSIONS

.1 Check all dimensions at the site before fabrication and installation commences and report discrepancies to the Consultant.

.2 Where dimensions are not available before fabrication commences, ensure that dimensions required are agreed upon between the parties concerned.

.3 Prior to commencing work, ensure that clearances required by jurisdictional authorities can be maintained

.4 Wall thicknesses and openings shown on the drawings may be nominal only; ascertain actual sizes at the site.

.5 Verify dimensions of shop fabricated portions of the Work at the site before shop drawings and fabrications are commenced. The Owner will not accept claims for extra expense by reason of non-compliance with this requirement.

.6 Fabricate and erect manufactured items, shop fabricated items, and items fabricated on or off site, to suit site dimensions and site conditions.

.7 In areas where equipment is to be installed, check dimensional data on equipment to ensure that area and equipment dimensions are compatible with necessary access and clearance provided. Ensure that equipment supplied is dimensionally suitable for space provided.

.8 The mechanical and electrical drawings are intended to show approximate locations of mechanical apparatus, fixtures, equipment, piping and duct runs, electrical apparatus, fixtures, outlets, equipment, units, and conduit in diagrammatic form and wherein the

mechanical and electrical items are not dimensioned, consider their locations to be approximate. Check the drawings and confer with the Consultant to settle the actual locations of these items as may be required to suit aesthetic and site conditions. Such relocation shall be done without change to the Contract Price.

.9 Leave areas clear where space is indicated to be reserved for future equipment, including access to such future equipment.

.10 Whether shown on the Drawings or not, leave adequate space and provision for servicing of equipment and removal and reinstallation of replaceable items such as motors, coils and tubes.

1.12 RELOCATION OF MECHANICAL AND ELECTRICAL ITEMS

.1 The Owner and the Consultant reserve the right to relocate outlets at a later date, but prior to installation, without additional cost to Owner, assuming that the relocation per outlet does not exceed 3000 mm from the original location. No credits will be anticipated where relocation per outlet of up to and including 3000 mm reduces materials, products and labour.

.2 Should relocations per outlet exceed 3000 mm from the original location the Contract Price will be adjusted in accordance with the provisions for changes in the Contract Documents.

.3 Alter the location of pipes and other equipment, without additional cost to the Owner, if approved, provided the change is made before installation.

.4 Make necessary changes, due to lack of coordination, as required and when approved, at no additional cost, to accommodate structural and building conditions.

1.13 EXPANSION, CONTRACTION, AND DEFLECTION

.1 Conform to manufacturer's recommended installation temperatures. If items, components, assemblies, systems, and finishes are installed at temperatures different from operation or service temperatures, make provisions for expansion and contraction in service as acceptable to manufacturer and consultant. Repair all resulting damage should expansion and contraction provisions provide inadequate.

.2 Make provisions for expansion and contraction due to temperature changes within components, Products and assemblies, and between adjacent components, Products and assemblies, and due to building movements including but not limited to creep, column shortening, deflection, sway and twist. Ensure provisions for expansion, contraction and building movements prevent damages from occurring to and within components, Products and assemblies.

.3 Make adequate allowance at wall and partition heads for deflection of the structure above. Determine requirements from Consultant where additional information is required. Where partitions butt to underside of floor assembly, or structural framing, the clearance shall be based on the span of the members supporting the floor or structural framing. In making such allowance use methods which maintain the integrity of the wall or partition as a sound, and/or fire barrier.

.4 Make provisions in pipes, plenums, ducts and vessels containing air and fluids as is necessary to prevent damage due to fluid and air induced pressure, surges and

vibrations, to pipes, plenums, ducts and vessels and to adjacent components, assemblies and construction to which pipes, ducts, plenums and vessels are attached or pass through.

1.14 DIELECTRIC SEPARATION

.1 Ensure that a dielectric separator is provided in a permanent manner over entire contact surfaces to prevent electrolytic action (galvanic corrosion) between dissimilar materials. Similarly, prevent corrosion to aluminum in contact with alkaline materials such as contained in cementitious materials.

END OF SECTION

1.01 PROGRESSIVE CLEANING

.1 Ensure that spatters, droppings, soil, labels, and debris are removed from surfaces to receive finishes, before they set up. Leave work and adjacent finished work in new condition.

.2 Use only cleaning materials which are recommended for the purpose by both the manufacturer of the surface to be cleaned and of the cleaning material.

.3 Maintain premises "broom clean" at all times. Vacuum clean interior areas immediately before finish painting commences.

.4 Do not burn or bury waste material at site. Remove as often as required to avoid accumulation.

.5 Do not allow waste material and debris to accumulate in an unsightly or hazardous manner. Sprinkler dusty accumulations with water. Provide containers in which to collect waste material and debris.

.6 Control lowering of materials. Use as few handlings as possible. Do not drop or throw materials from storeys above grade.

.7 Ensure that cleaning operations are scheduled to avoid deposit of dust or other foreign matter on surfaces during finishing work and until wet or tacky surfaces are cured.

.8 Each Section shall supply the Contractor with instructions for final cleaning of his work, and for inclusion in Project Data Book as specified in each trade Section and in Section 01 33 00.

1.02 FINAL CLEANING

.1 Final cleaning to take place the night before turn over to the LCBO. Coordinate exact times with LCBO Project Coordinator and Consultant.

.2 Before final inspection, replace glass and mirrors that have been broken, damaged and/or etched during construction, or which are otherwise defective.

.3 In addition to requirements for cleaning-up specified in the General Conditions of the Contract, and in Section 01 11 00, include in the Work final cleaning by skilled cleaning specialists on completion of construction.

.4 Remove temporary protections and make good defects before commencement of final cleaning.

.5 Remove dust, stains, paint spots, soil, grease, fingerprints, and accumulations of construction materials, interior and exterior to the building. Perform cleaning in accordance with installer's instructions for each material. Final cleaning of new and existing work shall include:

- .1 Washing of exterior paved surfaces, and interior concrete floors.
- .2 Cleaning and polishing of
  - .1 glass.
  - .2 mirrors.
  - .3 porcelain, enamel, and finish metals.
  - .4 washroom accessories.
- .3 Vacuum cleaning of ceilings, walls, and floors.
- .4 Cleaning of ceramic tile floors.

.5 Buffing and application of two light coats of wax, each buffed, of vinyl composition floor tile.

.6 Cleaning of glazed wall surfaces.

.7 Cleaning of hardware, mechanical fixtures, lighting fixtures, cover plates, and equipment, including polishing of their finish metal, porcelain, vitreous, and glass components.

.8 Removing of visible labels left on materials, components, and equipment.

.6 Maintain cleaning until Owner has taken possession of building or portions thereof.

.7 Complete base-building RTU filters, evaporator coils, and overall general cleanout upon completion of fit-out Contract.

.1 General Contractor to employ Standard Mechanical (Kevin Gelder, 905-625-9505)

1.03 ADJUSTING

.1 Ensure that all components of assemblies fit snugly, accurately and in true planes, and that moving parts operate positively and freely, without binding and scraping.

.2 Verify that work functions properly, and adjust it accordingly to ensure satisfactory operation. Lubricate products as recommended by the supplier.

1.04 DEMONSTRATION AND INSPECTION OF PRODUCTS AND SYSTEMS

.1 Arrange for a demonstration of systems and operating Products upon the 100% completion of their installation and prior to certification for Substantial Performance.

.2 Include in the arrangements for the attendance of the Consultant, Owner, jurisdictional authorities, and personnel assigned by the Owner for the operation of the systems and/or Products.

.3 Demonstrations shall be conducted by the Subcontractor responsible for the installation of the systems and/or Product, assisted by representatives of the manufacturer or supplier. All personnel conducting the demonstration shall be completely knowledgeable of all conditions of the operating, functioning and maintenance of the systems and/or Products.

.4 Owner's representative will acknowledge the successful completion of each demonstration on a form provided by the Contractor. The form shall be agreed to by the Owner, Consultant and Contractor prior to demonstration and testing.

.5 Submit copies of letters from manufacturers of Systems and/or Products before making application for certificate of Substantial Performance to verify that the Products has been installed and connected correctly, and that it is operating in a satisfactory manner. The certification shall be based upon inspection and testing of the Products by competent technical personnel. Include in letter of certification the names of personnel conducting the testing and inspection, the methods of inspection utilized, and the location in the building of the Products certified.

.6 Following submission of letters of certification and their acceptance by the Owner, the owner shall have the right to use the Products on a trial basis and for instructing their personnel in its use.

.7 During demonstration of Products and Systems, advise Owner, Owner's staff, and Consultant of location of all equipment name plates. Name plates shall be installed as specified in divisions 11 and 20.

.8 Lock and Key changes: all key pad locks installed, shall be changed from factory preset codes to a new code as selected by the Store Manager. Coordinate with Consultant.

1.05 FINAL INSPECTIONS AND CLOSE OUT

.1 Submit proposed closeout procedures and schedule of inspection to Consultant for approval before final inspections commence.

.2 Arrange for, conduct and document final inspections, close-out and take-over at completion of the Work in accordance with procedures described in OAA/OGCA TAKE-OVER PROCEDURES, OAA/OGCA Document No. 100, December 2007.

1.06 SUBMITTALS

.1 Submit as per above, project record drawings, and extra stock as specified in Section 01 33 00 on application for certificate of Substantial Performance.

.2 Submit other documents as required by specified take-over procedures.

.3 Portion of final payment will be held back until all close out documents are received by LCBO.

.4 For base building construction: Upon completion of construction, provide survey dimensions and area calculations as prepared by a registered surveyor, for Area Certification purposes.

1.07 CLOSEOUT DOCUMENTATION AND RETAINAGE

.1 Closeout Document Review procedure

- .1 Contractor to upload to Consultant ftp site a draft Closeout Document submission (pdf files) described in 01 33 00 consisting of:
  - a. Project Data Book,
  - b. final approved shop drawings, and
  - c. Hardcopy or scanned PDF copies of affected drawings.
- .2 All the Consultants – Architectural, Structural, Mechanical, Electrical, Coldroom - to review contents concurrently. Consultants to coordinate where consecutive reviews are required. Consultants provide comments directly to Contractor and cc all other Consultants and LCBO Coordinator, review is complete.
- .3 Contractor to address outstanding issues with the applicable Consultant, to the Consultant's satisfaction.
- .4 Contractor uploads the "FINAL" Closeout Documents to the FTP site. Consultant provides to LCBO 2 cd/dvd copies c/w cad and pdf "Record Set" drawings and one full record set at 11"x17" (folded and with three-hole punching) for the LCBO to include in the Contractor's hardcopy Project Data Book.
- .5 Contractor provides LCBO with one hardcopy of the finalized Project Data Book as currently described in 01 33 00. Upon LCBO possession of Project Data Book and 2 cd/dvd copies, Consultant will certify the Contractor's invoice for payment of the Closeout Documents.

.2 $20,000 of the final payment and an additional amount equal to outstanding deficiencies, as recorded by the Consultant, will be retained until all closeout documents are received by LCBO.

END OF SECTION

PART 1 GENERAL

1.01 DESCRIPTION

.1 Section includes labour, products, tools, equipment and services necessary for Selective Structural Demolition Work in accordance with the Contract Documents.

.2 Restore damaged or disturbed work.

1.02 REFERENCES

.1 Section 01 56 00

.2 Section 02 82 00

.3 Division 21, 22, 23 and 26

1.03 SUBMITTALS

.1 Submit a demolition plan for LCBO Project Coordinator's review in accordance with Section 01 33 00. Demolition plan shall be prepared by a qualified Professional Engineer licensed in Ontario, if structural elements are to be removed or modified.

1.04 MAINTAINING ACCESS/BUSINESS CONTINUANCE

.1 Maintain and preserve Owner's access requirements to all part of retail area to remain in active operation.

.2 Do not close, obstruct, place or store material in Owner's active retail area. Conduct operations with minimum interference to store operations.

.3 Provide and erect barriers as required by Section 01 56 00.

.4 Maintain clear access to fire exits at all times.

1.05 INTERRUPTIONS TO OWNER'S OPERATION

.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 Where Work under this Section cannot be conducted during LBCO Regular Hours of Operation, obtain written approval from LBCO Project Coordinator to perform Work outside of LCBO's Regular Hours of Operation. Refer to Section 01 14 00.

.3 Carry out work in such a manner to cause a minimum of noise or interference to adjoining operations and obtain approval of Owner before proceeding with any work which may cause interference.

.4 Service lines to be modified for fridges, computers and any other electrical equipment, to be kept in service throughout the construction period except for brief change-over periods.

.5 Maintain such services. Prepare sketches and detailed schedule of work, and submit to Owner for review.

.6 Ensure traffic flow of LCBO staff and public is not impeded by Work under this section.

.7 Provide separate areas for construction work traffic as required by Owner, in accordance with Section 01 56 00.

1.06 PHASING OF WORK

.1 Confirm with LCBO Project Coordinator phasing of work.

.2 Submit phases work schedule to LCBO Project Coordinator for approval, in accordance with Section 01 33 00.

1.07 PROJECT CONDITIONS

.1 Existing conditions:

.1 The Drawings indicate the physical dimensions, existing levels and similar items being indicated where known.

.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 construction work, survey and record the 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 insure 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 insure 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 for any damage caused.

.6 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 Owner.

.7 Remove and dispose of all temporary work when no longer required.

.8 Should material resembling spray or trowel applied asbestos or other Toxic or Hazardous Materials be encountered in the course of demolition, stop work, take preventative measures, and notify Owner immediately. Do not proceed until written instructions have been received. Refer to Section 02 82 00.

.9 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.

.10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust. Refer to Section 01 56 00.

.11 Provide temporary means of exit as required for affected exits or entrances.

.12 Protect existing air intakes for existing building ventilation system. Carry out all operation so as to prevent dust entering these intakes, using dampening abatement measures and protection.

.13 Pay particular attention to prevention of fire and elimination of fire hazards which would endanger the work or adjacent buildings and premises.

.14 Keep and maintain fire extinguishers throughout the work at all times to the approval of the Fire Marshall, and located at convenient and accessible points.

1.08 COORDINATION

.1 Mechanical:

.1 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.

.2 Carry out alterations to existing mechanical systems as shown on Drawings and as required to interconnect new and existing systems.

.3 Do all cutting, patching and making good of existing structure required to complete mechanical work.

.4 Refer to Mechanical Division for specific requirements.

.2 Electrical:

.1 Coordinate to facilitate demolition, removals, and alteration, in existing building, disconnecting, removing and/or relocating existing wiring, fixtures, devices interfering with such work.

.2 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.

.3 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.

PART 2: PRODUCTS

2.01 EQUIPMENT

.1 Equipment and heavy machinery:
  .1 On-road vehicles to meet applicable emission requirements as prescribed in CEPA-SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
  .2 Off-road vehicles to meet applicable emission requirements as prescribed in EPA CFR 86.098-10 and EPA CFR 86.098-11.
.2 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

PART 3: EXECUTION

3.01 TEMPORARY PARTITIONS OR SCREENS

.1 Take every possible precaution to prevent dust and dirt resulting from the contract operations from entering Owner's operational areas.
.2 Refer to Section 01 56 00.

3.02 PROTECTION

.1 Prevent movement, settlement or damage of structures, services, parts of existing building to remain, and Owner’s regularly scheduled operations.
  .1 Provide bracing, shoring and underpinning as required.
  .2 Repair damage caused by demolition as directed by, and at no cost to Owner.
.2 Support affected structures and, if safety of area being demolished or adjacent structures and services appears to be endangered, take preventative measures, stop Work and immediately notify Owner.

3.03 SAFETY CODE

.1 Do demolition work in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
.2 Blasting operations are not permitted.

3.04 DEMOLITION AND REMOVAL

.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 prevent dust and dirt rising.

.3 If x-raying of existing floor is required, such work shall be completed outside of LCBO Regular Operating Hours. Confirm with LCBO Project Coordinator suitable timing of x-ray work. Execute x-raying in accordance with all applicable safety codes and guidelines.

.4 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 the carrying out new work and make good any such damage in every respect.

.5 At end of each day's work:

.1 Leave work in safe condition so that no part is in danger of toppling or falling.

.2 Prevent debris from blocking mechanical and electrical systems which must remain in operation.

.3 Ensure that demolition work does not contribute to excess air and noise pollution.

.4 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.

.6 Cutting:

.1 Use power operated cutting devices. Chipping will not be allowed. Commence breaking out operations only after saw cutting 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 saw cut points will be judged as defective and shall be rectified at no increase in Contract price. Do not overcut corners.

.3 Demolish masonry and concrete in small sections.

.4 Coordinate with mechanical trade and saw cut and breakout existing floor or wall to accommodate new mechanical piping. Have mechanical trade lay out and supervise work.

3.05 DISPOSAL OF MATERIAL 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 Debris: Clean up debris as it is generated. Dispose of same at end of each day's work or place in waste disposal bins and empty on a regular basis.

.3 Do not burn material on site.

3.06 CLEANING

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

END OF SECTION

PART 1 GENERAL

1.01 DESCRIPTION

.1 Section includes labour, products, tools, equipment and services necessary for Selective Structural Demolition Work in accordance with the Contract Documents.

.2 Restore damaged or disturbed work.

1.02 REFERENCES

.1 Section 01 56 00

.2 Section 02 82 00

.3 Division 21, 22, 23 and 26

1.03 SUBMITTALS

.1 Submit a demolition plan for LCBO Project Coordinator's review in accordance with Section 01 33 00. Demolition plan shall be prepared by a qualified Professional Engineer licensed in Ontario, if structural elements are to be removed or modified.

1.04 MAINTAINING ACCESS/BUSINESS CONTINUANCE

.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 clear access to fire exits at all times.

1.05 HAULING OPERATIONS

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

.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, or disturb daily business of the general public.

1.06 INTERRUPTIONS TO OWNER'S OPERATION

.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 Where Work under this Section cannot be conducted during LBCO Regular Hours of Operation, obtain written approval from LBCO Project Coordinator to perform Work outside of LCBO's Regular Hours of Operation. Refer to Section 01 14 00.

.3 Carry out work in such a manner to cause a minimum of noise or interference to adjoining operations and obtain approval of Owner before proceeding with any work which may cause interference.

.4 Service lines to be modified for fridges, computers and any other electrical equipment, to be kept in service throughout the construction period except for brief change-over periods.

.5 Maintain such services. Prepare sketches and detailed schedule of work, and submit to Owner for review.

1.07 PROJECT CONDITIONS

.1 Existing conditions:

.1 The Drawings indicate the physical dimensions, existing levels and similar items being indicated where known.

.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 insure 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 insure 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 for any damage caused.

.6 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 Owner.

.7 Remove and dispose of all temporary work when no longer required.

.8 Should material resembling spray or trowel applied asbestos or other Toxic or Hazardous Materials be encountered in the course of demolition, stop work, take preventative measures, and notify Owner immediately. Do not proceed until written instructions have been received. Refer to Section 02 82 00.

.9 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.

.10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust. Refer to Section 01 56 00.

.11 Provide temporary means of exit as required for affected exits or entrances.

.12 Protect existing air intakes for existing building ventilation system. Carry out all operation so as to prevent dust entering these intakes, using dampening abatement measures and protection.

.13 Pay particular attention to prevention of fire and elimination of fire hazards which would endanger the work or adjacent buildings and premises.

.14 Keep and maintain fire extinguishers throughout the work at all times to the approval of the Fire Marshall, and located at convenient and accessible points.

1.08 COORDINATION

.1 Mechanical:

.1 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.

.2 Carry out alterations to existing mechanical systems as shown on Drawings and as required to interconnect new and existing systems.

.3 Do all cutting, patching and making good of existing structure required to complete mechanical work.

.4 Refer to Mechanical Division for specific requirements.

.2 Electrical:

.1 Coordinate to facilitate demolition, removals, and alteration, in existing building, disconnecting, removing and/or relocating existing wiring, fixtures, devices interfering with such work.

.2 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.

.3 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.

PART 2: PRODUCTS

2.01 EQUIPMENT

.1 Equipment and heavy machinery:

.1 On-road vehicles to meet applicable emission requirements as prescribed in CEPA-SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.

.2 Off-road vehicles to meet applicable emission requirements as prescribed in EPA CFR 86.098-10 and EPA CFR 86.098-11.

.2 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

PART 3: EXECUTION

3.01 TEMPORARY PARTITIONS OR SCREENS

.1 Take every possible precaution to prevent dust and dirt resulting from the contract operations from entering Owner's operational areas.

.2 Refer to Section 01 56 00.

3.02 PROTECTION

.1 Prevent movement, settlement or damage of structures, services, parts of existing building to remain, and Owner’s regularly scheduled operations.

.1 Provide bracing, shoring and underpinning as required.

.2 Repair damage caused by demolition as directed by, and at no cost to Owner.

.2 Support affected structures and, if safety of area being demolished or adjacent structures and services appears to be endangered, take preventative measures, stop Work and immediately notify Owner.

3.03 SAFETY CODE

.1 Do demolition work in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

.2 Blasting operations are not permitted.

3.04 DEMOLITION AND REMOVAL

.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 Reserved.

.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 Owner.

.4 Where work includes cutting of roof openings, provide a plywood catch board immediately under the areas to be cut so as to protect the building interior from falling debris. Provide catch board 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 the 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.

.8 Cutting:

- .1 Use power operated cutting devices. Chipping will not be allowed. Commence breaking out operations only after saw cutting 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 saw cut points will be judged as defective and shall be rectified at no increase in Contract price. Do not overcut corners.
- .3 Demolish masonry and concrete in small sections.
- .4 Coordinate with mechanical trade and saw cut and breakout existing floor or wall to accommodate new mechanical piping. Have mechanical trade lay out and supervise work.

.9 Cutting of Pre-cast Wall Panels:

- .1 Examine the site to verify existing precast wall panel condition.

.2 Engage the original precast wall panel manufacturer or a Professional Structural Engineer licensed in the province of Ontario 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.

3.05 DISPOSAL OF MATERIAL, 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 Do not burn material on site.

3.06 CLEANING

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

END OF SECTION

PART 1 GENERAL

1.01 DESCRIPTION

.1 Section includes labour, products, tools, equipment and services necessary for Toxic or Hazardous Materials Discovery Work in accordance with the Contract Documents.

1.02 REFERENCES

.1 Section 02 41 19.01-REN.

.2 Occupational Health and Safety Act - O. Reg. 278/05: Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations

1.03 DEFINITIONS

.1 Hazardous Materials: dangerous substances or goods, hazardous commodities and products, may include but not limited to: poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, asbestos or other material that can endanger human health or well being or environment if handled improperly

PART 2: PRODUCTS

2.01 NOT USED

PART 3: EXECUTION

3.01 TOXIC OR HAZARDOUS MATERIALS

.1 If Toxic or Hazardous Materials are known, prior to construction, they will be identified in a Hazardous Materials Report issued by the LCBO.

.2 If the Contractor encounters Toxic or Hazardous Materials or has reasonable grounds to believe that such materials, which were not brought to the Site by the Contractor or employees of the Contractor, and not disclosed by the Owner are present, the Contractor shall:

.1 Take all reasonable steps, **including stopping the Work**, to ensure that no person's exposure to any Toxic or Hazardous Material exceeds any time weighted levels prescribed by applicable legislation at the Place of Work.

.2 Immediately report the circumstances to the LCBO Project Coordinator in writing.

.3 Refer to audits and/or reports on Toxic or Hazardous Materials as provided by LCBO Project Coordinator.

END OF SECTION

PART 1: GENERAL

1.01 DESCRIPTION

.1 Section includes labour, products, tools, equipment and services necessary for Cast-In-Place Concrete Work in accordance with the Contract Documents.

1.02 STANDARDS, CODES AND ACTS

.1 Conform to the latest edition of the following

.1 Ontario Building Code and any applicable acts of any authority having jurisdiction.

.2 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.

.3 CSA CAN3-A23.3, Design of Concrete Structures for Buildings.

.4 Where there are differences between the specifications, drawings, codes, standards or acts, the most stringent shall govern.

1.03 TOLERANCES

.1 Make concrete in place plumb, level and true. Perform placing operations so that completed work will be within the tolerances set out in CAN/CSA-A23.1/A23.2, unless otherwise noted.

.2 Slab flatness tolerances for slabs-on-grade: In accordance with testing tolerances specified in this Section

.3 These tolerances are acceptable with regard to visual and structural requirements. Interfacing tolerances may not be compatible with the above. Review and coordinate interfacing tolerances so that the various elements come together properly.

1.04 CONCRETE MIX DESIGN

.1 Design of Mix

.1 Mix design shall be determined by a licensed and qualified Structural engineer and shall be in accordance with CAN/CSA-A.23.1 so that concrete will be homogeneous, uniformly workable, and readily placeable into corners and angles of forms and around reinforcement by the methods of placing and consolidation employed on the work, but without permitting materials to segregate or excessive free water to collect on the surface. The concrete, when hardened, shall have the qualities specified.

supply is proposed, provide the following certificates prepared by an approved inspection company. The cost of this work shall be borne by the Contractor.

.1 Certification that aggregates and cements proposed for the work comply with requirements of specifications and CAN3-A.23.3.

.2 Certification that compressive strength, water-cement ratio, slump, entrained air content and other specified properties will be met, using the proposed mixes.

PART 2: EXECUTION

2.01 QUALITY CONTROL

.1 Provide a system of quality control to ensure that the minimum standards specified herein are attained.

.2 Bring to the attention of Consultant any defects in the work or departures from the Contract Documents which may occur during Construction. The Consultant will decide upon corrective action and state his recommendations in writing.

2.02 NOTIFICATION

.1 Prior to commencing significant segments of the work, give the Owner and independent inspection and testing agencies appropriate notification so as to afford them reasonable opportunity to review the rough and finished work. Failure to meet this requirement may be cause for the Consultant to classify the work as defective.

2.03 CONSTRUCTION REVIEW

.1 The Consultant's general review during construction and inspection and testing by independent inspection and testing agencies reporting to the Consultant are both undertaken to inform the Owner of the Contractor's performance and shall in no way augment the Contractor's quality control or relieve him of contractual responsibility.

2.04 INSPECTION AND TESTING

.1 Appointment of Independent Inspection Agencies

.1 The Owner will appoint the inspection and testing agency to make inspections or perform tests as the Consultant directs. The inspection agency shall be responsible only to the Consultant, shall address his reports to the Consultant and shall make only such inspections or tests as the Consultant may direct. Authorized inspection and testing shall be paid for by the Owner, except that the Contractor will be required to pay for tests which show results not meeting the requirements of the drawings or specifications and for subsequent tests made necessary thereby.

.2 When defects are revealed, the Owner may request, at the Contractor’s expense, additional inspection or testing to ascertain the full extent of the defect.

.2 Tests on Concrete Materials

.1 Concrete Strength: Cylinder testing will be carried out in accordance with CAN/CSA-A23.1 and as follows: three companion laboratory cured concrete standard compression test cylinders; two tested at 28 days and one tested at 7 days, constitute a strength test. During the placing of concrete in cold weather one additional field cured test cylinder shall be made and tested at 7 days. The results of the 7 day tests related to curing procedure shall be the basis to strip soffit forms from horizontal or inclined members.

.2 Employ the services of an inspection and testing agency to make inspections or perform tests for Floor Tolerances as specified in this Section. Recommended inspection and testing agencies:

.1 Surface Dynamics, 3314 Yonge Street, Suite 10, Toronto, ON M4N 2M4, 416.488.1517

.2 CAN-BEST, 38 Regan Road, Unit 4, Brampton, ON L7A 1C6, 905.840.2014

.3 Davroc, 2051 Williams Parkway, Unit 19, Brampton, ON L6S 5T4, 905.792.7792

.4 Or approved alternative.

2.05 DEFECTIVE MATERIALS AND WORKMANSHIP

.1 Where factual evidence exists that defective workmanship has occurred or that work has been carried out incorporating defective materials, the Owner may have concrete coring tests, inspections or surveys performed, analytical calculation of structural strength and the like in order to help determine whether the work must be replaced. Tests, inspections or surveys carried out under these circumstances will be made at the Owner's expense, regardless of their results, which may be such that, in the Owner's opinion, the work may be acceptable.

.2 All testing shall be conducted in accordance with the requirements of the Ontario Building Code, except where this would cause undue delay or give results not representative of the rejected material in place. In this case, the tests shall be conducted in accordance with the standards given by the Consultant.

.3 Materials or workmanship which fail to meet specified requirements may be rejected by the Owner whenever found at any time prior to final acceptance of the work regardless of previous inspection. If rejected, defective materials or work incorporating defective materials or workmanship shall be promptly removed and replaced or repaired to the satisfaction of the Consultant, at no expense to the Owner.

2.11 PLACING CONCRETE

.1 Conform to requirements of CAN/CSA-A.23.1 and the following:

.2 Immediately before placing concrete, clean forms and reinforcement of foreign matter.

.3 During hot weather conditions, do not use concrete mixed more than 1 hour after introduction of mixing water or 1-1/2 hours during other periods.

.4 Allow 24 hours minimum after placing concrete in columns, piers or walls before placing concrete in beams or slabs supported thereon.

.5 Place concrete on steel deck floors in a manner that avoids piling up of concrete. Do not drop concrete directly from buckets, but employ suitable means of distribution. Wet down deck during hot weather prior to concreting.

.6 Remove concrete spilled onto forms around hoisting equipment before depositing concrete in these areas.

2.12 PROTECTION

.1 General - Conform with the requirements of CAN/CSA-A.23.1 and the following to protect freshly deposited concrete from freezing, premature drying and extremes of temperature. Maintain concrete with minimal moisture loss at a relatively constant temperature for the period of time necessary for the hydration of the cement and to achieve the specified strength of the concrete.

.2 Protection of Completed Work

.1 At all times during the work, protect exposed concrete, exposed masonry and other exposed members from staining or becoming coated with concrete leakage due to continuing concreting operations. Members which become coated may be classed as defective work by the Consultant.

.2 Protect exposed members from staining due to rusting of reinforcement projecting beyond construction joints.

.3 Take suitable measures to prevent spalling and cracking damage occurring to the structure due to water freezing in expansion joints, small holes, slots, depressions and take suitable measures to prevent damage occurring to foundations and the like due to frost action in the soil or backfill.

.4 The application of de-icing salts on completed work is not permitted.

2.13 SLABS ON GRADE

.1 General

.1 Do not place concrete slabs on grade until the specified sub-floor material has been placed, inspected and approved.

.2 Do not place concrete on a frozen sub-grade, or on one that contains frozen materials.

.3 Do not place concrete on a sub-grade that has been frozen and thawed until the sub-grade has been reviewed by the Consultant and approved. If, in the Consultant's opinion, the safe bearing capacity of the sub-grade has been reduced to below 25 kPa, remove the affected materials and replace with compacted granular fill at no additional cost to the Owner.

.4 Place 175 mm of a 19 mm maximum size clear crushed stone followed by a 25 mm depth of 6 mm crushed stone over the sub-base to depths shown. Thoroughly roll and consolidate to the lines and levels required.

.5 Place bond breaker, minimum of 1 layer of building paper between edges of slab on grade and abutting surfaces.

.6 Upon approval of the placement of the sub-floor material and setting of reinforcing, place and consolidate concrete and finish and cure as specified herein.

.7 Assure that the Walker Ducts or other cast-in-place components required by the LCBO agreement are set in accordance with the manufacturers specifications. Install Walker Ducts on gravel base so that, bottom of ducts are flush with bottom of concrete slab, refer to “WALKER DUCT” drawing

inserted at the end of this section. Identify the connection points in slab ductwork for reference to facilitate work for the LCBO tenant improvements contractor. Prior to the concrete pour, ensure that the duct system is level and properly aligned and secured in place such that it will not float or move during the concrete pour, ensure that it is completely watertight, and ensure that it is clean and clear of all obstructions and moisture. Be present at the site during all concrete placement and finishing work to ensure that the duct is not damaged or displace during the concrete pour.

.3 Carry out cutting in accordance with recommendations contained in ACI 302 but in any event between 6 and 18 hours after placement of concrete.

.4 After a period of at least 28 days, fill saw-cuts with joint filler. Ensure that joints to be filled are clean, dry and free of foreign matter. Joint filler: Euco Qwikjoint UVR

.5 Mask edges of saw-cuts to prevent concrete floors from becoming stained.

2.17 MAKING GOOD

.1 Where directed by the Consultant, make good temporary openings left in concrete construction around pipes, ducts and the like using a mortar of the same proportions as the surrounding work. Reinforce mortar with mesh or the like where openings exceed 75 mm. Roughen existing surfaces to receive mortar or apply suitable bonding agent such that mortar will be securely bonded to existing concrete.

2.18 TREATMENT OF FORMED SURFACES

.1 General

.1 After stripping for forms, the bared surface of concrete will be inspected by the Consultant. Do not proceed with repairs or surface treatment to concrete prior to the Consultant's inspection.

.2 Where no serious defects are revealed by the Consultant's inspection, cut out areas of moderate honeycombing to sound concrete. Saturate with water and fill with cement mortar of the same general composition as that used in the concrete.

.4 Where serious defects are found, such as large voids or extensive honeycombing, repair the defect as directed by the Consultant.

.5 Where surfaces are to tiled or similarly finished, remove fins, ridges or bulges which would interfere with the application of the final finishes.

.6 Remove traces of form lining compound from concrete surfaces which may affect the bonding of following surface application.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 ASTM A153, Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.2 ASTM A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

.3 ASTM A653, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.4 CSA B111, Wire Nails, Spikes and Staples.

.5 CAN/CSA G164-M, Hot Dip Galvanizing of Irregularly Shaped Articles.

.6 CAN/CSA O80 Series M, Wood Preservation.

.7 CSA O121-M, Douglas Fir Plywood.

.8 CAN/CSA O141, Softwood Lumber.

.9 CSA O151-M, Canadian Softwood Plywood.

.10 NLGA, Standard Grading Rules for Canadian Lumber, National Lumber Grades Authority.

.11 CAN/ULC-S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.02 QUALITY ASSURANCE

.1 Lumber identification: By grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood, OSB and wood based composite panel construction sheathing identification: By grade mark in accordance with applicable CSA standards.

.3 Each piece of fire retardant treated lumber shall be shop marked with the pressure treatment brand and ULC monogram respectively, In accordance with CAN/CSA O80-M.

1.03 ROUGH CARPENTRY PROTECTION

.1 Prevent damage to rough carpentry as required to maintain carpentry as for duration of project and wood life span.

.2 Provide protection to Owner’s staff, Contractor’s employees and all others coming in contact with any rough carpentry work. Refer to architectural drawings for plywood wall protection detail.

PART 2: PRODUCTS

2.01 LUMBER MATERIALS

.1 Lumber: Unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:

- .1 CAN/CSA-O141.
- .2 NLGA Standard Grading Rules for Canadian Lumber.

.2 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:

- .1 Board sizes: "Construction" or better grade.
- .2 Dimension sizes: "Construction" light framing or better grade.

2.02 PANEL MATERIAL AND PLYWOOD SHEATHING

.1 Douglas fir plywood (DFP): To CSA O121, standard construction.

.2 Canadian softwood plywood (CSP): To CSA O151, standard construction.

2.03 ACCESSORIES

.1 Rough hardware: Nails, bolts, screws, anchors, expansion shields, and other fastenings required to frame and fix rough carpentry as follows:

.1 Nails, spikes and staples: To CSA B111.

.2 Bolts: ASTM A325, 12 mm diameter unless indicated otherwise, complete with nuts and washers.

.3 Screws: Countersunk head, full thread type.

.4 Proprietary fasteners: Toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs recommended for purpose by manufacturer.

.5 Galvanize rough hardware exposed to the atmosphere in accordance with CAN/CSA G164-M.

.6 Fasteners for use in pressure treated wood: Provide hot dipped galvanized fasteners complying to ASTM A153 and connectors in accordance with ASTM A653, Class G185 for non-structural members. Provide type 304 or 316 stainless steel fasteners and connectors for use in Structural, pressure treated wood.

2.04 FINISHES

.1 Galvanizing: To CAN/CSA-G164, for galvanized fasteners for exterior work.

2.05 WOOD PRESERVATIVE

.1 Surface-applied wood preservative: Clear coloured or copper napthenate or 5% pentachlorophenol solution, water repellent preservative.

2.06 FIRE RETARDANT TREATMENT

.1 Fire retardant treatment of lumber and plywood: 'Dricon' fire retardant treatment by J. A. Biewer or approved 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 CAN/ULC-S102.

PART 3: EXECUTION

3.01 PREPARATION

.1 Treat surfaces of material with wood preservative, before installation.

.2 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

.3 Treat curbs, nailers, sleepers and all other roof woodwork.

3.03 INSTALLATION

.1 Install furring and blocking as required to space-out and support other work as required.

.2 Align and plumb faces of furring and blocking to tolerance of 1:600.

.3 Use fire retardant lumber for blocking/framing in ceiling spaces, partitions and bulkheads.

.4 Install rough bucks, nailers and linings to rough openings as required to provide grounds and rough backing for frames and other work.

.5 Install wood nailers, curbs and other wood supports as required and secure using galvanized fasteners.

.6 Install plywood backboards, primed and painted white on both sides, with fire retardant paint.

.7 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.8 Countersink bolts where necessary to provide clearance for other work.

.9 Install rough carpentry to allow for expansion and contraction of the materials.

.10 Cut work into lengths as long as practicable and with square ends. Align, level, square, plumb, and secure work permanently in place. Brace work temporarily as required. Join work only over solid backing.

.11 Bore holes true to line and to same size as bolts. Drive bolts into place for snug fit, and use plates or washers for bolthead and nut bearings. Turn up bolts and lag screws tightly when installed, and again just before concealed by other work or at completion of Work.

.12 Install 19mm plywood blocking within partitions to support upper millwork cabinets as indicated on plan and to support the communications box located within the office (refer to sketch SKE-G7 within division 26 for extent of plywood at communications box).

3.05 CLEANING

.1 Clean rough carpentry on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.06 SCHEDULES

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

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 ANSI A208.1, Particleboard.

.2 AWMAC Specification, Quality Standards for Architectural Woodwork of the Architectural Woodwork Manufacturers Association of Canada.

.3 CSA O121-M, Douglas Fir Plywood.

.4 CAN/CSA O141, Softwood Lumber.

.5 CSA O151, Canadian Softwood Plywood.

.6 CSA O153-M, Poplar Plywood.

.7 CAN/CGSB 11.3-M, Hardboard.

.8 Forest Stewardship Council (FSC).

1.02 SUBMITTALS

.1 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01 33 00.

.2 Submit shop drawings of finish carpentry Work indicating Materials, thicknesses, sizes, finishes, hardware, wood species, grades, profiles, connection attachments, shop jointing, field jointing, reinforcing, anchorage, fastener types and sizes, location of exposed fastenings, mechanical and electrical service routes, service outlets, cutout locations, and sizes. Include erection drawings, plans, elevations, sections, and details as applicable

.2 Samples:

.1 Submit two (2) samples (300mm x 300 mm) of each specified finish wood species. Three (3) sample varieties of each wood finish must be submitted for approval before fabrication.

1.03 QUALITY ASSURANCE

.1 Work of this Section to be executed by contractor with 5 years experience in finish carpentry work of comparable complexity and scope - members of AWMAC preferred. Submit proof of experience upon Consultant's request.

.2 Fabricate finish carpentry Work in accordance with AWMAC Quality Standards, Premium Quality materials and installation unless otherwise indicated. Perform Work in accordance with the definition of Good Workmanship as defined in the AWMAC Quality Standards.

1.04 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store, and handle finish carpentry in accordance with the AWMAC Quality Standards. Control the temperature and humidity in accordance with the AWMAC recommendations, before, during, and after finish carpentry delivery, and also during storage and installation.

.2 Receive finish hardware supplied by Section 08 70 00 and store, secure against theft.

.3 Do not deliver wood materials to site until storage areas are completed, and conditions are such that no damage will occur to them while in storage and during installation.

1.05 SITE CONDITIONS

.1 Environmental Requirements:
  .1 Ensure that relative humidity in areas where wood materials are stored and installed do not exceed 55%.

PART 2: PRODUCTS

2.01 MATERIALS

.1 General:
  .1 All wood and wood products to be Forest Stewardship Council (FSC) Certified.
  .2 Provide rough hardware required for finish carpentry specified in this Section. Use non-corrosive hardware at exterior locations.
  .3 Moisture content of wood at time of installation shall be for interior locations at an average of 7%, with a permitted range of individual pieces of 5% to 9%; and for exterior locations at an average of 12%, with a permitted range in individual pieces of 10% to 15%.
  .4 Use only adhesives and fastenings that develop sufficient strength for intended use, are non-staining, and are unaffected by the environment to which exposed.

.2 Wood:
  .1 Grade mark softwood and hardwood lumber by the appropriate association under authority of the National Lumber Grades Authority.
  .2 Where not exposed to view, use wood of grades suitable for fabrication, utility and structural needs.
  .3 Where exposed to view, use Appearance Grade wood for structural lumber, as otherwise specified. Meet requirements of specified AWMAC Quality Grade Standard, where applicable.
  .4 Ensure that surfaces exposed to view and given a natural or stained finish are free from markings and stains caused by milling, treatment, storage, handling and other causes.
  .5 Ensure that veneered panels, and solid finger jointed and edge laminated members, where admissible for incorporation as approved, are matched for grain configuration and uniformity of colour throughout all surfaces exposed to view which are to receive a natural or stained finish.

.3 Plywood:
  .1 Douglas Fir: To meet specified requirements of CSA O121-M, Sanded Grade, Good Two Sides where both sides are exposed to view, and Good One Side where only one side is exposed to view.
  .2 Softwood: To meet specified requirements of CSA O151, Sanded Grade, Solid Two Sides where both sides are exposed to view, and Good One Side where only one side is exposed to view.
  .3 Hardwood: To meet specified requirements of CSA O115 veneer core, Type 11, smooth sanded, rotary cut face veneers, Architectural Grade, Mahogany, where exposed to view and Sound Grade where not.
  .4 Poplar: To meet specified requirements of CSA O153-M.

.4 Particleboard: To meet specified requirements of ANSI A208.1, Grade M2.

.5 Plastic Laminate:
  .1 For Counter Tops: Type 1, General Purpose, 1lb Standard, 1.5 mm thick.

.2 For Postformed Counter Tops: Type 2, Postforming, 2a Standard, 1.2 mm thick.
.3 Backing Sheet: In same thickness as face sheet.
.4 Surface Finish: Furniture or similar finish selected by Consultant, except for backing sheet.
.5 Colour: Selected by Consultant from manufacturer's standard solid colour range.

.6 Hardboard: To meet specified requirements of CAN/CGSB 11.3-M, Type 2.

.7 Cabinet Hardware:
.1 Pulls: Clear anodized, 8 mm diameter solid aluminium wire style with 32 mm projection and 90 mm centres.
.2 Door Hinges: Fully concealed, 110 deg. opening, self-closing.
.3 Drawer Slides: Ball bearing carrier, fully extendable, of quality to operate adequately for size and capacity of drawer.
.4 Pilaster Strips: Recessed, slotted, nickel plated steel, with shelf clips to match.

.8 Coat Rods: 25 mm diameter chromium plated or polished stainless steel pipe, with matching flanges.

.9 Ticket Moulding
.1 Ticket moulding shall be fabricated in wood as per LCBO standard details.

.10 Custom Millwork:
.1 Standard units to meet high quality requirements of Owner.
.2 Refer to Millwork details on Drawing Sheets.

.11 Finishes: Paint and stain finishes in accordance with Section 09 91 00, Painting and Finishing.

2.02 FABRICATION

.1 General:
.1 Assemble fabricated millwork units in units as large as possible. Design units to fit together if site assembly is required.
.2 Incorporate services, fixtures and trim in fabricated millwork units as indicated on Drawings or specified in Division 20, 21, 22, 23, or 26. Make necessary cut-outs to template information.
.3 Edge plywood where specified or indicated with solid wood to match face veneer, with profiled pressure glued edge joint and finished level with plywood surfaces.
.4 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.

.2 Trim:
.1 Rout or groove backs of flat trim members.
.2 Kerf backs or wide flat members.

.3 Fastening:
.1 Fasten assemblies with nails generally, but use screws or special fasteners at critical joints where strain, and excessive usage and shrinkage is anticipated, and where required by specified quality grade standards.
.2 Glue built-up assemblies as well as nailing and screwing.
.3 Blind nail unless impossible.

.4 Set finish nails below finished surfaces.

.4 Plastic Laminate Facing:

.1 Apply plastic laminate for counters to poplar faced, phenolic bonded plywood, or to particleboard, minimum 19 mm thick, or as otherwise indicated on Drawings. Apply plastic laminate for doors, drawer fronts, gables, etc. of cabinets to minimum 19 mm thick wood core, Birch faced plywood.

.2 Bond plastic laminate to backing with urea formaldehyde adhesive, or by methods or equal or better quality recommended by the plastic laminate manufacturer.

.3 Seal edges of cut-outs with plastic laminate, or where concealed from view by other methods that will prevent entry of moisture into core.

.4 Apply plastic laminate backing sheet to core on back side of panels faced with plastic laminate.

.5 Ensure that both face and backing sheet have been sanded in same direction.

.6 Bond plastic laminate self-edges under pressure, and bevel and finish smooth finished corners.

.7 Round corners of holes cut through plastic laminate and file them smooth.

.8 Make joints only when lengths of plastic facing exceeds 3650 mm. Butt joints together, reinforce core with 36 mm hardwood blind splines, and lock together with Tite Joint fasteners located at a maximum of 75 mm from edges.

.5 Finishing:

.1 Finish each surface of millwork to specified quality grade standard where exposed or semi-exposed. Consider that all visible surfaces are exposed, including underside surfaces above 1200 mm from floor and interiors of fitments behind glass doors. Consider that underside surfaces within 1200 mm of the floor, top surfaces more than 1829 mm above the floor, interiors or fitments behind opaque doors and the backs of fitment doors are semi-exposed.

.2 Fine sand surfaces level and smooth after fabrication.

.3 Refer to Finish Schedule for special finishing.

PART 3: EXECUTION

3.01 EXAMINATION

.1 Before commencing installation, ensure that grounds, strapping, and other constructions and surfaces to which finish carpentry is installed are satisfactory for fitting and adequate for its securement.

.2 Take site measurements of construction to which finish carpentry installations must conform, and through which access must be made, before fabricated units are delivered to site, to ensure that adaptation is not required which would result in construction delay.

3.02 PREPARATION

.1 Protection: Ensure that finish carpentry materials are protected from damage and deterioration during installation, and otherwise until Project completion.

3.03 INSTALLATION

.1 General:

.1 Backprime exterior and interior millwork specified in this Section immediately after delivery to site under Work of Section 09 91 00. Ensure that cut ends are primed. Scrape or sand smooth surfaces by this Section. Notify those who are responsible for backpriming in sufficient time to enable them to schedule their work.

.2 Install finish carpentry plumb, level and straight, and fasten it securely to backing to support itself and anticipated superimposed loads.

.3 Build finish carpentry into construction as indicated on Drawings or specified in other Sections of the Specifications, or both.

.2 Trim:

.1 Install in single lengths except where material limitation makes impossible. Stagger joints where they occur and locate over solid backing for fastening.

.2 Install wood bases after finish flooring is laid.

.3 Cutting and Fitting:

.1 Cut mouldings with sharp true profiles.

.2 Cope trim and mouldings at interior corners and at returns.

.3 Mitre trim and mouldings at exterior corners. Glue and lock shop mitres that are over 100 mm from heel to point.

.4 Scribe and join members accurately together, and to other surfaces, to fit tightly and with flat smooth surfaces. Install trim or filler panels to close gaps.

.4 Fastening:

.1 Fasten finish carpentry with nails generally, but use screws or special fasteners at critical joints where strain, usage and excessive shrinkage is anticipated, and where specified quality grade standards require.

.2 Blind nail unless impossible.

.3 Set finish nails below finished surfaces to receive putty.

.5 Finishing:

.1 Sand wood surfaces after installation to leave surfaces in true planes and free of machine or tool marks.

3.04 ADJUSTMENT AND CLEANING

.1 Adjust hinged doors and windows to swing freely and easily, to remain stationary at any point of swing, to close evenly and tightly against stops without binding, and to latch positively when doors and windows are closed with moderate force. Ensure that when doors are installed with hinged stiles adjacent, both doors open simultaneously without binding.

.2 Adjust hardware so that latches and locks operate smoothly and without binding, and closers act positively with the least possible resistance in use. Lubricate hardware if required by supplier's instructions.

.3 Ensure that doors equipped with closers operate to close doors firmly against anticipated wind and building air pressure, and to enable doors to be readily opened as suitable for function, location and traffic.

.4 Clean hardware after installation in accordance with supplier's instructions.

.5 Sand and clean woodwork to leave free from finish defects in any exposed part.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCE

.1 AAMA 2605, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels - Series: Components, Coatings and Finishes.

.2 ANSI H35.1M, Alloy and Temper Designation Systems for Aluminum (Metric).

.3 ASTM A653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealled) by the Hot-Dip Process.

.4 ASTM B209, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.5 ASTM C920, Specification for Elastomeric Joint Sealants.

.6 CSA A123.3-M, Asphalt or Tar Saturated Roofing Felt.

.7 CSA B111, Wire Nails, Spikes and Staples.

.8 CRCA Roofing Manual, Canadian Roofing Contractors Association.

1.02 SUBMITTALS

.1 Product data: Submit duplicate copies of manufacturer's Product data for peel and stick vapour retarder indicating:

- .1 Performance criteria, compliance with appropriate reference standard, characteristics, and limitations.
- .2 Product transportation, storage, handling and installation requirements.

.2 Shop drawings:

- .1 Submit shop drawings in accordance with Section 01 33 00 indicating:
  - .1 Details of gutter, scuppers, copings, and miscellaneous flashings.
  - .2 Proposed method of shaping, forming, and jointing.
  - .3 Fastening and application of flashing and sheet metal Work.

.3 Samples:

- .1 Submit samples of pre-coated finish and sheet metal joints if requested.

PART 2: PRODUCTS

2.01 MATERIALS

.1 Steel sheet: to ASTM A653/A653M; Classification LFQ, Grade A, Z275 zinc coating designation, 0.60 mm minimum base steel thickness.

.2 Precoated Finish for Sheet Steel (used over out of sight surfaces such as roof curbs):

- .1 Use sheet metal with pre-coated finish where metal is exposed to view.
- .2 Organic coating applied to galvanized sheet steel in shop by continuous coating line, by Stelco, Dofasco approved alternate.
- .3 Apply 8000 Series coating to dry film thickness of 1 mil on surface exposed to view.
- .4 Apply manufacturers standard back coating to back face of sheet metal.
- .5 Flashings at roof curbs and similar roof-level conditions shall be VICWEST, prepainted, HMP Colorite VW 6071 Stone Grey; all other colours and gloss of finishes shall be selected by the Consultant.

.6 Supply of precoated metal to be installed in conjunction with preformed metal siding is included in specification for these systems. Form and install this sheet metal work under Work of this Section.

.3 Aluminum flashings (used over viewable surfaces such as coping/flashing): Aluminum sheet: ASTM B209 and ANSI H35.1 AA1100 aluminum alloy, H14 temper, minimum 3.0 mm thick. Finish: VW 4-SMX-30 Silver Metallic.

.4 Underlay for metal flashing: Felt: No. 15 asphalt saturated roof felt, to meet specified requirements of CSA A123.3.

.5 Isolation coating: Alkali resistant bituminous paint; 410-02 by Bakor Inc. or approved alternative.

.6 Peel and Stick Membrane Vapour Retarder: In accordance with Section 07 26 00, Vapour Retarders.

.7 Plastic cement: CAN/CGSB 37.5-M.

.8 Sealant: ASTM C920, Type S, Grade NS, Class 25; High-performance, medium-modulus, one-part, neutral-cure silicone sealant. 'CWS' by Dow Corning or approved alternative.

.9 Sealant: ASTM C920, Type S, Grade NS, Class 25; High-performance, medium-modulus, one-part, neutral-cure silicone sealant. 'CWS' by Dow Corning or approved alternative.

.10 Fasteners: CSA B111, Use only nails, bolts, screws and other fasteners of the same metal and with the same finish as the metal being fastened. Use fasteners of a size suitable for the particular fastening condition and service. Use only approved nails, bolts, screws and other fasteners.

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

.12 Touch-up paint: Same colour and material as [prepainted sheet steel] [aluminum], as recommended by prefinished coating manufacturer.

2.02 FABRICATION

.1 Fabricate copings, flashings, curb counter flashings, starter strips, and miscellaneous flashings in accordance with CRCA and to details shown.

.2 Fabricate all possible sheet metal in shop by brake forming, and bench cutting, drilling and shaping.

.3 Form bends with straight sharp lines, angles and arises; and sheets into true planes free from twists, buckles, dents and other visual distortions.

.4 Supply accessories required for installation of sheet metal specified in this Section. Fabricate accessories of same material as sheet metal with which they will be incorporated.

.5 Hem exposed edges 13 mm minimum on underside for appearance and stiffness. Mitre and seal corners with sealant.

PART 3: EXECUTION

3.01 INSTALLATION

.1 Install coping flashings, curb counter flashings, starter strips, and miscellaneous flashings to details shown on the Contract Drawings and in accordance with CRCA .

.2 Apply No. 15 roofing felt under sheet metal installed directly over masonry, concrete or wood. Secure felt in place, and lap joints 100 mm as sheet metal is installed. Turn up edges 150 mm where used on horizontal surfaces.

.3 Apply isolation coating to metal surfaces in contact with concrete or mortar.

.4 Install sheet metal exposed to view in straight lines, with junctions aligned and on same plan.

.5 Install sheet metal wherever possible in minimum lengths of equal 3000 mm on typical runs, except where conditions for securing dictates that shorter lengths are preferable.

.6 Install aluminum wherever possible in minimum lengths of equal 3650 mm on typical runs, except where conditions for securing dictates that shorter and equal lengths are preferable.

.7 Install sheet metal to prevent entry of water under service and weather conditions.

.8 Install sheet metal with concealed fastenings. Exposed fastenings will be permitted only as approved when concealed fastenings are impossible. Fasten sheet metal, clips and other components in an approved manner, with fasteners weathertight and evenly and neatly located. Do not use pop rivets.

.9 Join sheet metal by slip lock seams to permit thermal movement. Space joints evenly where exposed. Lock seam and solder internal corners. Form mitres with standing seams in precoated metal.

.10 Caulk joints with sealant as required to form weathertight seal between flashing and adjoining surfaces and between flashing and other Work. Sealing Work consists of bedding between members where possible. Tool sealant to concave profile where exposed.

.11 At exposed sheet metal install expansion joints with 200 mm wide hooked covers, bedded in caulking compound, fastened at one side only, and at intervals of approximately 7315 mm; or as otherwise shown on Drawings or approved.

.12 Install 50 x 75 mm cleats where required to fasten sheet metal. Secure each cleat to backing with 2 nails, space cleats at 3650 mm O.C. generally.

.13 Install edge strips in lengths of approximately 2430 mm, continuously, and with 6 mm between each length. Fasten at 300 mm O.C.

.14 Do not form open joints or pockets that fail to drain water.

.15 Caulk all reglets and open sheet metal joints that do not mechanically provide weathertight construction, in accordance with Section 07 92 00.

.16 Secure sheet metal by nailing at 150 mm O.C. where concealed, unless otherwise specified or indicated on Drawings.

.17 Roof Edge Trim: Install [prefinished sheet metal] [aluminum] trim secured by nailing and edge strip.

.18 Gutters, Scuppers: Install [prefinished sheet metal] [aluminum] as indicated on Drawings.

3.02 CLEANING

.1 Remove flux residue completely from surfaces and crevices, remove other deposits, stains or protections and wash metals left unpainted and exposed to view as recommended by the manufacturer of the metal.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCE

.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/CGSB 1.40, Anticorrosive Structural Steel Alkyd Primer.

.3 CAN/CGSB 1.122, Anticorrosive Vinyl Primer.

.4 CAN/CGSB 1.132-M, Zinc Chromate Primer, Low Moisture Sensitive.

.5 CAN/CSA G164-M, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.02 SUBMITTALS

.1 Submit shop drawings and maintenance instructions for specialties specified in this Section.

1.03 QUALITY CONTROL

.1 Tolerances: Fabricate specialties specified in this Section within tolerances specified for construction into which they are built.

1.04 DELIVERY, STORAGE AND HANDLING

.1 Package or crate, and brace products to prevent distortion in shipment and handling. Label packages and crates, and protect finish surfaces by sturdy wrappings.

.2 Deliver products to location at building site designated by Contractor.

PART 2: PRODUCTS

2.01 MATERIALS

.1 Incorporate reinforcing, fastenings and anchorage required for building in of products.

.2 Insulate between dissimilar metals, and metal and masonry materials, to prevent electrolysis with bituminous paint.

.3 Prime Paint on Steel: For finishing under Work of other Sections shall meet specified requirements of CAN/CGSB 1.40 for oil alkyd type structural steel primer, CAN/CGSB 1.122 for vinyl primer, or CGSB 1-GP-132M for zinc chromate primer as applicable for specified finish treatments.

.4 Galvanizing:

- .1 Zinc coated sheet; to meet specified requirements of ASTM A653/A653M, zinc coating designation G90.
- .2 Wipe coated sheet; zinc wiped coating 0.25 oz./sq.ft.
- .3 Zinc coated hardware; galvanized to meet specified requirements of CAN/CSA G164-M.

.5 Do not attach plates, or imprint or label products with manufacturer's name or trademark unless approved.

.6 Specified materials are minimum acceptable quality. Manufacturer's standards exceeding specified quality will be accepted.

2.02 ROOF PROTECTION

.1 Provide precast concrete pavers for access to HVAC units.

.2 Acceptable Manufacturer:

.1 Brooklin Paving Slabs – 450mm x 450mm, Standard Diamond Texture, Colour: Charcoal

.2 Or approved alternate.

PART 3: EXECUTION

3.01 INSTALLATION

.1 Provide manufacturer's information and templates required for installation of specialties specified in this Section, and assist or supervise, or both, the setting or anchorage devices, and construction of other installations incorporated with specialty products in order that they function as intended.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 ASTM C920, Specification for Elastomeric Joint Sealants.

1.02 SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.1 Product data: Submit copies of Product data in accordance with Section 01 33 00 describing type, composition and recommendations or directions for surface preparation, material preparation and material installation.

.2 Submit sample of sealant material specified, mount on material similar to that of location where sealant is to be used. Sample size to be no smaller than 100mm x 100 mm. Identify with project name and number, date, sealant type and manufacturer'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.

1.03 SITE CONDITIONS

.1 Do not install materials when ambient air temperature is less than 5° C, when recesses are wet or damp, or to manufacturer's recommendations.

1.04 WARRANTY

.1 Contractor hereby warrants that work of this section shall remain free from leaks and from defects in materials and workmanship in accordance with General Conditions, but for a period of 2 years, and agrees to promptly make good any defects which become apparent within warranty period. Defects shall include, but shall not be limited to, sag and failure in adhesion or cohesion.

PART 2 PRODUCTS

2.01 MATERIAL

.1 General:

.1 All sealant products to be certified low-VOC (ie. Below 250g/l). GC to submit proof of low-VOC compliance prior to application on site.

.2 Validation: sealants are to have the validation of Sealants and Weatherproofing 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.

.5 Properly formulate each sealant type for anti-sag characteristics when material is used in vertical and overhead locations.

.6 Sealants applied in exterior conditions for piping or conduit penetrations to be UV resistant.

.2 Refer to Sealant Schedule in Part 3 for locations and uses of sealants.

.3 Sealant Type 'A': One component polyurethane base, moisture curing conforming to ASTM C920. Type S, Grade NS, Class 25. Colour: As confirmed by LCBO coordinator.

.1 Tremco "Dymonic"
.2 BASF “MasterSeal NP1”
.3 Dow Corning “CWS or CCS”
.4 Bondaflex “PUR 25” (polyurethane) or Bondaflex “SIL 199” (silicone)
.5 Or approved alternate.

or

Sealant Type ‘AA’: Multi-component polyurethane base, chemical curing conforming to ASTM C920, Type M, Grade NS, Class 25. Colour: To match brick and Block Base

.1 W.R. Meadows "Pourthane NS/SL"
.2 BASF “MasterSeal NP2”
.3 Tremco "Dymeric"
.4 Sika “Sikaflex 2C NS/SL”
.5 Or approved alternate.

.4 Sealant Type 'B': One component silicone base sealant, chemical curing, anti-fungus composition, conforming to ASTM C920, Type S, Grade NS.

.1 Dow Corning "786 Mildew Resistant Silicone Sealant" or “Tub Tile and Ceramic”
.2 GE Silicones "Sanitary 1700"
.3 Sonneborn "Sonolastic Omniplus"
.4 Bondaflex “SIL 100 WF”
.5 Or approved alternate.

.5 Sealant Type 'C': Multi-component silicone, semi self-levelling type, conforming to ASTM C920, Type M, Grade P, Class 25.

.6 Sealant Type ‘D’: One component, moisture cured polyurethane based elastomeric sealant conforming to ASTM C920, Type S, Grade NS, Class 25.

.1 Sikaflex 1a by Sika Canada
.2 Or approved alternative by Tremco Ltd.

.7 Joint Backing: Round, closed cell foamed polyethylene; closed cell urethane foam; rubber; rubber tubing; non-migrating plasticised vinyl having Shore 'A' hardness of 20 and tensile strength of 20 - 30 psi, type of which is compatible with sealant type, and as recommended by manufacturer.

.8 Primer: Compatible type recommended and furnished by same manufacturer as sealant.

.9 Bond breaker: Type recommended by material manufacturers to prevent bonding of sealant to back of recess.

.10 Cleaning agents: As recommended by material manufacturer, harmless to substrates and adjacent finished surfaces.

PART 3 EXECUTION

3.01 PREPARATION

.1 Clean joints and spaces to be caulked and maintain dry and free of dust, loose mortar, oil, grease and other foreign material which may damage or destroy bond of sealant. Thoroughly clean sides of joints and spaces to establish good bond between sealant and adjacent materials.

.2 Clean ferrous metals of all rust, mill scale and foreign materials by wire brushing, grinding or sanding.

.3 Wipe metal surfaces to be caulked, except precoated metals, with cellulose sponges or clean rags soaked with ethyl alcohol, a ketone solvent, xylol or toluol and wipe solutions or compounds which will not injure finish and which are compatible with primer and sealant.

.4 Where joints are 12 mm or deeper, insert backing material in continuous 30% compression with set-back from finished face of adjoining materials equal to required depth of caulking (width/depth ratio) as recommended by manufacturer of sealant, but not less than a distance which leaves minimum 6 mm thickness of sealant.

.5 On horizontal traffic surfaces, support joint filler against vertical movement which might result from loads, including foot traffic.

.6 Prime surfaces of joints with primer to which adhesion is required, unless otherwise instructed by manufacturer.

.7 Where surfaces of materials adjacent to joints are likely to become coated with sealant during caulking operations, mask these surfaces with masking tape prior to priming and caulking.

3.02 APPLICATION

.1 Read other Sections of Specifications for extent of caulking provided by those Sections. Do all other caulking specified or required.

.2 Do not thin or adulterate sealants.

.3 When surfaces of adjacent materials are to be painted, do all caulking before these surfaces are painted.

.4 Where surfaces to be caulked are prime painted in shop before caulking, check to make sure prime paint is compatible with primer and sealant. When incompatible, inform Consultant and change primer and sealant to compatible type approved by Consultant.

.5 Apply caulking compound using pressure-operated guns fitted with suitable nozzles in accordance with manufacturer's directions. Apply caulking compound in such manner as to ensure good adhesion to sides of joints and to completely fill all voids in joint.

.6 Surface of caulking compound shall be worked smooth, free from ridges, wrinkles, sags, air pockets and embedded impurities. Keep surface of caulking flush with faces of adjacent surfaces, unless otherwise indicated on drawings.

.7 Remove masking tape, soils and all caulking compound which may have been deposited on surfaces near joint.

3.03 CLEANING

.1 Clean surfaces adjacent to joints, remove sealant smears or other soiling resulting from application of sealants. At metal surfaces, remove masking and other residue.

Do not to mar or damage finishes on materials adjacent to joints. Repair or replace marred or damaged materials.

3.04 CAULKING AND SEALING SCHEDULE

.1 Sealant Type 'A' & 'AA'
- .1 Apply at following locations:
  - .1 Perimeter of new window, door and wall frames; Colour to match masonry, or surrounding surfaces. If not installed in brick veneer, then colour of sealant shall match adjacent wall finish.
  - .2 Junction of wall panels and abutting materials; Colour to match masonry mortar. If not installed in brick veneer, then colour of sealant shall match adjacent wall finish.
  - .3 Locations not covered by trim; Colour to match masonry mortar.
  - .4 At any location indicated on drawings but not covered by foregoing. Confirm colour with LCBO.
  - .5 Or approved alternate.

.2 Sealant Type 'B'
- .1 Apply at following locations:
  - .1 At joint between washroom plumbing fixtures and walls/ floors;
  - .2 At junction of walls and vanity surfaces;
  - .3 At junction of equipment having horizontal work surfaces and walls;
  - .4 At junction of backsplash and walls.
  - .5 Or approved alternate.

.3 Sealant Type 'C'
- .1 Apply at any joints shown on drawings or required by work which are subject to foot traffic.

.4 Sealant Type 'D'
- .1 Apply at following resilient flooring locations:
  - .1 Areas where water may be tracked in from outdoors (i.e. vestibule areas)
  - .2 Where maintenance may create water that sits between transitional areas (i.e. quarry/linoleum, VCT/linoleum etc.)
  - .3 Around all other penetrations (i.e. floor outlets, drains, etc.) in order to prevent adhesive failure.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 AAMA 611, Voluntary Standards for Anodized Architectural Aluminum.
.2 ANSI A156.10, Power Operated Pedestrian Doors.
.3 ANSI H35.1, Alloy and Temper Designation Systems for Aluminum (Metric).
.4 CAN/CGSB-12.1-M, Tempered or Laminated Safety Glass.
.5 CAN/CGSB-12.8-M, Insulating Glass Units.
.6 CSA W47.2-M, Certification of Companies for Fusion Welding of Aluminum.

1.02 SUBMITTALS

.1 Product data:
  .1 Manufacturers product data and standard details shall be provided for automatic entrance doors, including fabrication, finishing hardware, operators, motion and Presence Sensing System, accessories and other components of the work.
  .2 Provide rough-in diagrams, wiring diagrams, parts lists, maintenance instructions, and certified test data.
  .3 Templates, diagrams and other data shall be furnished to fabricators and installers of related work, as needed for coordination of automatic entrance installation.
.2 Shop drawings:
  .1 Applicable shop drawings shall be submitted for the fabrication and installation of automatic entrance doors, motion and Presence Sensing System and associated components of the work and submitted to LCBO Design Co-ordinator for approval.
  .2 Indicate anchors, joint system, expansion provisions, hardware and other components not included in manufacturers standard data.
  .3 Include glazing details.
.3 Samples: Submit samples of sash, frame, sill and mullion sections and operating hardware, if requested and of each finish material.
.4 Maintenance instructions: Submit maintenance instructions for incorporation in Project Data Book.

1.03 QUALITY ASSURANCE

.1 Manufacturer's Qualifications: Door units shall be produced by a firm with not less than (5) five years successful experience in the fabrication of automatic doors of the type required for this project.
.2 Installer's Qualifications: Installer must be an authorized representative of the automatic door manufacturer for both the installation and maintenance of the type of units required for the project.
.3 Welder Qualifications: Perform welding of structural components only by fabricators certified by Canadian Welding Bureau to CSA W47.2 for welding of aluminum.

1.04 WARRANTY

.1 Automatic sliding doors shall be warranted to be free of any defects in material and workmanship, under normal use and service, (service includes preventive maintenance every 6 months by LCBO's door vendor), for a period of two years from the date of substantial performance without voiding the warranty.

.2 Defects in the fabrication and installation of units specified in this Section shall include, but shall not be restricted to: leaking, loosening of whole or of parts of units, breakage or deformation of unit metalwork, glass breakage from excessive stresses developed within the glazed unit or the glass (other than by accidental cause exterior to the glass and unit frame), and fading or discolouration of factory applied finishes.

PART 2: PRODUCTS

2.01 ACCEPTABLE PRODUCTS AND MANUFACTURERS

Sliding doors shall be pocket-style doors (active panel slides between two fixed panels, refer to drawings for door configuration), per the following manufacturers:

.1 Besam Canada Inc.:
  .1 Unislide Full Pocket Slider

.2 Horton Automatics:
  .1 Proslide Type 410

.3 Entrematic:
  .1 DS18 Pocket Door, Bi-Parting and Single Slide

.4 Nabco Entrances Inc.:
  .1 Model #1175-05 Single Slider
  .2 Model #1175-06, Bi-parting Slider

2.02 MATERIALS

.1 Aluminum:
  .1 Extrusions: ANSI H35.1 AA6063-T5, alloy and temper for framing, and otherwise where not exposed to suit specified and fabricator's requirements.
  .2 Exposed anodized sheet and plate: AA5005-H14, alloy and temper, or AA1100-H14, anodized quality.
  .3 Exposed surfaces of aluminum shall be free of die marks, scratches, blisters, "leave-off" marks, or other blemishes which are visible.

.2 Glass: To meet specified requirements of Section 08 80 00 and as specified for installation.

.3 Glazing Materials: Neoprene bulb type glazing gaskets with setting blocks to meet specified requirements of Section 08 80 00.

.4 Caulking: To meet specified requirements of Section 07 92 00

.5 Fastenings: AISI Stainless Steel Type 304.

.6 Anchors:
  .1 Exposed: Aluminum or stainless steel with aluminum materials, and otherwise to match metal anchored.
  .2 Non-Exposed: As for exposed or may be galvanized steel.

.7 Bituminous Paint: Bitumastic coating, acid and alkali resistant material.

.8 Thermal Separator: Solid extruded PVC sections with a durometer hardness between Shore "A" 75 and 85.

.9 Door vendor to provide "Form C" 3/4" recessed door contacts for connection to Security System.

2.03 DOOR FABRICATION

.1 The door shall include operator, header and track, sliding door(s), threshold, sidelight(s) and jambs. All structural aluminum header sections shall be no less than 5 mm thick and shall be capable of self support up to a length of 4878 mm on standard door size and glazing. The header shall be 100 mm deep by 150 mm high, the nylon covered track shall be replaceable without having to remove the operator and shall be 6 mm wide. Rollers shall be ledloy steel high quality ball bearing wheels 32 mm in diameter. Concealed guides shall stabilize bottom of sliding door panel. Anti-derailing means shall be a continuous extrusion full length of door travel. All unit types shall be perimeter mounted unless specifically designed to be surfaced mounted.

.1 Provide one-side tapered thresholds for Exterior Sliding Doors only.

.2 Provide thresholds for interior sliding doors at sidelight only. Thresholds at all interior sliding doors to have non-tapered edges.

.2 Telescoping (Space Saver) Door Units: Access to the operator and synchronizing mechanism shall be from both sides of the header. The sliding panels shall be equipped with a synchronizing cable and speed regulating mechanism that will cause the leading sliding panel to open twice as fast as the adjacent sliding panel. When the panels are in the open position they shall provide a net opening of approximately 70% of the overall package width. The sliding system shall be constructed of two separate tracks for the two-speed sliding door systems to travel.

.3 All exterior and coldroom doors shall be thermally broken.

.4 Sliding Door Panels and Sidelights: All structural aluminum sections shall have safety radius corners on all vertical rails. An adjustable astragal with double mohair weather-strip shall be provided on all strike rails. Joining vertical panel rails and horizontal rails shall have mohair weather-stripping. Door panel construction shall have mechanical joints. Door units provided with the emergency breakout feature shall require no more than 222 N (50 lbf) of force applied at the lock stile for the breakout panel to open. Swing-slide panels and swing-out sidelights shall include a torsion spring to re-close the door if pushed open in the direction of egress. Pushbars shall be sent loose to be field mounted if no midrail is specified on breakout units.

.5 Sliding Door Panels and Sidelight Options:

.1 Horizontal muntin (midrail)

.2 Medium and wide stile horizontal and vertical rails

.3 Prep for glazing 16 mm to 25 mm. It shall be noted that 12 mm glass and above is not recommended on sliding panels for the following reasons: maximum total weight of breakout panel shall not exceed 71 kg (156 lbs) as

per UL requirement and maximum total weight of non-breakout panel shall not exceed 91 kg (200 lbs).

.4 Provide directional stickers on doors and sidelights.

.6 Sliding Door Panel Hardware: Sliding panel shall have Security Lock (landlord to supply and install cylinders, hardware, etc.) Thumb Turn inside and standard cylinders outside. Biparting doors shall be provided with two-point deadlock hook bolt for adjacent panel or jamb and lock bolt into the top carrier frame. Hook bolt shall be installed to hook securely to reinforced post inside door assembly.

.1 The swing-side panel (SX) shall be installed to the exterior of the fixed sidelight (O) and shall slide along sidelight. All swing-slide panels shall swing out 90 degrees from any position of slide movement and shall be UL listed as an exit way.

.2 Provide cover plate on exterior door, in matching finish, installed so as to prohibit tampering with the lock.

.3 For Beer Cold Room door Panels, do not drill out panels for hardware.

.7 Form 'C' 3/4" recessed door alarm contacts to be provided by door manufacturer for future connection to Security System. Contacts to be provided on exterior doors only and in positions to cover both sliding and break-out functions.

2.04 OPERATOR

.1 Shall be an electromechanical, utilizing a 1/8 Hp, DC permanent magnet motor and unique linear drive to transmit power to the door. It shall be header mounted and concealed with a securely attached, removable cover.

.2 The Open Check, Open Cut-Off, Close Check, and Close Cut-Off microswitches shall be fully and independently adjustable and shall instruct the microprocessor master control on the sliding panel's position. Speed values for Open Speed, Close Speed, Open Check, Close Check, and Open Cushion parameters shall be programmable utilizing the operator's master control. Time values for Full-Open Time Delay and Partial-Open Time Delay shall also be programmable through the microprocessor control. Control shall include a digital display for diagnostic evaluation.

.3 The operator shall reverse when maximum force of 30 lbf (133 N) is exerted to prevent the door from closing. The reverser shall be field adjustable to meet job conditions.

.4 A power ON/OFF switch shall be located directly above the Operation Mode Select switch. Refer to 2.05. The OFF position shall serve as a programming mode. In the event of an electrical power failure or if the unit has been manually switched OFF the operator shall revert to free manual operation of the door.

.5 Power Fail Close: if power fails the door shall slide closed, but can still be operated manually.

.6 Electrical requirements: Contractor shall furnish and install all wiring to operator. 120 VAC, 60 cycle, 1 phase, 15 amp service shall be provided to each operator on a separate circuit breaker routed into header.

2.05 CONTROL SWITCH

.1 Motion and Presence Sensing System

.1 Sensing System for Automatic Sliding Door: Provide Sliding Door Sensing System. System consists of a planar K-band microwave technology to detect motion and focused active infrared Technology to detect presence, in a single housing. The focused active infrared presence overlaps the motion pattern. The active infrared is composed of 96 spots of detection made out of four rows of 24 spot of detection each (two rows on each side of the door). The focused presence technology never shuts off during the closing cycle of the door. Unit housed in black ABS plastic. The sensor shall have the option to be totally self –monitored (motion & presence) and temperature range 30 ° F to + 131° F. Mounting height, 2135 to 3658 mm above finished floor. The size of the unit is 360 mm W x 38 mm H x 35 mm D.

.1 Acceptable Manufacturer: Optex OA- Flex T – (2 Wizard units per sliding door), or approved alternate.

.2 Detectors shall be capable of distinguishing false impulse events, including rain, snow, and shall be unaffected by temperature changes, ambient light, or excessive traffic flow.

.3 Presence Technology Sensing System for Sidelight Protection

Presence sensor shall utilize focused active infrared technology. The unit shall be no larger than 250 mm L x 50 mm H x 38 mm D. The unit's adjustable detection pattern may be changed by switching lenses. This unit shall be water-resistant and shall have an adjustable self-adaptation time of 1 or 10 minutes. Operating temperature range of 30° F to + 131°F. Mounting height, 2135 to 3050 mm above finished floor. Active infrared pattern shall cover the sidelights and have a depth of 100 mm.

.1 Acceptable Manufacturer: Optex OA-Flex T (1 unit per sidelight), or approved alternate.

.2 The master control shall have five modes of operation: Automatic, Closed/Locked, Open, Reduced One-way, Reduced, One-way, all sensors shall remain enabled throughout the hold-open and closing modes for maximum safety, per ANSI A156.10.

.1 Provide Operation Mode Select switch at interior surface of latch side of door frame, 1829 mm (6’-0”) above finished floor.

2.06 OPERATIONS SEQUENCES

.1 Installer to sequence the activation of vestibule sliding doors according to proper approach side condition as determined by fixture layout and direction of planned pedestrian traffic flow.

.1 Vestibule to exterior sliding door: activation sensor to detect pedestrian movement on both interior and exterior sides.

.2 Vestibule to retail sliding door: vestibule side sensor activation (typical), retail side sensor activation required only if on a designated egress path.

1. Sliding door vendor to refer to Architectural Drawings to verify designated egress path.

.3 Retail to Vestibule sliding door: retail side sensor activation (typical).

.4 Retail Area to Beer Cold Room: activation sensor to detect pedestrian movement on both main retail area and beer cold room sides.

2.07 FINISH

.1 Clear anodized finish: Clear anodic oxide treatment to AAMA 611 per Aluminum Association Designation System for Aluminum Finishes AA-M12C22A41.

PART 3: EXECUTION

3.01 INSPECTION

.1 Installer must examine the areas and conditions under which automatic doors are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of work. Do not proceed with the work until all unsatisfactory conditions have been corrected in a manner acceptable to the installer and in accordance with approved shop drawings.

3.02 INSTALLATION

.1 Install sliding door system in accordance with manufacturers instructions, specifications and reviewed shop drawings.

.2 Install units plumb, level and in accordance with shop drawings, by qualified experienced workers and to conform to fabricator's instructions.

.1 All units are to be slab-on-grade installed such that sidelight thresholds are flush with interior finished floor tile. Use shims to account for height of future floor tile installation while ensuring breakaway door operation is not impeded by floor tile. Unit installer to coordinate with floor tile installer as required.

.3 Do not force units into place, nor superimpose on them loads for which they were not designed.

.4 Provide for thermal movement to take place between units and adjacent construction.

.5 Secure units by non-corrosive and inorganic anchorage materials.

.6 Conceal anchors, clips, blocking, and all other attachments.

.7 Provide reinforcing and supporting members as indicated and required structurally.

.8 Seal metal-to-metal joints between components provided by this Section to ensure a weathertight assembly, and in accordance with sealant manufacturer's specifications.

.9 Fill voids between frames and rough openings, and in mullions with glass wool.

.10 Install units with consideration for finish variations. Abrupt variations of appearance or colour in adjacent components will not be acceptable without approval before installation.

.11 Make connections to services and operator as required to make doors function.

.12 Caulking: Caulk joints between frame members, sills and thresholds, and adjacent construction.

.13 Glazing: Install glass in units in accordance with Section 08 80 00 of the Specifications.

3.03 ADJUSTMENT AND CLEANING

.1 Clean surfaces promptly after installation and shall lubricate operating equipment for optimum condition and safety. Contractor shall be advised of protective treatment and other precautions required through the remainder of the construction period, to ensure that doors will be without damage or deterioration, other than normal weathering, at the time of acceptance.

.2 Adjust operator and controls for optimum condition and safety.

.3 Allow for three site visits for fine tuning of system.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 Standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association and to meet barrier free requirements where required.

.2 BHMA, Builders Hardware Manufacturing Association.

1.02 SUBMITTALS

.1 Hardware Schedule and Shop Drawings:

.1 The hardware specialist shall prepare and submit shop drawings containing a completely itemized schedule of hardware for review. The schedule of hardware shall list all doors by number (in sequence) and location with complete details of the hardware to be supplied, including installation heights and special instructions. Format of schedule to be approved.

.2 Hardware schedule shall incorporate catalogue numbers of hardware as specified, including material, function and finish as well as all alternatives which have been accepted. Submit appropriate catalogue literature.

.3 Contractor shall furnish copies of final reviewed shop drawings to the doors and frames fabricators and to the door and hardware installers.

.2 Templates:

.1 The hardware specialist shall promptly furnish templates and information necessary for proper preparation of doors and frames and for the installation of hardware to the doors and frames fabricator and to the doors and hardware installer, in ample time to facilitate the progress of the work.

.3 Maintenance instructions manual

.1 Prior to Date of Substantial Performance, hand over to the Owner, a manual containing a final "as built" hardware schedule, full instructions for the adjustment, maintenance, spare part list etc. of all hardware items, together with special keys, wrenches etc. required to carry out normal adjustments to hardware.

.4 Warranty

.1 Medeco Manufacturer’s Warranty and installation of cylinders: Submit Warranty document which covers repair or replacement of defective cylinders or labour for one year after date of Substantial Completion

1.03 QUALITY ASSURANCE

.1 Have the supervision, administration and servicing of the work of this section performed by a hardware specialist certified as an Architectural Hardware Consultant (A.H.C.).

.2 Have the installation of hardware performed by a firm which specializes in this work.

.3 The hardware installer shall fully cooperate with the hardware specialist to ensure doors and hardware are properly and securely installed and that the installed doors and hardware are functioning properly to the approval of the Consultant.

1.04 INSPECTION AND SUPERVISION

.1 The hardware specialist shall examine the drawings, Hardware Schedules and shop drawings to determine final dimensions, sizes and quantity of the hardware items required, ensure that the hardware listed shall fit and operate properly and make adjustments to the hardware at no extra cost to the Owner.

.2 The hardware specialist shall obtain and examine shop drawings for doors and frames to ensure proper provisions and preparations for hardware are made.

.3 The hardware specialist shall make periodic inspections of the hardware and door installations, report improper and unsatisfactory conditions and expedite the replacement or correction of faulty hardware.

.4 The hardware specialist and the door and hardware installer shall attend job site meetings when so requested.

1.05 DELIVERY AND STORAGE

.1 Deliver and store each hardware item in the manufacturers' original containers. The containers shall be clearly labeled as to content and door on which the hardware is to be installed in accordance with the shop drawing schedule of hardware.

.2 Store finish hardware in locked, clean and dry area.

.3 The hardware specialist shall be responsible for ensuring the timely delivery of hardware so that all on site work progresses without delay and interruptions.

1.06 EXTENDED WARRANTY

.1 Fully warranty locksets and latchsets for a period of three (3) years from the date of Substantial Performance of the Project.

.2 The warranty shall state expressly that all hardware will be replaced on the doors and frames at no cost to the Owner in the event of breakage or other defect occurring, willful damage excluded.

PART 2: PRODUCTS

2.01 MATERIALS

.1 Hardware - General:

.1 Hardware shall be as specified herein and as specified on the drawings.

.2 All hardware shall be by Schlage or approved alternative and accept Medeco cores.

.3 Installed hardware shall comply with applicable fire and building codes and requirements of local authorities having jurisdiction over doors and hardware.

.4 All hardware applied to metal doors and frames shall be made to template.

.5 All hardware shall be supplied complete with all necessary screws, bolts and other fastening of suitable size and type to anchor the hardware in position

neatly and properly in accordance with the best practices and to the Consultant's approval.

.6 All fastenings shall harmonize with the hardware as to materials and finishes.

.7 Use one manufacturer's products only for all similar items.

.2 **Hinges**: To ANSI/BHMA A156.1, ball bearing, 115 mm high, button tip, non rising pins, standard weight, steel.

.1 Provide minimum 2 pair butts for doors 2135 mm in height; 3 pair butts for over sized doors.

.2 Where specified, provide and install hinges with non-removable pins or with safety stud feature to prevent doors being removed from frames even if pins are removed.

.3 Stamp hinge catalogue numbers on face of leaf of each hinge at factory to enable easy recognition of hinge material and manufacture after doors are hung.

.3 **Locks and Latches** (bored): To ANSI/BHMA A156.2 Series 4000, Grade 2, designed for function and keyed as stated in Schedule, 70 mm backset, latch bolt throw 19 mm, knobs of plain round design, escutcheons, finished to satin chrome.

.1 Latch bolt: To ANSI/BHMA A156.5.

.2 Provide and install all locks and latches exactly as specification complete with cylinders. Contractor to supply and install new “Medeco” lock core, at retail turnover, by a bondable locksmith (date TBC with LCBO).

.1 Scope includes: All lockable millwork cabinets complete with lock cylinder/core/trim rings, sliding door locks, all folding security grille locks, office door lock, THC unit lock(s) where applicable, loss-prevention cage pad-lock.

.3 Strikes shall be box type, with lip projection not beyond jamb ASA dimensions. Strikes shall be ASA standard size with curved lip strikes for latch bolts and no lip strikes for dead locks. Provide complete with wrought boxes finished to match strike.

.1 Universal washroom to receive fail-safe electric strike complete with latch bolt monitor and be operable by “OP” key, refer to Scope listed in Keying below.

.1 Lever on approach side of door to be disconnected from bolt.

.2 Lever on washroom side to engage/disengage latch bolt.

.4 All locks installed on labeled fire doors and frames shall bear the ULC label.

.4 **Keying**:

.1 All new lock cores and keys to be Medeco for installation in deadlocks provided with special doors as listed in hardware schedule. Key into keying system as directed.

.2 One key to operate all locks to gain access to LCBO premises from outside (vestibule, sliding doors and folding grille). Locksmith shall engrave the key with “ENT” for *entrance*.

.3 A separate key operates all other items not including vestibule sliding doors and folding grille, refer to Scope listed in Locks and Latches above. Locksmith shall engrave the key "OP" for *operations*.
.4 Provide 5 engraved copies of each of these two keys (10 keys in total).
.5 Stamp all keys "DO NOT DUPLICATE".

.5 **Keypad Locks**: Provide keypad locks at offices "L1076 M" by Kaba Ilco, "CO-100 Standalone Electronic Lock" by Schlage or approved alternative.

.6 Reserved.

.7 **Stops**: to ANSI/BHMA A156.16.
.1 Supply and install floor stops exactly as specified in brushed chrome finish. Cast zinc stops are not acceptable.
.2 Supply and install wall bumpers equal in design to the type specified. Other designs of wall bumpers are not acceptable.
.1 Wall type bumper: convex pad, no visible fasteners, type L42101, finish 688
.2 Wall type bumper: concave pad, no visible fasteners, type L42251, finish 688.
.3 Wall stops shall not be installed on gypsum board partitions.
.4 Floor stops shall be installed so as not to create a tripping hazard.

.8 **Door Sweeps**:
.1 Automatic.

.9 **Pushplates and Kickplates**: To ANSI/BHMA A156.6, Type J106 metal aluminium bevelled edges, square corners, width less 16 mm on push side of door and 25 mm on pull side of door than width of door x 150 mm high.
.1 Brushed chrome finish, 1.2 mm (18 ga.) thick, from same manufacturer with self tapping, oval head screws at maximum 150 mm o.c. around perimeter of plates.

.10 **Door closers**: To ANSI/BHMA A156.4, surface mounted, parallel arm, modern type closer with cover, size as per recommended door size listed in standard, with back checking action, equipped with hold-open arm when specified, and equipped with arms or brackets where required.

.11 **Bi-passing sliding door hardware**: to ANSI/BHMA A156.14, Type D8731, 54 kg capacity without valance.

.12 **Exit devices**: To ANSI/BHMA A156.3, flat, full width, rim type, modern-style touch bar design with removable cover plates concealing mechanism and fasteners. Cover aluminum, colour selected by LCBO. Inside key locks or unlocks knob or lever. Outside key retracts latch.

.13 Reserved.

.14 **Door Viewer**: "PEEK-O" revolving viewer, as manufactured by Canaropa Security Hardware.

.15 **Padlock**: Heavy duty "Protector II" padlock or alternate, as manufactured by Medeco Canada. Keyed to "Operations" key. Supplied and installed by general contractor.

PART 1: GENERAL

1.01 REFERENCES

.1 ASTM C920, Specification for Elastomeric Joint Sealants.
.2 CAN/CGSB-12.1-M, Tempered or Laminated Safety Glass.
.3 CAN/CGSB-12.3-M, Flat, Clear Float Glass.
.4 CAN/CGSB-12.5-M, Mirrors, Silvered.
.5 CAN/CGSB-12.6-M, Transparent (One-Way) Mirrors.
.6 CAN/CGSB-12.8, Insulating Glass Units.
.7 CAN/CGSB-12.9-M, Glass, Spandrel.
.8 CAN/CGSB-12.20-M, Structural Design of Glass for Buildings.
.9 CAN/CGSB-12.11-M, Wired Safety Glass.
.10 CAN/CGSB-19.13-M, Sealing Compound, One Compound, Elastomeric, Chemical Curing.
.11 Insulating Glass Manufacturer's Alliance (IGMA)

1.02 DESIGN REQUIREMENTS

.1 Limit glass deflection to flexural limit of glass with full recovery of glazing materials.
.2 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.
.3 Perform a thermal stress analysis on each insulating unit and provide heat strengthening units as necessary to prevent thermal breakage.
.4 Design glass to CAN/CGSB-12.20-M. Perform stress analysis. Design units to accommodate live, dead, lateral, wind, seismic, handling, transportation, and erection loads.
.5 Structural glazing:
  .1 Single Source Responsibility for Sealants, Gaskets and Other Glazing Accessories: In order to ensure consistent quality of performance, provide all glazing sealants and seals from a single manufacturer.
  .2 Preconstruction Compatibility and Adhesion Testing: Submit to sealant manufacturer, samples of each glass, gasket, glazing accessory and glass-framing member that will contact or affect glazing sealants for compatibility and adhesion testing. Schedule submission of test samples to provide sufficient time for testing and analysis of results to prevent delay in the progress of work.
.6 All glass to be Laminated, unless stated otherwise.

1.03 SUBMITTALS

.1 Shop drawings:
  .1 Submit shop drawings 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 sample of each type of glass.
.3 Certificates:
  .1 Submit manufacturer's certification that glass and glazing materials are compatible.
.4 IGMA Compliance Audit:

.1 Submit a written certification of successful completion of a Compliance Audit within the last six months.

1.04 QUALITY ASSURANCE

.1 Insulating glass unit fabricators shall be a certified member of the Insulating Glass Manufacturer's Alliance (IGMA). IGMA members must participate in the certification program and shall have successfully passed a Compliance Audit within the last six months.

.2 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.

.3 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.

1.05 DELIVERY, STORAGE AND HANDLING

.1 Label each piece of glass, and each container of glazing compound of sealant to indicate manufacturer, type, and quality. Leave labels on glass until final cleaning.

1.06 SITE CONDITIONS

.1 Environmental Conditions:

.1 Proceed with glazing only when glazing surfaces are accumulating no moisture from rain, mist or condensation.

.2 When temperature of glazing surfaces is below 4°C, obtain approval of glazing methods and protective measures which will be used during glazing operations.

1.07 WARRANTY

.1 Submit a warranty of the installation of insulating glass covering the period for four years beyond the expiration of the warranty period specified in the General Conditions of the Contract. Deflects in glass units shall include, but shall not be restricted to, breakage (other than by accidental cause exterior to the glazed unit after installation of the glass) and loss of seal. Fogging of glass inside sealed units will be considered sufficient evidence of loss of seal.

PART 2: PRODUCTS

2.01 MATERIALS

.1 Acceptable manufacturers: Glass shall be manufactured by AGC Glass, Guardian Industries, Okalux OSG, Pilkington Mirropane, PPG or Viracon Inc.:

.1 Polished Plate or Float Glass: To meet specified requirements or CAN/CGSB-12.3-M, Glazing Quality.

.2 Clear Wired Glass: Polished Georgian wired plate, to meet specified requirements of CAN/CGSB 12.11-M, Type 1, Style 3.

.3 Insulating Glass Unit: To meet specified requirements of CAN/CGSB-12.8-M, with double sealed edge binding, 13 mm air space, and 6 mm thick clear glass inner and outer lites. Refer to Glazing Schedule for inner-outer (laminated-laminated and laminated-tempered) combinations.

.4 Laminated Safety Glass:

.1 Standard: CAN/CGSB-12.1-M, Category II, consisting of top layer of 3 mm thick clear float glass, 0.8 mm thick clear PVB interlayer, and bottom layer of 3 mm thick clear float glass.

.2 Sliding operator doors: CAN/CGSB-12.1-M, Type 1, Class B.; Laminated glass consisting of two 3 mm thick glass panes laminated together, laminating film thickness: 1.52 mm.

.3 Laminated glass as necessary to prevent thermal breakage.

.5 Spandrel glass: CAN/CGSB-12.9-M, 6 mm thick unless otherwise indicated, with water-based silicone emulsion coating applied to backside, 'Opaci-Coat 300' by Oldcastle Glass or approved alternative. Colour: To match #3-1850 'Kendall Charcoal' (Benjamin Moore #HC-166). Insulation and metal back pan are as noted under glazing accessories.

.6 Silvered mirror glass: To CAN/CGSB-12.5, 6 mm thick, Type 1A - Float glass for normal use.

.7 One-way mirrored glass, by Pilkington Mirropane:

.1 Standard: CAN/CGSB-12.6,

.2 Visible Light Transmittance 11%,

.3 Visible Reflectance (Coated Side) 68%,

.4 Visible Reflectance (Glass Side) 16%,

.5 Durable pyrolytic coating

.6 Tempered glass 6 mm thick.

.8 Heat Treated Safety Glass: Tempered glass to meet specified requirements of CAN/CGSB-12.1-M, Type 2, Class B, Category II, clear, minimum 6 mm thick.

.2 Glazing Accessories:

.1 Standard: Setting Blocks: Neoprene, of durometer hardness of Shore "A" 70 to 90.

.2 Setting Block (Structural Glazing): Silicone Setting Blocks.

.3 Rigid insulation for spandrel panel as identified in Section 07 21 00.

.4 Metal back pan as identified in Section 08 41 13.

.3 Glazing Sealants:

.1 Ensure that glazing sealants are completely compatible with insulating glass unit sealants.

.2 One Part Silicone Glazing Sealant: To meet specified requirements of CAN/CGSB-19.13-M, in glazing hardness grade.

.3 Glazing Tape: 'Visionstrip' by Tremco Ltd., extruded composite glazing, size as recommended by manufacturer.

.4 Dry Glazing: Unit manufacturer's standards as approved by Consultant.

.5 Glazing Sealant (Structural Glazing):

.1 Silicone, One Part in accordance with ASTM C920, Type S or M, Grade NS, Class 25.

.2 Structural glazing tensile bead: 'Spectrem 2 Sealant' by Tremco or 'Dow 795' by Dow Corning.

.3 Structural glazing weather bead: 'Spectrem 2 Sealant' by Tremco or 'Dow 795' by Dow Corning.

.4 Structural glazing (factory glazed): Two-part, neutral cure silicone sealant, 'Proglaze ll' by Tremco or 'Dow 983' by Dow Corning.

.5 Colour to later selection of Consultant.

.4 Combination Security and Ultra-violet Film:

.1 Interior surface application acceptable product:

.1 "PRS70" by 3M

1. Applied on non-laminated glass.
2. Functions as Security and UV Control in one-film.

.2 Installation

.1 Remove existing window treatments prior to installation of security film

.2 Install security and ultra-violet combination laminate on inside surface of glazing as recommended by manufacturer

.3 Sealant:

.1 As recommended by Film manufacturer

PART 3: EXECUTION

3.01 INSTALLATION

.1 Provide glazing in accordance with IGMA recommendations, manufacturer's written instructions, and ensure that each material in a glazing system is compatible with the others. Provide continuous contact between glazing tapes and gasket to the glazing.

.2 Ensure that projections have been removed from rebates and that sufficient width and depth clearances are provided for specified glass.

.3 Remove stops and store during glazing to avoid damage to them.

.4 Do not set any glass without glazing beds or gaskets.

.5 Glass:

.1 Install glass in thickness to comply with Ontario Building Code requirements.

.2 Cut glass to fit openings and to allow clearances which will ensure that glass is held firmly in place and is not subjected to stresses.

.3 Ensure that glass edges are clean cut, not nipped or seamed.

.4 Replace oversize or flared lights with entirely new units or proper dimensions.

.5 Glazing Preparation and Methods: Clean glazing rebate surfaces of all traces of dirt, dust, or other contaminants.

.6 Positioning Glass: Support glass, in lights of over 2540 mm perimeter, by two setting blocks, one at each quarter point of each light.

.7 Tape Bedding at Fixed Stops: Cut tapes of full depth of stop accurately to length on a work table. Set sill and head tapes first at full length of rebated opening. Butt jamb tapes into sill and head tapes tightly to weld them together. Remove protective paper backing only when glass is ready for setting, and ensure that

butted joints of tape are positively filled with applied sealant.

.8 Bedding at Stop Beads: Apply tape to removable stops as specified for fixed stops.

.9 Mirrors:

.1 Mounting height: no higher than 1000 mm. Ensure that mirror starts above the 100 mm lever handles.

.2 Provide one-piece 12 mm stainless steel channel frame with mitred corners.

.1 20 gauge stainless steel

.2 #4 Satin Chrome finish

.3 Provide backup as required to provide plumb mounting.

.10 Structural Glazing: Glaze units in accordance with reviewed shop drawings and in accordance with manufacturer's written instructions.

.6 Glazing Films:

.1 Install glazing films and edge sealants as recommended by manufacturer

.2 Install films in a manner such that there are bubbling and de-lamination of films does not occur.

.3 Schedule installation with LCBO Coordinator and Store Manager, and perform all installations in warm weather conditions.

3.02 ADJUSTMENT AND CLEANING

.1 Replace scratched, etched, or defective glazing resulting from manufacture, setting, handling, or storage before or during installation. Glass accidentally broken or physically damaged, by other than faulty glazing or materials, after glazing by this Section has been completed shall be replaced as specified in the General Conditions of the Contract.

.2 Remove stains, deposits, marks or blemishes caused by this Section from surfaces of all materials exposed to view. Replace materials that cannot be cleaned to appear as new.

.3 Remove excess glazing sealants from adjacent surfaces, including glass, during working life of material, and by methods not harmful to the surfaces.

.4 Collect broken glass and cuttings in boxes and remove from site.

3.03 PROTECTION

.1 Following glazing, mark each light of glass, except heat absorbing, to indicate its presence with a material, easily removable and harmless to glass.

3.04 GLAZING SCHEDULE

.1 Automatic Sliding Doors, side panels and transoms, specified in Section 08 32 00:

.1 Insulating glass units (Exterior): CAN/CGSB-12.8-M; 25 mm overall thickness. Laminated inside, laminated outside.

.2 Interior: 6mm clear laminated glass.

.3 Glazed by Section 08 32 00 in accordance with manufacturers standard methods as approved, and this section.

.2 Aluminium Entrances, windows (Exterior), specified in Section 08 41 13:

.1 25 mm thick hermetically sealed glass units, 6 mm thick clear laminated glass outer lite and 6 mm thick clear tempered glass inner lite.
.2 Glazed by Section 08 41 13 in accordance with manufacturer's standard Methods as approved, and this section.

.3 Aluminium Entrances, doors (Exterior), specified in Section 08 41 13:
.1 25 mm thick hermetically sealed glass units, 6 mm thick clear laminated glass inner and outer lites.
.2 Glazed by Section 08 41 13 in accordance with manufacturer's standard Methods as approved, and this section.

.4 Aluminium entrances, vestibule doors, side panels and transoms (Interior, standard application), specified in Section 08 41 13:
.1 6mm thick clear laminated glass – no tint.
.2 Glazed by Section 08 41 13 in accordance with manufacturers standard methods as approved, and this section.

.5 Aluminium entrances, vestibules and doors (Walk-in Cooler), specified in Section 08 32 00:
.1 Insulating glass units (Interior): CAN/CGSB-12.8-M; 25 mm overall thickness. 6 mm thick clear tempered glass inner and outer lites.
.2 Glazed by Section 08 41 13 in accordance with manufacturer's standard method as approved, and this section.

.6 Frameless Clear Glass (Interior) as shown on Drawings, located at Vestibule:
.1 12 mm thick clear laminated glass.

.7 Mirrors: Provide and install all washroom mirrors throughout the project.

.8 One-way tempered glass (Interior) as shown on Drawing sheets, located at Office.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 ASTM C475, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

.2 ASTM C645, Specification for Non-Load Bearing (Axial) Steel Studs, Runners (Tracks), and Rigid Furring Channels for Screw Application of Gypsum Board.

.3 ASTM C754, Specification for Steel Framing Members to Receive Screw-Attached Gypsum Board.

.4 ASTM C840, Specification for Application and Finishing of Gypsum Board.

.5 ASTM C1002, Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.

.6 ASTM C1047, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base

.7 ASTM C1396, Specification for Gypsum Board.

.8 ASTM F1267, Standard Specification for Metal, Expanded, Steel.

1.02 DESIGN REQUIREMENTS

.1 Design ceiling suspension system in accordance with manufacturer's printed directions and ASTM C754.

.2 Design ceiling system for adequate support of electrical fixtures as required by the current bulletin of the Electrical Safety Authority.

.3 Design hanger anchor and entire suspension system static loading not to exceed 25% of their ultimate capacity including lighting fixture dead loads.

.4 Design suspension system to support weight of mechanical and electrical items such as air handling boots and lighting fixtures, and with adequate support to allow rotation/relocation of light fixtures.

.5 Design subframing as necessary to accommodate, and to circumvent, conflicts and interferences where ducts or other equipment prevent the regular spacing of hangers.

1.03 SUBMITTALS

.1 Product Data: Submit Product Data indicating performance criteria, compliance with appropriate reference standard, characteristics and limitations.

.2 Shop Drawings: Submit engineer stamped shop and erection drawings in accordance with the requirement of Division 01 for Approval. Include engineer stamped shop drawings for metal stud walls between Retail area and Warehouse area and between Retail Area and Office. Include all necessary shop details and erection diagrams. Indicate member sizes, locations, thicknesses exclusive of coating, coatings, and material types. Include connection details for attaching framing to itself and for attachment to the structure. Indicate dimensions, openings, requirements of related work and critical installation procedures.

.3 Certifications: Submit written certification stating that suspended ceiling system is designed for adequate support of electrical fixtures as required by the current bulletin of the Electrical Safety Authority.

PART 2: PRODUCTS

2.01 MATERIALS

.1 Standard board and Type 'X': To ASTM C1396, 13 mm, 16 mm and 19 mm thick as indicated on drawings, 1200 mm wide x maximum practical length, ends square cut, edges squared. As manufactured by CertainTeed, CGC Inc., or G-P products.

.2 Water resistant board: To ASTM C1396 treated to resist moisture, 13 mm thick, 1200 mm wide x maximum practical length. As manufactured by CertainTeed, CGC Inc., or G-P products, or approved alternate.

.3 Metal furring runners, hangers, tie wires, inserts, anchors: To ASTM C645, galvanized.

.4 Drywall furring channels: 0.5 mm (26 ga.) core thickness galvanized steel channels for screw attachment of gypsum board.

.5 Non-loadbearing channel stud framing: To ASTM C645, stud sizes and gauges as indicated, roll formed, hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock out service holes at 450 mm centres. For load bearing studs, at retrofit of an Impact Door, refer to Section 08 38 19.

.6 Floor and ceiling tracks: To ASTM C645, in widths to suit stud sizes, 32 mm flange height.

.7 Insulating strip: Rubberized, moisture resistant 6 mm thick cork or foam strip, 50 mm wide, with self sticking adhesive on one face, lengths as required.

.8 Batts (*in retail office and washroom walls*):Refer to Section 07 21 00 Building Insulation.

.9 Waterproof membrane: 1.5 mm thick, single-ply, self adhering, self sealing, rubberised asphalt, bonded to a cross-laminated high density polyethylene film. 'Blueskin WP 200' by Bakor Inc., 'Colphene 3000' by Soprema, or 'Mel-Rol' by W. R. Meadows, or approved alternate.

.10 Steel drill screws: To ASTM C1002.

.11 Casing beads, corner beads, control joints and edge trim: To ASTM C1047, ABS or PVC or metal, zinc-coated by hot-dip process, 0.5 mm (26 ga.) base thickness, perforated flanges, one piece length per location.

.12 Joint compound: To ASTM C475, asbestos-free.

.13 Reserved.

.14 Vestibule access panel:

- .1 Acceptable Manufacturer:
  - .1 Baucoplus BP12-2424 – 610 x 610 mm door for 13mm thick drywall ceiling. For 16mm drywall, provide BP58-24x24.
  - .2 Or approved alternate.
- .2 Door: Aluminium frame with gypsum board inlay and structural nylon corner elements.
- .3 Frame: Recessed aluminium frame to provide edge similar to drywall bead against which ceiling can be finished.
- .4 Materials:
  - .1 Extruded aluminium alloy 6063-T6
  - .2 Standard 16 mm gypsum board inlay

.3 Fibreglass reinforced nylon.
.4 Zinc-plated screws, stainless steel springs and retaining wire.

.5 Finish: Aluminium frames, gypsum board, nylon and aluminium cam latch to receive same finish and paint as surrounding surface.

.6 Hinge: Patented, concealed, two-point pin hinge, non-corroding. Allows door to open 120 degrees. Door can be removed.

.7 Latch: Flush screwdriver cam latch.

.8 Schedule: Install one BP12-24x24 access panel in Vestibule ceiling.

.15 Warehouse access panel:

.1 Steel access panel 24" x 36" – 610 x 915 mm door.

.2 Finish: Two coats alkyd enamel to match adjacent wall finish.

.3 Schedule: Install one painted steel 24" x 36" access panel, at 2400mm above finished floor, in warehouse wall to access space above beer coolers. Coordinate final location with refrigeration contractor.

PART 3: EXECUTION

3.01 ERECTION

.1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.

.2 Install work level to tolerance of 1:1200.

.3 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles.

3.02 INSTALLATION OF FRAMING

.1 Align partition tracks at floor and ceiling and secure at 400 mm o.c. maximum.

.2 Install dampproof course under stud shoe tracks of partitions on slabs on grade.

.3 Place studs vertically at spacing indicated and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.

.4 Erect metal studding to tolerance of 1:1000.

.5 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.

.6 Co-ordinate erection of studs with installation of door and sidelight frames and special supports or anchorage for work specified in other Sections.

.7 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.

.8 Erect track at head of door to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.

.9 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.

.10 Provide blocking or furring channel secured between studs for attachment of fixtures as and where required.

.11 Install steel studs or furring channel between studs for attaching electrical and other boxes.

.12 Maintain clearance under steel deck to avoid transmission of structural loads to studs. Use extended leg ceiling tracks or double track slip joint.

.13 Install continuous insulating strips to isolate studs from uninsulated surfaces.

3.03 RESERVED

3.04 INSTALLATION OF GYPSUM BOARD

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm oc.

.2 Install all furring and runner channels radius to suit ceilings shown on reflected ceiling plan. Construct bulkheads and maintain curvatures as shown on the drawings.

.3 Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical work are approved.

.4 Apply single layer gypsum board to metal furring or framing using screw fasteners. Maximum spacing of screws 300 mm oc.

.5 Apply water resistant gypsum board where wall tiles to be applied and at core area. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.

.6 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.

.7 Control Joints:

- .1 Construct control joints of two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint. Provide continuous dust barrier.
- .2 Install control joints straight and true.
- .3 Install control joints at 9000mm maximum spacing in continuous runs.
- .4 Install control joints at steps in walls and bulkheads, at areas of anticipated deflection, twist, creep and sway, and at walls subject to vibration.

.8 Construct expansion joints at building expansion joints.

.9 Install access doors to electrical and mechanical fixtures specified in respective Sections, and as required for concealed mechanical and electrical installation.

.10 Rigidly secure frames to furring or framing systems.

.11 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

.12 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.13 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.

.14 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.15 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

.16 Ensure all areas receiving wall coverings are completely smooth and free of any imperfections that may telegraph through the wall covering, or adversely affect the adhesion of the wall covering.

3.05 Reserved.

3.06 REPAIR

1. Make good cut-outs for services and other work, fill in defective joints, holes and other depressions with joint compound.
2. Make good defective work, and ensure that surfaces are smooth, evenly textured and within specified tolerances to receive finish treatments.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 ASTM A653/A653M, Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealled) by the Hot-Dip Process.

.2 ASTM C37, Specification for Gypsum Lath.

.3 ASTM C475, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

.4 ASTM C645, Specification for Non-Load Bearing (Axial) Steel Studs, Runners (Tracks), and Rigid Furring Channels for Screw Application of Gypsum Board.

.5 ASTM C754, Specification for Steel Framing Members to Receive Screw-Attached Gypsum Board.

.6 ASTM C1002, Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.

1.02 SUBMITTALS

.1 Product Data: Submit Product Data indicating performance criteria, compliance with appropriate reference standard, characteristics and limitations.

.2 Shop Drawings: Submit Shop Drawings to LCBO Design Co-ordinator for Approval.

PART 2: PRODUCTS

2.01 RESERVED.

2.02 MATERIALS

.1 Steel framing: ASTM C754.

.1 Bailey Metal Products Limited

.2 Corus Metal Profiles

.3 Or approved alternate.

.2 Galvanized steel sheet: ASTM A653/A653-M, Z275; cold rolled, galvanized steel sheet.

.3 Steel studs and track runners: ASTM C645; Formed from galvanized steel sheet, minimum 0.456 mm thick, galvanized steel studs and runners, 32 mm wide x depth as indicated on Contract Drawings.

.4 Corner bead, casing bead, and special shapes: Formed from 0.6 mm thick minimum, galvanized steel sheet, designed to be concealed by plaster compound.

.5 Control joint strip: Roll formed from galvanized steel sheet, with a tape protected recess, 6 mm wide x 11 mm deep.

.6 Screw fasteners: ASTM C1002 Type S; Corrosion resistant.

.7 Gypsum board plaster base: ASTM C37; solid gypsum board lath with special paper facing 1220 mm wide x 2440 mm long x 12.7 mm thick, provide fire rated board where fire rating is indicated. ‘Rocklath’ by CGC Inc. or approved alternative by Domtar Construction Materials, or Westroc Industries Limited, or approved alternate.

8. Plaster base: ‘Diamond Plaster base’ by CGC Inc. or approved alternative, Applied to a nominal 1.6 to 2.4 mm thickness.

9. Gypsum plaster Finish: 'Diamond Veneer Plaster' by CGC Inc. or approved alternative, Applied to a nominal 1.6 to 2.4 mm thickness, to achieve texture to match Consultant's sample. Paint finish in accordance with Section 09 91 00.

.10 Joint reinforcing tape: ASTM C475; 50 mm wide x 0.25 mm thick, perforated paper, with chamfered edges. Cement Board: Mesh reinforcing tape recommended by cement board manufacturer.

.11 Joint compound: ASTM C475; Asbestos-free, supplied by manufacturer of gypsum board used.

PART 3: EXECUTION

3.01 STEEL STUDS AND FURRING

.1 Install steel stud partitions to underside of structure unless indicated otherwise.

.2 Install track runners at floors, ceilings, and underside of structure; align track runners accurately and secure to structure at 600 mm centres maximum.

.3 Install double top track runner assembly to prevent the transmission of structural loads to steel studs.

.4 Install steel studs vertically at 400 mm and not more than 50 mm from abutting walls, at openings, and at each side of corners. Install studs securely to track runners.

.5 Schedule and coordinate steel framing installation with mechanical and electrical services installation.

.6 Install full height, double studs at door and service openings, fastened together and stiffened back to the structure to prevent vibration when doors close.

.7 Frame control joints using back to back double studs at abutting structural elements, at dissimilar backup interface, at dissimilar walls and ceilings, at structural expansion and control joints, at door and other openings, and at 9000 mm maximum spacing in continuous runs. Install control joint strips and secure in place.

.8 Install cross bracing in accordance with the steel stud manufacturer's recommendations.

3.02 GYPSUM LATH

.1 Install gypsum lath vertically or horizontally, whichever results in fewer end joints. Locate end joints over supporting members.

.2 Install gypsum lath in lightly butted contact at edges and ends and with 1.6 mm maximum open space between boards; do not force gypsum lath into place. Do not install imperfect, damaged or damp laths.

.3 Install gypsum lath butting paired tapered edge joints, and mill-cut or field-cut end joints; do not place tapered edges against cut edges or ends.

.4 Fasten gypsum lath with screws spaced 300 mm o.c. in field of lath and along abutting end joints for non-fire rated construction. In fire rated locations install screws at spacing indicated on test reports. If gypsum lath is not tight against framing drive another fasteners within 38 mm of first fastener.

.5 Drive fastener heads flush with lath, not dimpled and without breaking paper.

3.03 CORNER, CASING BEADS AND TRIM

.1 Corner reinforcing bead: Install along all external angles, erect plumb, level and with a minimum of joints. 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.

.2 Casing bead: Install where wallboard butts against a surface having no trim concealing the juncture and where shown on drawings. Erect casing beads plumb or level, with minimum joints, and secure with screws at 300 mm o.c. apply filler over flange flush with 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.

.3 Recess channels and trim: Install recess channels and special metal trim where shown. Secure to substrate. Provide casing beads full height on wallboard edges at recess channels and metal trim.

3.04 JOINT TAPING

.1 Install reinforcing tape and a minimum of 3 coats of joint compound over gypsum lath joints, metal trim and accessories, and screw fasteners in accordance with the gypsum lath manufacturer's instructions.

.2 Fill gaps between, and any imperfections in, gypsum lath with joint compound, allow to dry, and sand smooth ready for painting.

3.05 GYPSUM PLASTER FINISH

.1 When surfaces are prepared and dry, apply base coat with sufficient material and pressure to form a good bond to base and cover wall then double back to bring plaster out to grounds. Apply trowelled texture finish coat in texture as selected by Consultant in accordance with manufacturer's written instructions to obtain the texture specified.

3.06 REPAIR

1. Fill in defective joints, holes and other depressions with joint compound.
2. Make good defective work, and ensure that surfaces are smooth, evenly textured and within specified tolerances.

END OF SECTION

PART 1 GENERAL

1.01 REFERENCES

.1 ANSI A108/A118/A136.1, Installation of Ceramic Tile.

.2 TTMAC Specification Guide 09300 Tile Installation Manual.

1.02 SUBMITTALS

.1 Materials data: Submit manufacturer's technical information and installation instructions for all specified materials.

.2 Prior to commencing the work, submit for approval four (4) representative tile samples of each type, finish and colour mounted on a 12.7 mm exterior grade plywood using the specified mortar and grouted with the specified grout. These samples shall be of current production, properly identified, clean and representative of the appearance of the finished work.

1.03 QUALITY ASSURANCE

.1 Provide tile, grout and setting materials from one source. Additives, dry-set mortars, installation materials and grouts shall be from the same manufacturer.

.2 Recommended installers:

.1 **Adlers Main Tile + Carpet Co. Ltd.**
Contact name: Mitchell Abrams
4005 Chesswood Drive, Toronto, Ontario M3J 2R8
Office (905) 738-4995
Cell (416) 721-5320
Fax (416) 398-9477
Email: mitch@adlersmaintile.com

.2 **Champion Flooring Limited**
Contact name: Steve Gillard
6600 Goreway Drive, Unit A, Mississauga, Ontario L4V 1S6
Office (905) 673-5899
Cell (416) 708-8649
Fax (905) 673-8488
Email: steve@championflooring.ca

.3 **Europro Tile & Marble**
Contact name: Xhezmi Zendeli
42 Woodland Trail Court, Woodbridge, Ontario L4L 9H9
Office/Cell (416) 333-8802
Fax (905) 856-6544
Email: info@europrotile.com

.4 **AddaiWEST Flooring Inc.**
Contact name: Michael Addai
5484 Tomken Road, Unit 29, Mississauga, Onatrio, L4W 2Z6
Office (905) 824-WEST (9378),
Cell (416) 833-7222

Fax (905) 824-9377
Email: michael@addaiwestflooring.com

1.04 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle tiles in a manner to avoid chipping, breakage or any other damage.

.2 Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, moisture, freezing, excessive heat, foreign matter or other causes. Do not stir any frozen material until it has completely thawed.

.3 Provide heated and dry storage facilities on site.

.4 Deliver and store all materials on site at least 24 hours before work begins.

1.05 ENVIRONMENTAL CONDITIONS

.1 Maintain environmental conditions and protect work during and after installation. Comply with trade standards and manufacturer's printed recommendations.

.2 Turn off all forced ventilation and radiant heating systems and protect the work against drafts during installation and for at least 72 hours after completion.

.3 Supply temporary heaters where necessary to maintain an adequate temperature level in the working environment.

.4 Vent temporary heaters to exterior to prevent damage to tilework from carbon dioxide build-up.

.5 Maintain temperatures at not less than 10°C or not more than 35°C in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by ANSI A108/A118/A136.1 installation standards or manufacturer's written instructions.

1.06 EXTRA MATERIAL

.1 Provide 1 box of each type of tile required for this project for maintenance use, as specified in Section 01 33 00.

.2 Extra materials to be from same production run as installed materials.

.3 Clearly identify each container of floor tile and each container of adhesive.

.4 Replace up to 25 cracked tiles due to settlement/shrinkage of concrete floor slabs during the warranty period. Replacement tiles, during the warranty period, to be new material supplied by the Contractor, separate from the extra material provided to the LCBO.

.5 Deliver to Owner, upon completion of the work of this section.

.6 Store where directed by Owner.

1.07 WARRANTY

.1 Warrant Work of this section against defects and deficiencies for a period of 2 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.

PART 2: PRODUCTS

2.01 MATERIALS

.1 Porcelain Tile and Ceramic Tile:
- .1 Refer to Drawings for layout, size and type.
- .2 Refer to Finish Schedule for type of tile.

.2 Mortar: Flextile 53 Mortar with 44 additive or approved alternative.

.3 Drywall Latex Primer: Planicrete AC, as manufactured by MAPEI, or equivalent.

.4 Grout: For selection of one of the following grouts refer to Flooring Finishes Plan and Finishes Schedule.
- .1 Polymer Modified Tile Grout (500 series for wall, 600 series for floor): Portland cement based commercial tile grout conforming to ANSI A108/A118/A136.1, as manufactured by Flextile Ltd, or approved alternate.
- .2 Flextile 650: ANSI A 118.7, material shall be non-toxic, low odour, water cleanable and stain resistant. Colour as per floor finish plan/schedule.

.5 Grout residue removal: Ceramiclean by Stone Care International, Inc, or approved alternate. Follow tile manufacturer's recommended acid-wash cleaning process.

.6 Transition Strip:
- .1 For use at impact doors (warehouse to retail):
  - .1 6" Pemko Profile 259A
  - .2 Mill finish aluminium
  - .3 Use mitred transitions when changing directions and Tapcon screws, sized and coloured to suit transition strip, at corners to prevent lifting unless approved otherwise.
  - .4 Refer to Architectural drawings for further information.
- .2 For all other locations:
  - .1 Schluter Reno-Ramp, product # AERP 125 B90.
  - .2 Anodized aluminium.
- .3 Adhesive: Dry-set mortar

.7 Aluminum Tile Base Trim: Schluter "Schiene AE100", or approved alternative, in longest lengths possible at exposed edges of base tiles within retail area. Use mitred transitions when changing directions and at all corners. Refer to Architectural drawaings

.8 Exterior Trim: Refer to Architectural drawings.

.9 Grout haze remover: Type as recommended by floor tile manufacturer and approved by Consultant.

.10 Crack-isolation Membrane:
.1 For use on existing floor slabs where conditions require a decoupling membrane for the finished floor tile.
.1 Schluter DITRA, or approved alternate.

2.02 MIXING

.1 Use clean mixing containers.
.2 Use a low speed mixer (approximately 150 rpm).
.3 Mix all installation materials in strict accordance with the manufacturer's mixing instructions.

PART 3: EXECUTION

3.01 EXAMINATION

.1 Before work commences, examine the areas to be covered and report any flaw or adverse condition in writing to the General Contractor and the Owner. Do not proceed with the tilework until surfaces and conditions comply with the requirements indicated in the manufacturer's instructions and in ANSI A108/A118/A136.1. For more details, refer to the TTMAC Handbook for Ceramic Tile Installation.
.2 Ensure substrates are structurally sound, level and plumb, within the tolerances set out in CAN/CSA-23.1/A23.2 from finished floor levels of the surface, or better.

.3 Review existing conditions prior to commencement of work. Leveling of floors requiring floor tolerances greater than those provided, shall be completed by the Contractor. Arrange for site visit with LCBO Project Coordinator.

.1 Provide a crack-isolation membrane to separate existing substrate from finished floor tile.

.4 Concrete floor slab tolerance will be at a minimum [FF=25 & FL=20] Given the existing floor slab flatness, Floor Tiling Contractor is responsible for installation of specified tiles in a flat, level and true fashion, ensuring an even and consistent floor finish free of lippage, unevenness and trip hazards. Tiled areas with

floor drains shall have a minimum 2% slope to drain. Floor Tiling Contractor to demonstrate correct slope and drainage with LCBO Project Coordinator after tile work is complete.

3.02 SURFACE PREPARATION

.1 All supporting surfaces shall be structurally sound, solid, stable, level, plumb and true to a tolerance in plane as specified in Section 03 30 00. They shall be dry, clean and free of dust, oil, grease, paint, tar, wax, curing agent, primer, sealer, form release agent or any deleterious substance and debris which may prevent or reduce adhesion.

.2 Mechanically sand and scarify the substrate to completely remove all paint, loosely bonded topping, loose particles and construction debris.

.3 Neutralize any trace of strong acid or alkali from the substrate prior to the application of the mortar.

.4 Concrete Surfaces:

- .1 Install gauging strips.
- .2 Brush apply a latex slurry bond coat (Drywall Primer and Portland Cement).
- .3 While the slurry coat is wet, spread the mortar mix, minimum 16 mm, (1 part Portland Cement, 5 parts sand, water) onto the floor surface. Work the mortar mixture with a steel trowel to promote a secure mechanical bond.
- .4 Finish the surface with a steel trowel, light broom finish.
- .5 Install polyethylene sheets on top of mortar bed for 14 days of "wet cure" prior to setting porcelain tile.

.5 Plaster: Prime all plaster wall surfaces with drywall primer multi-purpose latex and let dry completely before applying the mortar.

.6 Temporarily plug floor drains during construction procedures. Remove plugs during final cleanup work and demonstrate free and clear operation of each drain. Replace any damaged grates. Do not dispose of any mortar or grout down the drains.

.7 Contractor to to chip out any coverings or obstructions in drains and clean-outs before commencing installation of tile. Commencement of installation indicates acceptance of existing conditions. Rejected work, as deemed by the LCBO Project Coordinator shall be made good at the no additional cost to the LCBO.

3.03 INSTALLATION

.1 GC to be responsible for ensuring that all Floor Outlet Boxes, Foot Grille Frames and other in-floor items are raised or lowered, as necessary, to be flush with the surrounding floor tile.

- .1 Floor tile to be flush with existing sidelite thresholds at all automatic sliding doors. Tile installer to coordinate with GC as required, ensure that tile is level and will not impede nor be damaged by breakaway door operation.

.2 Using a slightly damp towel, wipe the backside of the tile to remove any dust or other residue that may be left over from the manufacturing process.

.3 When universal dry-set mortar and fast-curing latex hydraulic installation is specified, use a notch trowel with deep enough grooves to promote an 80% minimum mortar contact with the back side of the tile for interior installations. In all areas, back-butter

each piece with fresh mortar using the flat edge of the trowel and apply tiles immediately while both mortar surfaces are wet to obtain a 100% mortar contact and a void-free installation.

.4 Install tiles according to the manufacturer's strict recommendations as to the particulars of the mortar system and following the general outline procedure set forth in ANSI A108/A118/A136.1.

.5 On interior floors and walls, install tiles leaving a regular even spacing between tiles. No butt joints shall be permitted.

3.04 GROUTING

.1 Except where tiles are installed with the fast-curing latex hydraulic mortar, grout no sooner than 24 hours after installation.

.2 Where tiles are installed with the fast-curing hydraulic mortar, grout no sooner than 3 hours after installation.

.3 Prepare surface of tiles for easier grout release by damp wipe with clean water.

.4 Mix tile grout with water only. Do not mix with any grout additive.

.5 Use grout only on surfaces which are maintained at a temperature above 10 °C during application and for at least 72 hours after application.

.6 Install all sanded commercial tile grouts in strict accordance with the grout manufacturer's instructions and following the general outline procedure of ANSI A108/A118/A136.1 for latex Portland cement grouts. Ensure that all grout is removed with an appropriate haze remover.

.7 Clean tiles completely leaving no apparent cement laitance film on the surface of the tile. Do Not Acid Wash, especially where coloured grouts are used. Grout residue remover with #M Scotchbright scrubs can be used. Rinse 3 to 4 times with clean water.

.8 Ensure that transition strip profile is solidly embedded in the setting material and that all cavities are filled to prevent the collection of moisture.

3.05 PROTECTION

.1 Universal dry-set mortar installation:

.1 Protect finished tilework against weather, and complete water immersion for at least 21 days after completion of the work.

.2 Floors: Protect floor from foot traffic with boards for at least 24 hours and general traffic for at least 72 hours after installation. Prohibit heavy traffic on floors for at least 7 days after installation.

.3 Walls: Protect walls from impact, vibration and hammering on adjacent and opposite walls for at least 14 days after installation.

.2 Since temperature and humidity during and after installation affect the final curing time of all cement-based and epoxy materials, allow for extended periods of cure and protection when temperatures drop below 15°C and/or when the relative humidity is higher than 70%.

3.06 CLEANING

.1 Remove all construction debris from the floor.

.2 Grout residues must be removed immediately after completion of installation with approved haze remover.

.3 Special cleaning to remove grout or product residue: Surface should be cleaned with a sulfamic or phosphoric mild acid-based detergent and rinsed with clean water if a light film of grout is still apparent. Follow tile manufacturer's recommended acid-wash cleaning process.

.4 It is recommended to wait until the grout is fully cured, (usually 14 days), before performing the acid wash.

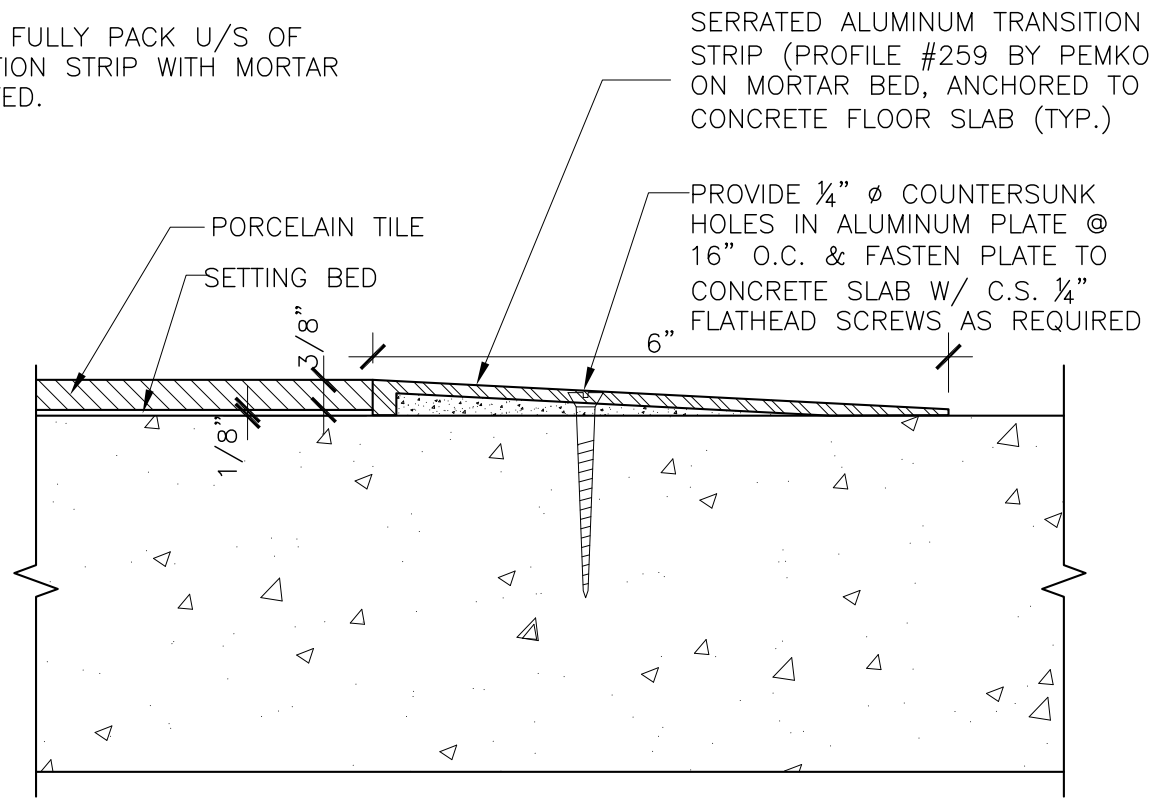
.5 Acid washed surface must be rinsed and neutralized using a clean water rinse and grout residue remover.

.6 Remove mortar or grout residue from all visible surfaces of transition strips. Oxidation films on strips may be removed with common polishing agents, but no abrasive cleaning agents should be used.

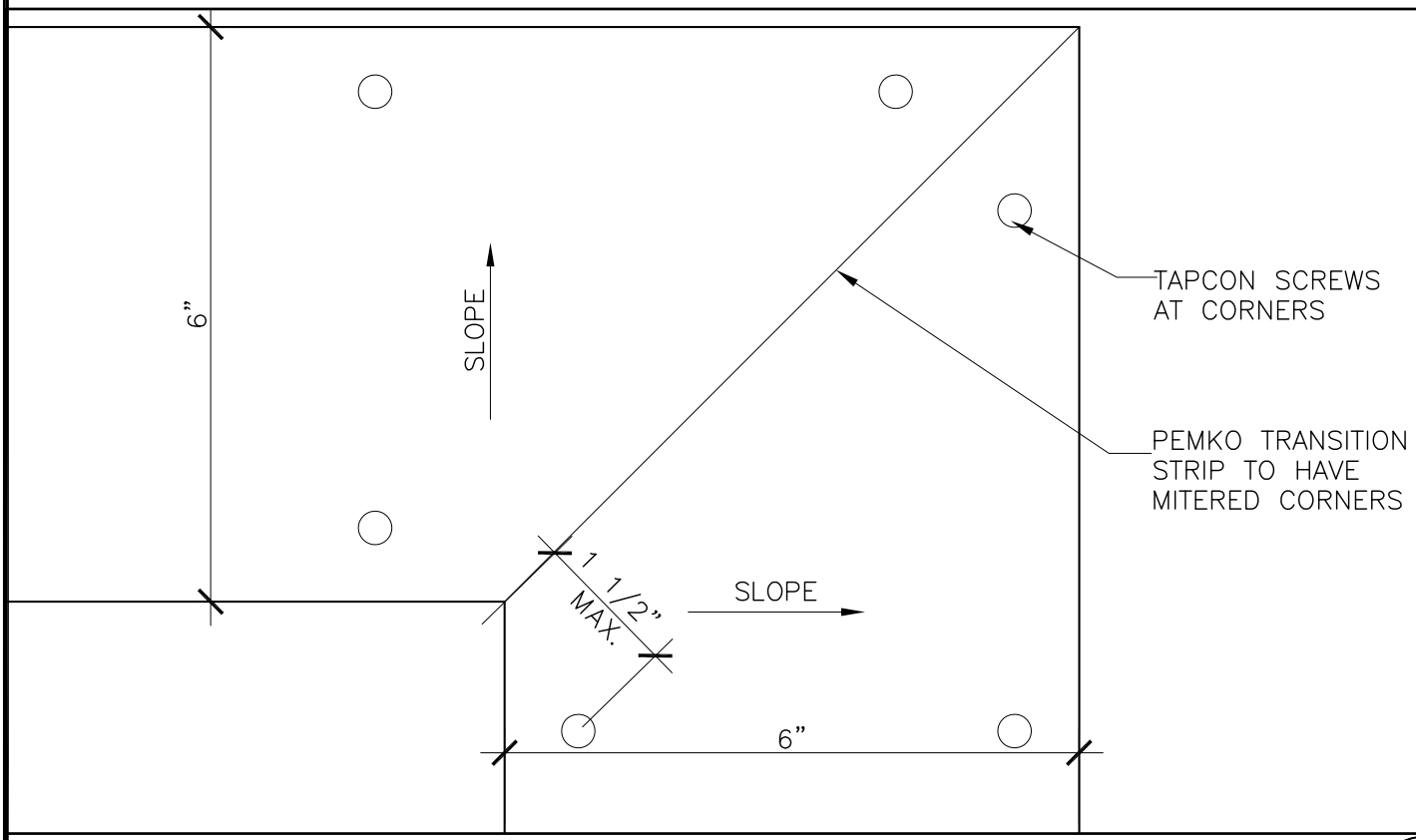
.7 Ensure mortar and grout residues are not disposed of through floor drains.

END OF SECTION

NOTE:
G.C TO FULLY PACK U/S OF TRANSITION STRIP WITH MORTAR AS NOTED.



Section Detail B



Plan Detail A

DO NOT SCALE DRAWINGS. DETAILS ARE PROVIDED TO EXPRESS DESIGN INTENT AND SHOULD BE ADAPTED TO SUIT SITE CONDITIONS.

ALL NECESSARY SAMPLES AND SHOP DRAWINGS SHALL BE SUBMITTED TO THE LCBO FOR APPROVAL PRIOR TO PROCEEDING WITH THE WORK.

LCBO

Title: TRANSITION STRIP – PLAN AND SECTION DETAIL

Scale; 6"=1'–0" Date; JAN 2019

DWG NO.: SK02 09 30 00

PART 1: GENERAL

1.01 REFERENCES

.1 ASTM C636, Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.

1.02 DESIGN REQUIREMENTS

.1 Design ceiling suspension systems in accordance with ASTM C636 and manufacturer's printed directions.

.2 Design tile ceiling system for adequate support of electrical fixtures as required by the current bulletin of the Electrical Safety Authority. Acoustic panel system is not designed to carry the weight of electrical equipment.

.3 Design hanger anchor and entire suspension system static loading not to exceed 25% of their ultimate capacity including lighting fixture dead loads.

.4 Design tile suspension system to support weight of mechanical and electrical items such as air handling boots and lighting fixtures, and with adequate support to allow rotation/relocation of light fixtures. Acoustic panel system is not designed to carry the weight of mechanical and electrical equipment.

.5 Design subframing as necessary to accommodate, to avoid conflicts and interferences where ducts or equipment prevent regular spacing of hangers.

1.03 SUBMITTALS

.1 Samples: Submit two samples of each specified acoustical board and exposed grid material.

.2 Affidavits: Submit two copies of affidavits to verify that ceiling meets fire protective requirements where required.

1.04 QUALITY ASSURANCE

.1 Subcontractor Qualifications:

.1 Install acoustical ceilings specified in this Section only by a Subcontractor who has adequate equipment and skilled mechanics to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least five years.

.2 Ensure that mechanics have full knowledge of specified systems and requirements of jurisdictional authorities.

.2 Requirements of Regulatory Agencies:

.1 Install only materials specified in Finish Schedule.

.2 Install ceilings that serve as fire protective membranes exactly as specified in Underwriters' Laboratories test design specification that validates specified rating. Verify, before installation of ceiling, that installations specified in other Sections, as a part of the entire assembly, are installed to meet validating specification for a ceiling-floor or a ceiling-roof assembly, whichever is applicable.

1.05 DELIVERY, STORAGE AND HANDLING

.1 Deliver finish materials in unopened packaging provided by manufacturer.

.2 Store materials in protected dry area.
.3 Ensure that finish metal members are not bent, dented, or otherwise deformed.

1.06 SITE CONDITIONS

.1 Install acoustical ceilings only in areas closed and protected against weather, and maintained at no less than 10 deg.C.
.2 Do not install acoustical ceilings in any area unless satisfied that construction in place has dried out, and that no further installation of damp materials is contemplated.

1.07 MAINTENANCE MATERIALS

.1 Provide two sealed cartons of each specified acoustical board for Owner's use.

PART 2: PRODUCTS

2.01 MATERIALS

.1 Accessories: Fabricate miscellaneous clips, splicers, connectors, screws, and other standard accessories of steel, zinc coated or cadmium plated, of strength and design compatible with suspension methods and system specified. Include special accessories required to provide a complete assembly of acoustical ceilings.
.2 Hangers: Galvanized annealed steel wire:
  .1 2.6 mm (12 ga.) to support a maximum weight of 150 pounds per hanger
  .2 3.8 mm (9 ga.) to support a maximum weight of 310 pounds per hanger.
  .3 Galvanized annealed steel rod: 4.8 mm diameter to support a maximum weight of 500 pounds per hanger.
.3 Hanger Anchoring Devices: Phillips Red Head by Phillips Drill Company of Canada Limited, or approved alternate:
  .1 WS-3822 wedge anchor with tie wire insert for use in composite concrete and steel deck.
  .2 SDI-3822 for use in steel floor deck, with screw eye bolts to suit inserts.
.4 Exposed Tee Ceiling Grid System:
  .1 Two directional, size as per drawings.
  .2 Main Beams: 0.5 mm steel, bulb tees.
  .3 Cross tees: 0.5 mm steel, with tongues to interlock with main beams.
  .4 Wall Moulding: Angle section to match tees.
  .5 Finish: Factory applied finish. Refer to Finish Schedule.
  .6 Manufacturer: CGC Limited, Armstrong, or Certainteed.
.5 Acoustical Units:
  .1 Acoustical units shall match submitted samples with no perceptible visual variations within a building area. Fabricate edges uniformly and true to fit suspension system, and to maintain true lines and surface planes.
  .2 All locations shown on Room Finish Schedule: Refer to Drawing Finish Schedule and Reflected Ceiling Plan for location, colour and type of ceiling tiles, typical.
  .3 Manufacturer: CGC Limited, Armstrong, or Certainteed.
.6 Eggcrate:

.1 Provide 610 mm x 610 mm eggcrate, with 12 mm x 12 mm x 12 mm cube, to match adjacent ceiling tile in locations where fire alarms have been provided in ceiling area above. Confirm locations with LCBO Coordinator or Consultant.

PART 3: EXECUTION

3.01 EXAMINATION

.1 Ensure that environmental conditions and installations preceding that of this Section are satisfactory, and will permit compliance with the quality and dimensions required of acoustical ceilings.

.2 Verify that installations by other Sections which are a part of an underwriter specification for a fire rated protective assembly have been done in accordance with that specification.

3.02 INSTALLATION

.1 Refer to Room Finish Schedule for types and locations of acoustical ceilings.

.2 Coordinate installation of acoustical ceiling systems specified in this Section. Ensure that adequate preparation is made for attachment of hangers and fasteners. Install framing for support and incorporation of flush-mounted and recessed service components. Ensure adequacy of supports by consultation and verification of methods and locations of installations specified in Division 23 and 26.

.3 Install hanger anchoring devices in appropriately drilled holes in composite concrete and metal deck construction. Install hanger wires plumb and securely anchored to the building structural framing, independent of walls, pipes, ducts, and metal deck; install additional framing and hangers to bridge interference items.

.4 Screw apply hanger anchoring devices to joists and supplementary framing. Ceilings shall not be secured to underside of roof deck.

.5 Do not use through the roof hangers.

.6 Space hangers for supporting grid at 1200 mm maximum centres each way, and to suit structure and ceiling system. Secure hangers to structure by a permanent method as approved. Secure wire hangers to framing by bending sharply upward and wrapping securely with three turns. Install hangers free of kinks and at no more than 5 degrees off vertical. Install extra hangers at each corner of lighting fixtures, and reinforce other ceiling equipment with hangers.

.7 Install the entire hanger and suspension grid to adequately support the ceiling assembly, including services incorporated, with a maximum specified deflection for each component member, and free from horizontal movement.

.8 Enclose recessed lighting fixtures to maintain fire rating as required by ULC test design specification validating system. Enclosure by an insulating blanket will not be acceptable should such a method be approved by ULC.

.9 Support recessed lighting fixtures independently from ceiling framing system. Install supports in accordance with ULC test design specification validating system.

.10 Lay out ceilings with acoustic units evenly spaced in each area, with grid lines symmetrical about room axes, columns and service elements, and with maximum border widths of equal dimensions on opposite sides of areas, or as indicated on reflected

ceiling plans. Provide angle mouldings to match exposed grid where ceiling abut walls or other vertical surfaces.

.11 Frame around recessed fixtures, diffusers, grilles, and openings.

.12 Maintain true surface planes, and component and joint lines throughout each area.

.13 Butt joints between components tightly together.

.14 Install grid system ceilings as specified by the manufacturer of the system. Ensure that methods of installation used are acceptable to the manufacture of each system component and to Consultant.

.15 Brace system to maintain alignment of grid.

.16 Install acoustical panels in exposed tee system. Cut panels neatly to fit off-module grid and with sufficient clearances to ensure removal without damage.

.17 Do not install acoustical units with broken or marred edges exposed to view.

.18 Install hold-down clips at each panel. Adapt installation to provide ceiling access where required for services.

3.03 ADJUSTMENT AND CLEANING

.1 Clean soiled or discoloured surfaces of exposed ceiling surfaces on completion of ceiling installation.

.2 Replace components which are visibly damaged, marred, or not cleanable.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 CAN/CGSB-1.188, Filler, Block, Emulsion Type.

.2 CAN/CGSB-85.100, Painting.

.3 Master Painters Institute (MPI), Painting Specification Manual.

1.02 SUBMITTALS

.1 Samples:

.1 Submit 215 x 280 mm draw-down samples 30 days before materials are required; labelled to indicated finish, formula, colour name, number, sheen and gloss units of:

.1 Each specified colour in each specified finish coat material.

.2 Each wood stain finish on each specified wood species, referenced to correct finish number specified in the Drawings.

.2 Affidavits:

.1 Submit affidavits from manufacturer to certify that materials supplied for Project meet Specifications requirements, and that he approves of their use of each proposed application.

.3 List of materials:

.1 Before ordering materials, submit a list of those materials proposed for use on Project for approval.

.2 For each material, give manufacturer and descriptive nomenclature that will appear on label.

.3 Do not order disapproved materials for Project.

1.03 QUALITY ASSURANCE

.1 Subcontractor Qualifications: Perform painting and finishing specified in this Section only by a Subcontractor who has adequate equipment and skilled tradesmen to perform Work expeditiously, and is known to have been responsible for satisfactory applications similar to that specified during a period of at least the immediate past five years.

.2 The best practices specified in CAN/CGSB-85.100-M, Painting, shall govern for painting materials, methods and procedures, unless specified otherwise in this Section.

1.04 DELIVERY, STORAGE AND HANDLING

.1 Deliver to site each container sealed, and labelled with manufacturer's name, catalogue number or brand name, colour, formulation type, reducing instructions, and reference standard specification number if applicable.

.2 Store only acceptable Project materials at site, and in an area specifically set aside for purpose that is locked, ventilated, maintained at a temperature of over 4 deg.C. and protected from direct rays of sun.

.3 Ensure that health and fire regulations are complied with in storage area. Provide carbon dioxide fire extinguishers of 20 lbs. minimum capacity in each storage area while materials are contained within.

1.05 SITE CONDITIONS

.1 Apply finishing materials only when air and surface temperatures exceed 4 deg. C. except for 7 deg. C. for latex paint at interior locations and 21 deg. C. for lacquers and enamels.

.2 Do not apply exterior finishes in direct sunlight that raises surface temperatures above that for proper application and drying, nor in rainy, foggy or windy weather.

.3 Do not apply finishes when relative humidity is over 85%, when condensation has formed or is likely to form, nor immediately following rain, forms or formation of dew.

.4 Do not apply finishes when dust is begin raised.

.5 Do not apply finishes on porous surfaces such as concrete, gypsum board, masonry, that contain over 12% moisture.

.6 Do not finish wood surfaces that contain over 15% moisture.

.7 Ensure that all areas in which paint is applied as are well-ventilated and broom clean.

1.06 MAINTENANCE MATERIALS

.1 Submit to LCBO Project Coordinator Product data, in accordance with section 01 33 00, for each finish painting material applied. Leave no containers of any finish painting material upon project completion.

PART 2: PRODUCTS

2.01 MATERIALS

.1 Painting shall be Premium Grade.

.2 Provide paint materials for paint systems from one manufacturer.

.3 .1 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:

.2 Water-based for concrete, concrete block and gypsum board

.3 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.

.4 Manufactured without compounds which contribute to smog in the lower atmosphere.

.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 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.

.6 All materials and paints shall be lead and mercury free and shall have low VOC content where possible.

.7 All paint materials shall have good flowing and brushing properties and shall dry or cure free of blemishes or sags.

.8 Where required, paints and coatings shall meet flame spread and smoke developed ratings designated by local Code requirements and/or authorities having jurisdiction.

.9 Conform to latest MPI requirements for exterior and interior painting work including preparation and priming.

.10 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.

.11 Provide paint products meeting MPI "Environmentally Friendly" ratings based on VOC (EPA Method 24) content levels. Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use on this project.

.12 Caution Area Paint for use around baler, top stair landing, and at electrical panels:

.1 Sherwin Williams ArmorSeal 8100 Water Based Epoxy floor coating, or approved alternate.

.2 Safety Yellow Satin finish (B70-8160).

.3 Ensure surface is clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion. Refer to manufacturer for detailed surface preparation information.

.13 Wood stain blocker for priming of exposed wood to be painted:

.1 Zinsser Primer Stain Blocker Sealer, or approved alternate.

.2 Ensure surface is clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion. Refer to manufacturer for detailed surface preparation information.

2.02 MIXING

.1 Paints shall be supplied ready-mixed unless otherwise specified. Do not incorporate adulterants.

.2 Mix specified paste or powder coatings, or those that are filed-catalysed at job, to meet specified requirements of manufacturer.

.3 Pigment shall be well ground to form a soft paste in the vehicle during its storage life. Paddle mixing at job shall evenly disperse paste throughout mixture to ensure paint of smooth-flowing, easy brushing, consistency.

.4 Mix paints only in mixing pails place on suitably sized, non-ferrous or oxide resistant metal pans.

2.03 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)	Max. 5	Max. 10
Gloss Level 2 - Velvet-Like Finish	Max.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	

PART 3: EXECUTION

3.01 EXAMINATION

.1 Verify that specified environmental conditions are ensured before commencing painting and finishing preparation and applications.

.2 Ensure that surfaces to receive finishing materials are satisfactory for specified materials; have been provided by other Sections as specified will not adversely affect execution, permanence, or quality of applications; and can be put into an acceptable condition by means of preparation specified in this Section.

.3 Test all surfaces for moisture content with an electronic moisture meter. Test surfaces of materials containing lime for acid-alkali balance.

.4 Maintain at site at all time until applications are completed a moisture meter, hygrometer and thermometer to verify surface and environmental conditions.

.5 Defective painting and finishing applications resulting from failure to properly test surfaces and/or from application to unsatisfactory surfaces will be considered the responsibility of this Section.

3.02 PROTECTION

.1 Mask instruction and specification plates attached to equipment being painted. Apply sufficient masking, clean drop cloths, and protective coverings to Work not receiving paint treatment that is installed by other Sections to ensure full protection from damage and soil. Sections include, but are not limited to, the following:

- .1 Light fixtures, fire and smoke detectors,
- .2 Sprinkler heads,
- .3 Prepainted diffusers and registers,
- .4 Prepainted equipment,
- .5 Fire rating labels and equipment specification plates,
- .6 Finished surfaces,
- .7 Mechanical or Electrical labelling of services (i.e. direction or use stencilling),

.2 Take particular care in storage and mixing areas that floors are protected by tarpaulins and metal pans.

.3 Place cloths and other disposable finishing materials, that are a fire hazard, in closed metal containers containing water, and remove from building every night.

.4 Ensure that the appropriate trades remove from finished surfaces store and reinstall after finishing is completed finish hardware, switch and receptacle plates, escutcheons, luminaire frames and similar items.

.5 Porous materials from which soil from finish materials cannot be completely removed shall be replaced by this Section.

.6 Post "No Smoking" signs and ensure that spark-proof electrical equipment is used in areas where inflammable painting materials are being applied.

.7 Post "Wet Paint" signs throughout freshly finished areas and remove when finishes are dry.

3.03 PREPARATION

.1 General:

.1 Vacuum clean interior areas immediately before finishing Work commences.

.2 Remove from surfaces grease, oil dirt, dust, ridges, and other soil and materials that would adversely affect the adhesion or appearance of finish coatings.

.3 Remove rust from damaged surfaces primed by other Sections and reprime.

.4 Touch up damaged prime coats on shop primed metals with same priming material. Feather out edges of hop coat and smooth repair coat into shop coat surfaces.

.5 Finish, patch and smooth surfaces to remove cracks, holes, ridges, and similar blemishes.

.6 Neutralize highly alkaline surfaces with a neutralizing wash of 4% solution of zinc sulphate. Brush off residue before painting.

.7 Scrub mildewed surfaces with a solution of tri-sodium phosphate, bleach with a solution of one part sodium hypochlorite (Javex) to three parts water, and rinse with clear water.

.2 Metal Surfaces:

.1 Unprimed Steel: Remove weld flux and scale with scrapers, wire brushes, wire power wheels, sandblasting, chipping, or grinding as may be required. Finish surfaces smooth, and remove alkali contamination from weld flux with phosphoric acid solution. Wash with solvent.

.2 Primed Steel: Before touch-up of prime paint, smooth out surface irregularities; clean weld joints, bolts, nuts and damaged areas with phosphoric acid solution; and wash with solvent.

.3 Galvanized Steel: Wash thoroughly with mineral spirits, and wipe dry with completely clean cloths. Apply galvanized steel primer: Alternately, phosphatize, or apply one coat of etch type primer except where either of these treatments are specified in another Section.

.3 Cementitious Substrates:

.1 Fill minor holes and cracks with portland mix. Match patches to texture of adjacent surfaces.

.2 Remove dirt, scale, loose mortar, and similar foreign matter by brushing.

.3 Remove oil and grease with a washing with tri-sodium phosphate solution followed by thorough rinsing with water.

.4 Remove efflorescence by dry brushing; or, if required, by washing with dilute muriatic solution of one part commercial muriatic acid to 20 parts water, followed by a complete rinse with a drenching by clear water.

.5 Wire brush concrete generally. Etch very smooth concrete, such as floors, with application of a solution of one part commercial muriatic acid (31.45%) to three parts of water by volume. Apply at rate of 1 gal. /100 sq.ft. When foaming action is finished, flush surfaces clean of cement laitence with high pressure water.

.4 Wood:

.1 Sand finish surfaces smooth with No.00 sandpaper.

.2 Clean soiled surfaces with an alcohol wash.

.3 Wipe off dust and other loose dirt, or vacuum clean before application of coatings.

.4 Seal knots, pitch, and sapwood with two coats of orange shellac where painted, or an application of special sealer. Use only a clear sealer that is compatible with transparent finish.

.5 After prime coat is dry and sanded, fill nail and screw holes, and cracks with wood filler, or with putty. Colour fillers to match wood or stain if surfaces are given clear final coatings. Smooth, sand and prime fillers when set.

.5 Gypsum Board:

.1 Fill minor holes and depressions, caused by accidental damage, with drywall joint compound, and sand smooth when it is set, taking care not to raise nap of paper cover.

.2 Ensure all areas receiving wall coverings are completely smooth and free of any imperfections that may telegraph through the wall covering, or adversely affect the adhesion of the wall covering.

.6 Existing Painted Surfaces:

.1 Remove finish that is incompletely bonded to substrate.

.2 Smooth uneven and rough surfaces.

.3 Roughen highly finished surfaces to ensure adhesion of new coatings.

.4 Reprime areas bared to substrate by preparation.

.5 Ensure all areas receiving wall coverings are completely smooth and free of any imperfections that may telegraph through the wall covering, or adversely affect the adhesion of the wall covering.

3.04 APPLICATION

.1 General:

.1 Perform painting and finishing specified in this Section under supervision of experienced foremen, with clean equipment designed for purpose used, and under directions and specific recommendations of manufacturers whose materials are used.

.2 Before commencing applications, arrange for a site meeting, at which conditions of surfaces and possible adaptations to suit, and use of materials and application procedures shall be discussed between Contractor, Painting Subcontractor, Consultant, and representatives of materials manufacturers.

.3 Consult with Consultant before proceeding with application of finishes to surfaces for which a formula is not given in Specifications.

.4 Finish glazing rebates before glazing commences.

.5 Do not paint caulked joints.

.6 Remove spatters from adjacent surfaces, including glass, before they set up, and by methods not harmful to the surfaces.

.2 Finishing Methods:

.1 Apply finishing materials at proper consistency, free from brush marks, sags, crawls, streaks, runs, laps, skips, voids, pinholes, missed areas, and other perceptible defects, and with even colour, sheen and texture.
.2 Apply finishing materials to ensure full coverage, and at a rate not to exceed that recommended by the manufacturer for the applicable surface.
.3 Make clean true junctions with no overlap between adjoining applications of finish coatings.
.4 Leave all parts of mouldings and ornaments clean and true to details with no undue amount of coating in corners and depressions.
.5 Use materials of a single manufacturer in each coating system.
.6 If evidence is inconclusive that a specified coat has been applied, apply a full coat to the areas concerned.
.7 Where exposed to view, fill holes and open grain of exposed plywood edges with wood filler following prime coats. Smooth and sand before applying next coat.
.8 Paint glazing compound only after it is set and skimmed over. Remove dirt and grease from compound before painting, and without breaking skin.

.3 Staining:
.1 Pad filler well into pores of open-grained wood with a circular rubbing motion. Clean surplus off by rubbing across the grain before filler dries.
.2 Tint filler to match wood.
.3 Stain wood to obtain a uniformity of colour over entire stained surfaces. Adjust stain colours as necessary to obtain the same colour over variations between wood pieces.

.4 Existing Surfaces:
.1 Apply two final finish coats as specified in Finish Formula Schedule on existing painted surfaces.
.2 Primer is required only on surfaces bared by preparation.

3.05 ADJUSTMENT AND CLEANING

.1 Touch up and refinish minor defective applications.
.2 Refinish entire wall, ceiling or similar surfaces where finish is damaged or not acceptable.
.3 Remove spilled or splattered finish materials from surfaces if installations provided by other Sections. Do not mar surfaces while removing.
.4 Leave storage and mixing areas clean and in same condition as equivalent spaces in Project.

3.06 PAINTING AND FINISHING SCHEDULE

.1 General:
.1 This Section shall include painting and/or finishing of all surfaces exposed to view that have been installed with no final finish provided by the installer, unless otherwise specified.

.2 Finish interior surfaces, including objects within each area unless otherwise excluded, as indicated on Room Finish Schedule and Finish Schedule.

.3 Wall surfaces partially finished with other finish materials shall have remainder of surfaces finished as for surrounding surfaces.

.4 Finish equipment, panels, fitments, services, structure, attachments, accessories, prime coated hardware, or similar appurtenances on or near finished surfaces to match finish of the surfaces.

.5 Finish edges and tops of trim, projecting ledges, fitments, cupboards, and similar surfaces to match adjacent surfaces, whether or not they are above or beyond sight lines.

.6 Finish interior of alcoves, recesses, closets, cupboards, fitments, and similar spaces to match adjacent surfaces unless otherwise indicated.

.7 Finish high humidity designated areas such as Janitor room and behind refrigeration units with Elastomeric Antimicrobial Coating as indicated in Finish Formula Schedule.

.8 Finish surfaces visible through grilles, grille cloth, perforated metals, screening, convector covers, louvres, linear metal ceilings, and other openings, including inside of ductwork, with two coats of matte black paint. If it is the intention that finished surfaces be seen behind the elements listed above, finish the surfaces to match adjoining surfaces.

.9 Finish exposed metal housings of weatherstripping and door seals and door closers to match surface to which they are attached and which are painted or finished by this Section.

.10 All exposed conduit and device boxes fastened to unpainted sealed concrete columns within the retail area shall receive paint finish (Benjamin Moore 2112-60 Cement Gray). Where columns are designated to receive paint finish, conduits and device boxes fastened to the column shall be painted to match column colour.

.2 Doors and Drawers:

.1 Finish wood edges of doors and drawers and edges of metal doors exposed to view with the same number of coats of material and colour as adjoining surface finishes. Where not exposed to view, finish with two coats of varnish.

.2 Paint exposed plywood edges of doors to match stained finish.

.3 Finish interior of drawers with two coats of natural varnish, except when prefinished.

.3 Include finishing of the following surfaces by this Section

.1 Steel lintels where exposed to view.

.2 Access doors.

.3 Convector covers.

.4 Prime painted louvres, grilles, and diffusers at exterior.

.5 Prime painted fire hose and extinguisher cabinets.

.6 Prime painted electric panel doors and frames.

.7 Mechanical, electrical and other equipment and accessories on roof.

.8 Transite drain pipe shall have the word TRANSITE spray-stenciled once overall painting is complete, at a spacing of 15' with a letter height of 1.5". Lettering to be black where on white piping, and white where on black piping.

.4 Surfaces that Require No Finishing: Painting or finishing of the following surfaces is not included in this Section

.1 Plastics
.2 Metals with porcelain enamel, baked enamel or plated finishes.
.3 Sound absorbent surfaces.
.4 Vitreous, glazed ceramic or plastic facings.
.5 Special coatings.
.6 Factory finished surfaces as specified in other Sections.
.7 Control panels, circuit breakers, switches, receptacles or similar electrical components.
.8 Name and specification plates on equipment.
.9 Ducts, pipes and conduit concealed from view.

.5 Colours:

.1 Colours of paints, including shades of stains, shall be applied to match approved samples.
.2 Colours shown on Finish Schedule

3.07 FINISH FORMULA SCHEDULE

.1 Exterior Primed or Galvanized Metal:

.1 Formula EXT 5.3B
Alkyd, High Gloss Finish:
1st. Coat: Cementitious Primer.
2nd. Coat: Exterior Alkyd.
3rd. Coat: Exterior Alkyd.

.2 Formula EXT 5.3G
Light Industrial Coating, 'Eggshell' Gloss Finish:
1st. Coat: Cementitious Primer.
2nd. Coat: Exterior W.B. Light Industrial Coating.
3rd. Coat: Exterior W.B. Light Industrial Coating.

.2 Interior painted Cementitious Substrates:

.1 Formula INT 4.2D
High Performance Architectural Latex, Low Sheen "Velvet-Like" Finish, Filled:
1st. Coat: Latex Block Filler, CAN/CGSB-1.188.
2nd. Coat: Interior HIPAC Latex.
3rd. Coat: Interior HIPAC Latex.

.3 Interior Ferrous Metals:

.1 Formula INT 5.1B
Waterborne Semi-Gloss Finish:
1st. Coat: Acrylic Metal Primer.

2nd. Coat: Light Industrial Water based coating.
3rd. Coat: Light Industrial Water based coating.

.4 Interior Galvanized Metal:
.1 Formula INT 5.1B
Waterborne Semi-Gloss Finish:
1st. Coat: Acrylic Metal Primer.
2nd. Coat: Light Industrial Water based coating.
3rd. Coat: Light Industrial Water based coating.

.5 Interior Painted Wood:
.1 Formula INT 6.3A
High Performance Architectural Latex, Low Sheen "Velvet-Like Finish, Low VOC:
1st. Coat: Latex Primer.
2nd. Coat: Interior HIPAC Latex.
3rd. Coat: Interior HIPAC Latex.

.6 Interior Stained Wood:
.1 Formula INT 6.3D
Alkyd Varnish on Close Grain Woods, Semi-Gloss Finish:
1st. Coat: Wood Stain.
2nd. Coat: Sanding Sealer/Shellac.
3rd. Coat: Alkyd Varnish.
4th. Coat: Alkyd Varnish.
.2 Formula INT 6.3D
Alkyd Varnish on Open Grain Woods, Semi-Gloss Finish:
1st. Coat: Wood Filler Paste.
2nd. Coat: Wood Stain.
3rd. Coat: Sanding Sealer/Shellac.
4th. Coat: Alkyd Varnish.

.7 Interior Painted Wood Floors (Service Platform Floors):
.1 Floor colour is to match handrails/pickets. Refer to Finish Schedule.
.2 Waterborne epoxy, Low Gloss Finish, Low VOC:

.8 Interior Gypsum Board:
.1 Formula INT 9.2A
Latex, Flat Finish. Low VOC:
1st. Coat: Latex Primer Sealer.
2nd. Coat: Interior Latex.
3rd. Coat: Interior Latex.

.9 Interior High Humidity Finish for use behind all retail fridges and designated areas:

.1 Elastomeric Antimicrobial Coating, Pennsanitex by Pennkote Limited, or approved alternate.
.2 Apply coating in accordance with manufacturer's written instructions.

END OF SECTION

PART 1: GENERAL

1.01 RELATED SECTIONS

.1 Section 10 14 01 - Channel Letters and Community Signage
.2 Section 10 14 03 - Awnings
.3 Section 10 14 04 - Illuminated Sign Boxes
.4 Section 10 14 05 - Temporary Graphics and Signage
.5 Section 10 14 06 - Feature Boards, Blade Signs, and Miscellaneous Signs
.6 Section 10 14 07 - Permanent Window Graphics

1.02 DESIGN REQUIREMENTS

.1 Design signage in accordance with this specification and the accompanying "SK" Series of sketches. The written specification precedes the sketches.
.2 Design signage work in accordance with Contract Documents, utilizing material types, accessories and methods indicated.
.3 Design signage work to withstand live, dead, lateral, wind, seismic, handling, transportation, and erection loads and with a deflection not exceeding L/360.
.4 Design signage in accordance with climatic design data for place of Work contained in the Ontario Building Code to accommodate thermal movements of the components and structural movements to provide an installation free of oil canning, buckling, delaminating, failure of joint seals, excessive stress on fasteners or any other detrimental effects.
.5 Design connections to substrates and structures to withstand live, dead, lateral, seismic, and other imposed loads for the locations they are installed. Confirm installation of ¾" exterior grade plywood backing in walls finished with Exterior Insulation and Finish Systems (EIFS). Inform LCBO Project Coordinator if proper backing is not incorporated in walls.
.6 Design miscellaneous, additional structural framing members as required to complete the Work, where not indicated on Contract Drawings. Provide Drawings Signed and Sealed by a Professional Engineer licensed in the Province of Ontario, as required by Owner.
.7 Design illuminated signs and LED and electrical sign components in accordance with CSA C22.1 Canadian Electrical Code, Part 1, Safety Standards for Electrical Installations and the Ontario Hydro Electrical Safety Code. Submit ESA Certification as required and requested by Owner.
.8 Immediately inform LCBO Project Coordinator in writing, should any conditions prevent proper design of signage. Substitutions will not be accepted without prior approval of existing conditions from LCBO Coordinator.

1.03 FONT, LANGUAGE AND COMMUNITY SIGNAGE

.1 Font: Theinhardt Regular
.2 Language:

.1 All language for this project will be in (English) (French) (English and French) (Other) and as shown on drawings.
.2 On exterior signage in the French language, show lettering accents or language specific punctuation, as shown on drawings.

.3 Community Signage:
.1 Submit Shop Drawings as required for site specific community signage.
.2 Coordinate with LCBO Project Coordinator/Store Manager for exact phrasing of community signage

1.04 SUBMITTALS

.1 Shop Drawings:
.1 Submit shop drawings in accordance with the requirements of Section 01 33 00 Submittals of Division 01.
.2 Shop drawings shall clearly indicate the requirements of bid drawings and specifications, and accurately show types of materials, methods of assembly, anchorage, attachment to building, sign size and graphic layout. No Work shall commence until shop drawings are approved by Consultants, and LCBO Co-ordinators.

.2 Samples: Submit to the LCBO representative, samples showing colour of sign face and logo and full scale sample section of the sign corner clearly indicating the self-hinging face frame, sign frame, sign back, raceway, lamp sockets, and plastic sign face and finish. Refer to Drawing Package for detail of sign sample required. Finished sign work shall conform to LCBO standard sample panel.

.3 Upon completion of the Work, submit digital or 35mm coloured photographs of the completed installation, showing all signs, sign faces and awnings.

1.05 QUALITY ASSURANCE

.1 Retain the services of a Professional Structural Engineer, licensed in Province of Ontario, with experience in work of comparable complexity and scope, to review, stamp, and sign shop drawings and design calculations, including footing details.

.2 Execute welding by firms certified to CSA W47.1 Division 1 or 2.1.

.3 Ensure welding operators licensed to CSA W47.1 for types of welding required by Work.

.4 Test signs to CSA C22.1. Record light fixture testing and measurement on standard form acceptable to the LCBO Project Coordinator.

.5 Apply paint finish only by certified applicators

.6 All sign work shall comply with municipal, provincial and federal restrictions, standards, and by-laws that may affect the Work. Apply and pay for all permits required to complete the Work. Inform LCBO Project Coordinator of signage types not permissible by municipality, provincial or federal authorities. If application for variance is required, LCBO will be responsible for related fees.

.7 Source Quality control:
.1 Arrange for the LCBO Project Coordinator to conduct shop inspections and tests.

.2 Notify the LCBO Project Coordinator minimum twenty-one (21) days prior to shop inspections and testing

1.06 DELIVERY, STORAGE AND HANDLING

.1 Package accessories and label with description of contents and installation location.

.2 Deliver accessories where designated at site by Contractor.

1.07 WARRANTY

.1 Provide a warranty that will remedy any defects due to faulty materials or workmanship for a period of 3 year after completion (excluding lamps).

.2 Cover plastic sign faces with similar warranty against peeling, chipping, warping, discolouring and fading for a period of three years.

.3 Carry the full manufacturers' warranty and as such, comply with all warranty conditions stipulated by the Manufacturer.

PART 2: PRODUCTS

2.01 MATERIALS

.1 General:

.1 Printed artwork to receive colour: Pantone PMS 567C.

.2 Vinyl signage to receive colour: 3M 3630-5670

PART 3: EXECUTION

3.01 FABRICATION

.1 Form and fabricate sign materials with skilled labour in accordance with this specification and Exterior Signage Package.

.2 Layout signage in accordance with LCBO Symbol and Logo Type - Protected Spaces, indicated in Exterior Signage Package, using digital art work that will be supplied to the sign manufacturer by the LCBO.

.3 When seaming is necessary, overlap seams with the top going on the previous to prevent moisture penetrating the seam.

3.02 EXAMINATION

.1 Examine existing conditions on which this Work will depend and ensure that any defects or discrepancies are corrected before commencement of Work. Commencement of Work shall imply acceptance of surfaces and conditions.

.2 Verify on site all sizes indicated.

3.03 INSTALLATION

.1 Install signs and awnings in accordance with reviewed shop drawings and manufacturer's written instructions.

.2 Provide manufacturer's information and templates required for installation of Work of this Section.

.3 Install Work securely, in correct location, level, square, plumb, at proper elevations, free of warp or twist. All fastenings to be concealed or have colour matched heads.

.4 Apply isolation coating at 0.8 mm dry film thickness to prevent corrosive or electrolytic action between dissimilar materials such as aluminum to concrete, masonry, galvanized steel and similar conditions.

.5 Perform electrical work in accordance with CSA C22.1 and the Ontario Hydro Electrical Safety Code.

.6 Conduit locations, wiring and final connections by signage Contractor.

.7 Working hour limitations:

.1 Confirm working hours with General Contractor or LCBO Project Coordinator and Consultant prior to commencing work.

.2 Interruptions to Owner's daily operations due to commencement of work, not scheduled and coordinated with General Contractor or LCBO Project Coordinator and Consultant is not acceptable.

.8 Mechanical attachment (General):

.1 Unless specified otherwise, mechanically attach sign as specified below.

.2 To concrete or solid masonry, use lag screws and expansion bolts or screws and fibre plugs, as appropriate for stresses involved.

.3 To hollow masonry, use toggle bolts or equivalent.

.4 To steel, use bolts with nut and lock washers, self-tapping screws, welding, as appropriate for stresses and metal thicknesses.

.5 Mechanical fasteners on exterior to be non-staining, non-ferrous, concealed type.

.6 Fabricate special fasteners as required for installation conditions.

.7 Mechanical fasteners and methods of attachment subject to Consultant's approval. Obtain Consultant's approval before fixing to structural steel, concrete or precast concrete.

.8 Install signs on doors with a minimum of fasteners per sign.

3.04 CLEANING

.1 Leave signs clean and polish all exposed surfaces.

.2 Touch up any damaged finishes.

.3 Remove and dispose of any leftover materials or debris.

END OF SECTION

PART 1: GENERAL

1.01 RELATED SECTIONS

.1 Section 10 14 00 - General requirements for Exterior Signage

1.02 DESIGN REQUIREMENTS

.1 General:

.1 Provide appropriate materials to suit each style and type of signage as outlined below.

1.03 SUBMITTALS

.1 Shop Drawings, Samples and record Photos:

.1 Submit shop drawings, Samples and Record Photos in accordance with the requirements of Division 01 and as outlined in Section 10 14 00.

1.04 QUALITY ASSURANCE

.1 Retain the services of a Professional Structural Engineer, licensed in Province of Ontario, with experience in work of comparable complexity and scope, to review, stamp, and sign shop drawings and design calculations, including connection details.

.2 Execute welding by firms certified to CSA W47.1 Division 1 or 2.1.

.3 Ensure welding operators licensed to CSA W47.1 for types of welding required by Work.

.4 Test signs to CSA C22.1. Record light fixture testing and measurement on standard form acceptable to the LCBO Project Coordinator.

.5 Apply paint finish only by certified applicators.

.6 Sign work shall comply with municipal, provincial and federal restrictions, standards, and by-laws that may affect the Work. Apply and pay for all permits required to complete the Work. If application for variance is required, LCBO will be responsible for related fees.

.7 Source Quality control

.1 Arrange for the LCBO Project Coordinator to conduct shop inspections and tests.

.2 Notify the LCBO Project Coordinator minimum twenty-one (21) days prior to shop inspections and testing.

1.05 DELIVERY, STORAGE AND HANDLING

.1 Package accessories and label with description of contents and installation location.

.2 Deliver accessories where designated at site by the General Contractor, Store Manager and/or LCBO Project Coordinator.

.3 Deliver components safely packaged to prevent damage, labeled to identify contents.

.4 Store in secure areas, out of weather and protected from Work of other trades.

1.06 WARRANTY

.1 Provide a warranty that will remedy any defects due to faulty materials or workmanship for a minimum period of 3 year after completion (excluding lamps).

.2 Cover Plastic sign faces with similar warranty against peeling, chipping, warping, discolouring and fading for a period of 3 years.

.3 Carry the full manufacturers' warranty and as such, comply with all warranty conditions stipulated by the Manufacturer.

PART 2: PRODUCTS

2.01 MATERIALS

.1 General:

.1 Fasteners: Hardened aluminum or stainless steel or of type that will not permit galvanic action.

.2 Source all Channel Letters and Pin Mounted Signage from one manufacturer.

.3 Sign interiors: Include all parts such as stiffeners, wiring raceways, ballast raceways, and raceway covers fabricated from 1.5mm (0.06") aluminium painted in accordance to drawings.

2.02 INDIVIDUAL ILLUMINATED CHANNEL LETTER SIGN

.1 General:

.1 12V from outdoor rated, weather tight, power supply in transformer box located remotely from each channel letter, model StormTight II LED ACLW-CW2, by Allanson or approved alternative.

.2 LED lighting output of 6000K-6500K.

.3 Light level of each letter shall be at a uniform consistency.

.4 Disconnecting means one per set of letters.

.2 Channel Letters:

.1 Letters:

.1 Individual mylar trim cap letters, 25.4 mm (1") thick, with 125 mm (5") deep aluminium cans pre-painted aluminium roll 1.59 mm (1/16") thick with notched and siliconed seams.

.2 Letters are mounted flush to wall/bulkhead, freestanding on canopy or suspended from soffit depending on application.

.3 Fasten letters as required. Seal all penetrations.

.4 Provide 6.35mm (1/4") dia. drip hole for each letter.

.5 Acrylic face 4.76mm (3/16") thick

.2 Finish:

.1 LCBO Letters: 42 MP12734 Garrison (matte finish)

.2 LCBO Letters Acrylic Face: Letters are to have white LED acrylic faces finished in 3M Scotchcal 3M 3735-60 Diffuser Film White.

.3 LCBO Letters Trip cap: 42 MP12734 Garrison (matte finish)

PART 3: EXECUTION

3.01 EXAMINATION

.1 Examine existing conditions and work on which this Work will depend and ensure that any defects or discrepancies are corrected before commencement of Work. Commencement of Work shall imply acceptance of surfaces and conditions.

.2 Verify on site all sizes indicated.

3.02 INSTALLATION - GENERAL

.1 Install signs and letters in accordance with reviewed shop drawings and manufacturer's written instructions.

.2 Locate low voltage transformer inside building over accessible Retail area ceiling.

.3 Provide manufacturer's information and templates required for installation of work of this Section.

.4 Install Work securely, in correct location, level, square, plumb, at proper elevations, free of warp or twist. All fastenings to be concealed or have colour matched heads.

.5 Apply isolation coating at 0.8 mm (0.03") dry film thickness to prevent corrosive or electrolytic action between dissimilar materials such as aluminum to concrete, masonry, galvanized steel and similar conditions.

.6 Perform electrical work in accordance with CSA C22.1 and the Ontario Hydro Electrical Safety Code.

.7 Conduit locations, wiring and final connections by signage Contractor.

3.03 MOUNTING

.1 All Channel Letters and Three-Dimensional Pin Mounted letters are to be (Wall Mounted, centred on back wall) (Canopy Mounted, centred on canopy) (Suspended from soffit) configuration.

.2 Mount external lighting fixtures centred on canopy and channel/pin mounted letters.

.3 Refer to SK Sketches for typical locations of letters and lights.

.4 Submit Shop Drawings, signed and sealed by a Professional Structural Engineer, licensed in the province of Ontario, showing, but not limited to:

.1 Mounting methods and procedures

.2 Locations of connectors

.3 Product Data for mounting materials

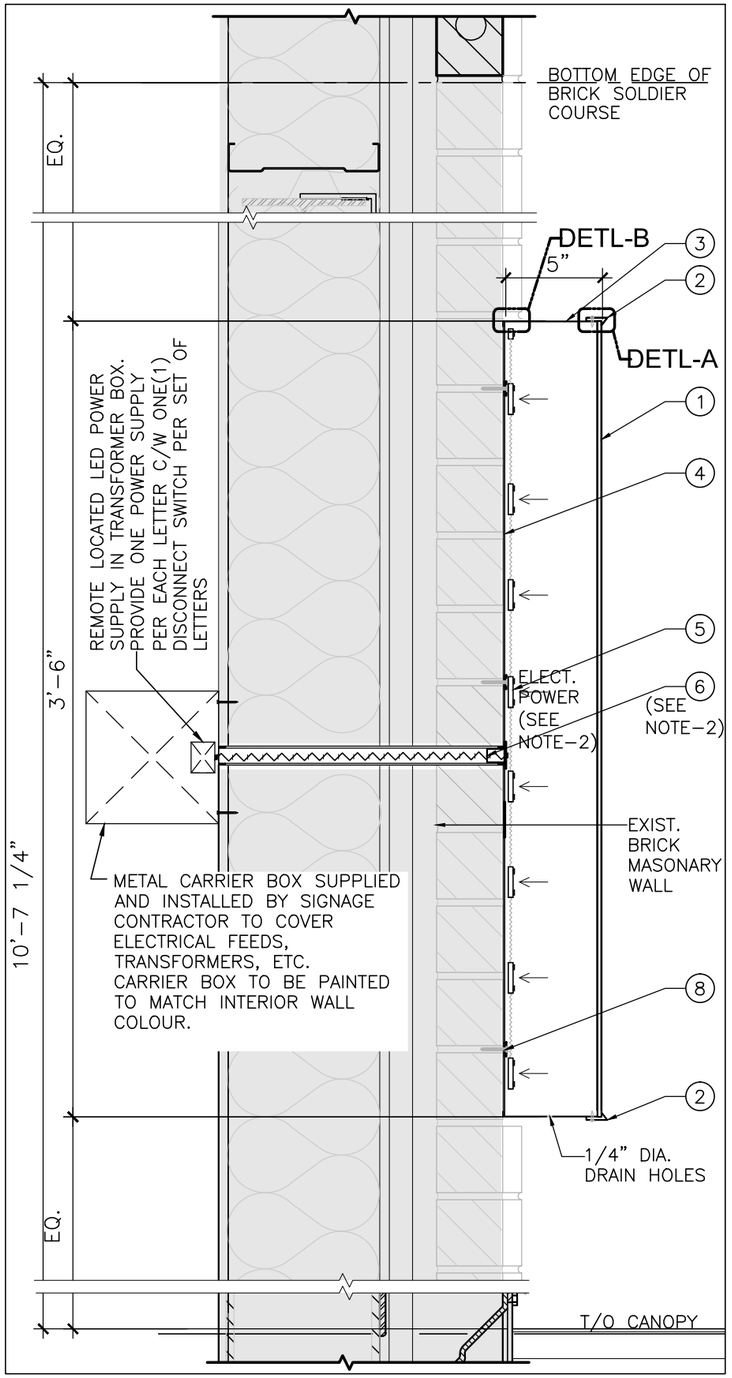
3.04 CLEANING

.1 Leave signs clean and polish all exposed surfaces.

.2 Touch up any damaged finishes.

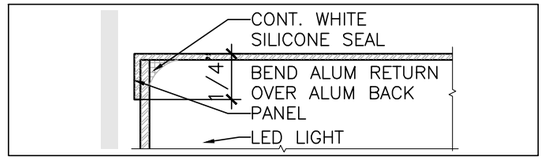
.3 Remove and dispose of any leftover materials or debris.

END OF SECTION



2. SECTION VIEW

Scale: 1 1/2"=1'-0"



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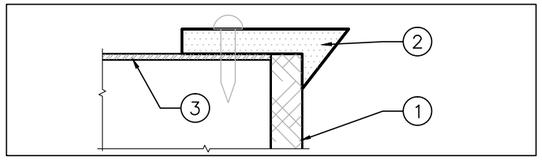
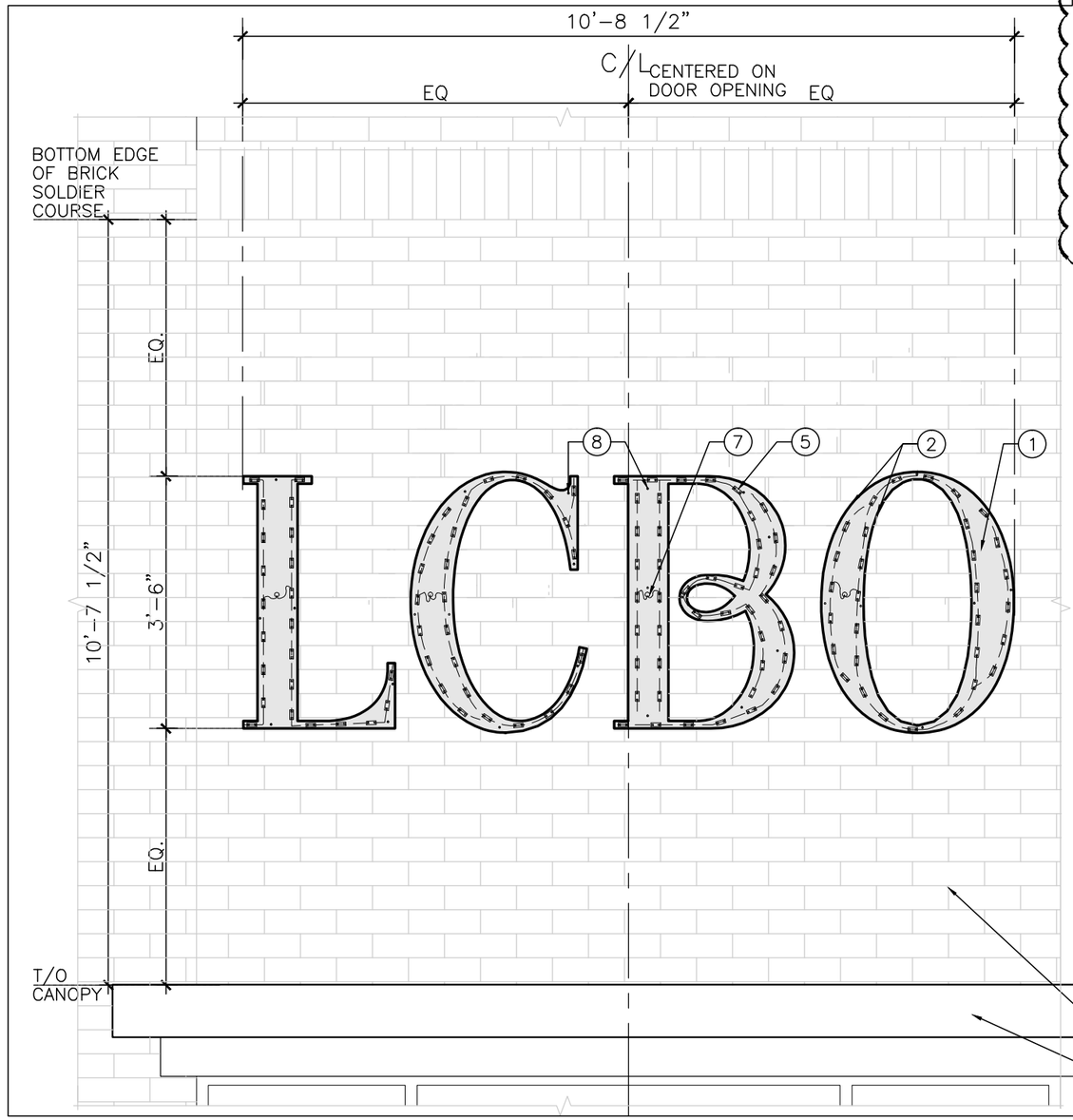


3. DETAIL 'A': Scale: 1:1



1. FRONT VIEW

Scale: 1/2"=1'-0"

FINISH/COLOR LEGEND:

1. CHANNEL LETTER FACE: 3/16"THK., 2447 WHITE TRANSLUCENT ACRYLIC WTH 3M 3735-60 DIFFUSER FILM WHITE. (CENTER LOOP OF LETTER "B" TO BE HOLLOW).
2. TRIM CAP: 1" MYLAR TRIM CAP W/ FIN. TO MATCH 42 MP12734, GARRISON (MATTE FINISH).
3. ALUMINUM RETURN: 1/16"THK x 5"DP CNC BENDED AND PUNCHED TO 1/16" ALUM. BACKING. TO NOTCH OVER ALUM. BACK PANEL. PAINTED WITH 42 MP12734 'GARRISON' (MATTE FIN.)
4. ALUMINUM BACK PANEL: 1/8"THK. ALUM. PAINTED WITH 42 MP12734 'GARRISON' (MATTE FIN.)
5. LIGHT SOURCE: INDIVIDUAL INTERNAL ALLANSON STORM TIGHT II LED ACLW-CW2, 5" TO 5 1/2" O.C.
6. POWER SOURCE: ALLANSON POWER SUPPLY CV125-120 IN TRANSFORMER BOX. PAINT TRANSFORMER BOX TO MATCH INTERIOR WALL COLOR. COORDINATE WITH G.C. PROVIDE ONE(1) DISCONNECT PER SET OF LETTERS. (REFER TO SPEC).
7. ELECTRICAL HOLE: 7/8"ø LIQUID TIGHT ELECT. WIRE HOLE C/W CONNECTOR IN EXTERIOR WALL. PROVIDE CONT. SILICONE SEAL AT BOTH SIDES OF EXTERIOR WALL. TYP.
8. MOUNTING: 1/4"ø MOUNTING HOLES IN ALUM. BACK PANEL TO RECEIVE 3/16"ø x1 1/4" TAPCON SCREW SECURED TO EXTERIOR WALL.

NOTE:
1. FOR TYPE FACE AND FONT REFER TO SPECIFICATION SECTION 10 14 01.
2. PROVIDE 7/8"ø CORE IN EXTERIOR WALL C/W 1/2" ø ELECTRICAL CONDUIT. PROVIDE CONTINUOUS AIR/MOISTURE SEAL BOTH SIDES OF WALL. BY SIGNAGE CONTRACTOR.
3. ADJUST LED LIGHTS TO ENSURE EVEN LIGHTING.

DO NOT SCALE DRAWINGS. DETAILS ARE PROVIDED TO EXPRESS DESIGN INTENT AND SHOULD BE ADAPTED TO SUIT SITE CONDITIONS.

ALL NECESSARY SAMPLES AND SHOP DRAWINGS SHALL BE SUBMITTED TO THE LCBO FOR APPROVAL PRIOR TO PROCEEDING WITH THE WORK.

LCBO

EXTERIOR SIGNAGE
SECTION.: 10 14 01

Title: CHANNEL LETTERS: WALL MOUNTED (INTERNALLY ILLUMINATED)

Scale: AS NOTED
Dwg. No.: SK-01

Date: DECEMBER 2016

PART 1: GENERAL

1.01 SUMMARY

.1 Work of this Section includes fabric awnings and metal awning frames systems.

1.02 RELATED SECTIONS

.1 Section 10 14 00 - General requirements for Exterior Signage.

1.03 REFERENCES

.1 Structural welding code steel AWS D1.1 & AWS D1.2.

.2 American Society for Testing and Materials (ASTM)

.1 ASTM-D4847 - Standard Performance Specification for Woven Awning and Canopy Fabrics

.2 ASTM-E84 - Standard Test Method for Surface Burning Characteristics of Building Materials

1.04 DESIGN REQUIREMENTS

.1 Design signage in accordance with this specification and the accompanying "SK" Series of sketches. The written specification precedes the sketches.

.2 Design signage work in accordance with Contract Documents, and applicable ASTM Standards, utilizing material types, accessories and methods indicated.

.3 Design signage work to withstand live, dead, lateral, wind, seismic, handling, transportation, and erection loads and with a deflection not exceeding L/360.

.4 Design signage in accordance with climatic design data for place of Work contained in the Ontario Building Code to accommodate thermal movements of the components and structural movements to provide an installation free of oil canning, buckling, delaminating, failure of joint seals, excessive stress on fasteners or any other detrimental effects.

.5 Design connections to substrates and structures to withstand live, dead, lateral, seismic, and other imposed loads for the locations they are installed. Confirm installation of ¾" exterior grade plywood backing in walls finished with Exterior Insulation and Finish Systems (EIFS). Inform LCBO representative if proper backing is not incorporated in walls.

.6 Design miscellaneous, additional structural framing members as required to complete the Work, where not indicated on Contract Drawings.

.7 Site verify all dimensions prior to fabrication or awnings.

1.05 SUBMITTALS

.1 Shop Drawings: Submit shop drawings, Samples and Record Photos in accordance with the requirements of Division 01 and as outlined in Section 10 14 00.

.1 Include engineering calculations showing wind load requirements of the local Building Department and include fastener and erection details, signed and sealed by the qualified professional engineer responsible for their preparation.

.2 All anchoring to be concealed type. Submit Shop Drawings detailing concealing method for Consultant review.

.2 Submit test data confirming Surface burning characteristics of Awning Fabrics.

1.06 QUALITY ASSURANCE

.1 Requirements of Awning manufacturer and Awning Contractor
- .1 Contractor must provide proof of certifications:
  - .1 Have been in continuous operation as a professional fabric awning manufacturer for a minimum of ten (10) years prior to this contract.
  - .2 Hold a valid general contractor's license for a minimum of five (5) years.
- .2 Welder Qualifications: The personnel manufacturing the metal awning frames must be certified welders. Execute welding by firms certified to CSA W47.1 Division 1 or 2.1.
- .3 Retain Professional Engineer, licensed in Province of Ontario, who is experienced in providing engineering services for installing fabric awnings similar to those indicated for this project and with a record of successful in service performance to review, stamp, and sign shop drawings and design calculations.

.2 Test awnings to CSA C22.1. Record light fixture testing and measurement on standard form acceptable to the LCBO Project Coordinator.

.3 Awning work shall comply with municipal, provincial and federal restrictions, standards, and by-laws that may affect the Work. Apply and pay for all permits required to complete the Work. If application for variance is required, LCBO will be responsible for related fees.

.4 Source Quality control
- .1 Arrange for the LCBO Project Coordinator to conduct shop inspections and tests.
- .2 Notify the LCBO Project Coordinator minimum twenty-one (21) days prior to shop inspections and testing.

1.07 DELIVERY, STORAGE AND HANDLING

.1 Package accessories and label with description of contents and installation location.

.2 Deliver accessories where designated at site by Contractor and /or LCBO Project Coordinator.

.3 Deliver components safely packaged to prevent damage, labeled to identify contents.

.4 Store in secure areas, out of weather and protected from Work of other trades.

1.08 WARRANTY

.1 Warrant frame materials and workmanship against defects for a period of 3 year from date of substantial completion of the Work.

.2 Warrant fabric materials and workmanship against defects for a minimum period of 3 years, on a prorated basis, from the date of substantial completion of the Work and/or offer the same warranty offered by the fabric mill that manufactured or supplied the fabric.

1.09 REFERENCES

.1 AAMA CW-10, Care and Handling of Architectural Aluminum from Shop to Site.
.2 ANSI H35.1M Alloy and Temper Designation Systems for Aluminum (Metric).
.3 ASTM A240/A240M, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
.4 ASTM B209M, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
.5 ASTM B221M, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
.6 ASTM F738M, Specification for Stainless Steel Metric Bolts, Screws, and Studs.
.7 CAN/CGSB 1.108, Bituminous Solvent Type Paint.
.8 CSA C22.1, Canadian Electrical Code, Part 1, Safety Standards for Electrical Installations.
.9 CAN/CSA C22.2 No. 56-M Flexible Metal Conduit and Liquid Tight Flexible Metal Conduit.
.10 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steels.
.11 CAN/CSA-S16, Limit States Design of Steel Structures.
.12 CAN/CSA-S6, Canadian Highway Bridge Design Code.
.13 CAN/CSA W117.2, Safety in Welding, Cutting and Allied Processes.
.14 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
.15 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
.16 CSA W59, Welded Steel Construction (Metal Arc Welding).
.17 CSA W59.2-M, Welded Aluminum Construction

PART 2: PRODUCTS

2.01 STANDARD WINDOW AWNINGS

.1 Fabric: Flexible seamless substrate:
  .1 3M Panagraphics III
  .2 Or approved alternative
.2 Sign Face: Graphic vinyl – seamless where possible (Sign contractor to secure to frame and/or cover as specified).
.3 **Graphics and lettering:** Translucent film to be 3M Scotchcal, applied to front of sign face (first surface). Colours:
  .1 Logo/Text: 3M 3735-60 White.
  .2 Background: 3M 3630-5670 LCBO Green (equal to Sherwin Williams SW7749 Laurel Woods)
  .3 Font: Theinhardt Regular

2.02 FRAMING

.1 Awning framing to be minimum 25 mm square 16ga. Aluminium tube, welding to AWS standards with welds ground smooth. Frames designed for wind loads, snow loads and seismic requirements as required by structural engineering requirements and in accordance with approved Shop Drawings.

.2 Metal welding: All joints must be mitered or completely welded to AWS standards, ground smooth, primed and painted.

.3 Anchors: Anchoring hardware shall be galvanized, zinc-coated 9.5mm (3/8") diameter or greater. All anchors to be concealed.

.4 Use aluminum MP1 extrusion to attach material to head bars. Staple fabric to head bar extrusion channel using stainless steel staples. Install vinyl gasket to cover staples in channel.

.5 Depth of Awning at bottom: 610mm, unless lesser depth mandated by municipality.

.6 Eggcrate soffit shall be clear anodized aluminium.

2.03 FABRICATION

.1 Fabricate awning and frames in strict accordance with the reviewed shop drawings, written welding procedure specifications and the reference standards.

.2 Awning Frame Finish: Frames and metal components are to be milled aluminum finish.

.3 Awning Fabric to be seamless. If seaming is required, submit proposed seaming locations, procedures for seaming, and representative samples, as specified in this Section and Section 10 14 00.

2.04 ELECTRICAL REQUIREMENTS

.1 Illuminations: Provide Allanson Powerfed 3 Watt StormTight LED. Catalogue#: ACLW-CW-3W cool white, 12V DC, LEDs to be distributed to evenly illuminate each letter.

.2 Power Source: CV-125-120-277, 12V DC, 60 Watts, fully encapsulated, UL recognized Class 2 power supply with short circuit and overload protection. Increase power capacity as required.

PART 3: EXECUTION

3.01 INSTALLATION

.1 Mechanical attachment:

.1 Hanger brackets, not exceeding 1060mm (42") o/c, to be fastened to the masonry veneer with galvanized, zinc-coated 9.5mm (3/8") diameter or greater anchors or approved alternative equally spaced over the length of the member.

.2 Each vertical awning member, not exceeding 1060mm (42") o/c, to be connected to the masonry veneer with galvanized, zinc-coated 9.5mm (3/8") diameter or greater anchors or approved alternative at the base of the awning.

.3 All anchors to be concealed.

.2 Install awnings and frames in strict accordance with the Drawings and the reviewed shop drawings, and provide appropriate building code requirements and aligned and plumb.

.3 Align Awnings with underside of the exterior cladding soldier course.

.4 Use concealed fasteners fabricated from metals that are non-corrosive to either the sign material or the mounting surface.

.5 Welding procedures and operation shall comply with the referenced standard. Welding electrodes shall comply with ASTM A 233, E-70 Series. Grind smooth exposed welds; finish welds to the inside.

.6 All frame components, brackets, fasteners, and other mounting equipment must be concealed from view.

3.02 CLEANING

.1 Leave signs clean and polish all exposed surfaces.

.2 Touch up any damaged finishes.

.3 Remove and dispose of debris and left over material offsite.

END OF SECTION

PART 1: GENERAL

1.01 SUBMITTALS

.1 Submit product data sheets of each item specified indicating performance criteria, compliance with appropriate reference standard(s), characteristics, and limitations.

.2 Submit shop drawings in accordance with Section 01 33 00 and 05 50 00.

.3 Closeout submittals: Submit cleaning and maintenance instructions for miscellaneous specialties for incorporation into Operations and Maintenance Manuals.

1.02 DELIVERY, STORAGE, AND HANDLING

.1 Package or crate, and brace products to prevent distortion in shipment and handling. Label packages and crates, and protect finish surfaces by sturdy wrappings.

PART 2: PRODUCTS

2.01 ENTRANCE CONTROLS/ SECURITY GATE

.1 General:

.1 Provide all required wiring for electrical devices.

.2 Entrance Controls/ Security Gate:

.1 Accepted products: Bolduc Solutions, “BMS-5M42-45” or approved alternate

.1 Finish: stainless steel (brushed)

.2 (Left Side)(Right Side) 1 arm and cart corral as shown on drawings

.2 Submit Shop Drawings of security gate and cart corral for LCBO approval prior to installation.

.3 Connect to fire alarm system, manufacturer to supply a 25’ lead for connection to the alarm signaling system

.4 Manufacturer to supply and install a manual pull station for emergency exiting

.3 Customer Service Return Gate:

.1 Accepted products: Bolduc Solutions, “Crowd Control, Surveillance Model” or approved alternative

.1 Finish: stainless steel (brushed)

.2 Provide electric-magnetic release, Release to be mounted and only accessible from the inside surface of customer service desk,

.1 Steelcase, distributed by POI, Tel: (905) 479-1123:
Three High lateral filing Cabinet, 36” wide with lock, Model RLF18363F, Colour 4242 Milk.

2.02 SECURITY BELT

.1 Located at cash lanes.
.2 Model 896CM Fully-Concealed Mount “Tensabarrier by Tensator,” (7’6”/2.3m) complete with panic break belt end, or approved alternate
.3 Finish: Cover plate cover finish to match Pantone PMS410.
.4 Belt Colour: G6 Green
.5 Provide cover plate at through-slot, see Standard Details.

2.03 CASH STOOL

.1 Location: Checkout area (refer to architectural drawings)
  .1 3 in 1 Sit Stand stool
    .1 Fully upholstered backrest (14"w X 10"h)
    .2 Seat pan (17 1/2”w X 15 1/2”d)
    .3 Upholstery: Vinyl – Gunmetal US 392
    .4 Control Mechanism: Geometric shaped adjustment paddles and icon plates
    .5 Pneumatic lift: 200mm knurled dual height adjustment system (seat height 7 1/2” of adjustment between 19 1/4" – 35 1/2”)
    .6 Base/Glide/Casters: 22” chrome base, 18” footring, 5 lock casters
  .2 Accepted suppliers:
    .1 ErgoCentric, 1-866-438-3746 ext.229, or approved alternates

PART 3: EXECUTION

3.01 PREPARATION

.1 Verify substrate surfaces are solid, free from surface water, dust, oil, grease, projections and other foreign matter detrimental to performance.
.2 Items to be built-in: Provide information and templates required for installation of work of this Section, and assist or supervise, or both, the setting of anchorage devices, and construction of other work incorporated with products specified in this Section in order that they function as intended.
.3 Verify there is adequate supports and/or blocking in gypsum wall assemblies prior to installation of wall mounting items.

3.02 INSTALLATION

.1 Install miscellaneous specialties level and securely and rigidly anchored to substrate in accordance with authorities having jurisdiction, reviewed shop drawings, and manufacturer's written instructions.
.2 Isolate dissimilar metals and metal to concrete or masonry with 2 coats of bituminous paint.

.3 After installation, adjust miscellaneous specialties in accordance with manufacturer's written instructions.
.4 Install items plumb, straight and level to a tolerance of 1:500.
.5 Securely fix items in place with concealed fasteners.

END OF SECTION

3 in 1 Sit Stand

The only seating system designed specifically for bank Customer Service Representatives

As a Sit Stand

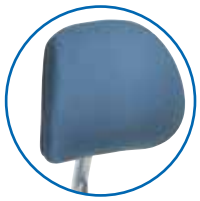
As a Sit Stand
with a Backrest

As a Task Chair
at Counter Height

3 chairs in 1 for every bank Customer Service Representative

The 3 in 1 Sit Stand was designed specifically to be flexible enough to meet the varied needs of Financial Institutions' Customer Service Representatives. Regardless of the task that the Customer Service Representative needs to perform, or the desired standing or sitting position, the 3 in 1 Sit Stand provides the solution.

3 in 1 Sit Stand



Finally a sit stand that overcomes all of the negatives identified by bank Customer Service Representatives (CSR's), a sit stand so well designed for CSR's that they will thank you for it. The unique No Slip Strip makes the 3 in 1 Sit Stand the most user friendly sit stand available with three seating options.

The 3 in 1 Sit Stand is three chairs in one seating system. ergoCentric worked with one of Canada's leading Financial Institutions to create a seating system that could be used as a sit stand or as a counter height task chair. Now the 3 in 1 Sit Stand is that Financial Institution's official seating for in-branch CSR's. The 3 in 1 Sit Stand meets the exacting specifications of ergonomists and the varied desires of CSR's.

- Use as a sit stand with our durable No Slip Strip
- Use as a sit stand with a back support
- Use as a counter height task chair
- Two casters allow for easy movement from station to station or out of the way
- Three glides provide stability when perching

Moves Easily

specifications

Backrest
- Fully upholstered backrest **(14" wide by 10" high)**
- 4" of back height adjustment

Seat
- Upholstered seat with dual density molded polyurethane foam with No Slip Strip
- Seat Pan **(17.5" wide by 15.5" deep)**

Control Mechanism
- Geometric shaped adjustment paddles and icon plates make Adjustability Understood™:
  - *Single lever provides synchronized back and seat angle adjustment – circle paddle*
  - *Pneumatic seat height adjustment – square paddle*

Pneumatic Lift
- The highest seat height will work with the highest of counter tops. At the lowest seat height the chair can be used as a desk chair, providing bank branches with complete flexibility. (we almost called it the 4 in 1 Sit Stand)
- 200mm knurled (Adjustment between 19.25" - 35.5") (Dual height adjustment system)

Base/Glides/Casters
- 22" Chrome 22 Base has an 18" oval tube footring built in for durability
- Two dual wheel nylon 2¼" casters and three 2¼" glides

Warranty

***LIFETIME** **

- Original purchaser
- Defects and functional failure of materials up to a weight of 280 lbs
- With the following exceptions:

***10 YEARS** **

- Mechanisms, arms, foam, fabric

** Includes labor costs*

additional options

Options

As with all ergoCentric seating systems the 3 in 1 Sit Stand is completely modular allowing you to add arms, change the seat size, base, casters, glides and cylinders to suit changing needs.
- Fixed and adjustable arm options
- Caster and glide options

Visit our website for more details at www.ergocentric.com.

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Printed in Canada
BR3IN1ENG

PART 1: GENERAL

1.01 REFERENCES

.1 ASTM A167, Standard 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 (Galvannealled) by the Hot-Dip Process.

.3 ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials.

.4 CAN/CGSB-19.13-M, Sealing Compound, One-Component, Elastomeric, Chemical Curing.

.5 Refer to Section 20 05 00
20 07 00
23 23 00.

1.02 SUBMITTALS

.1 Submit shop drawings stamped by a Professional Engineer indicating:

.1 Construction details of all equipment by drawings and manufacturers literature.

.2 Insulated metal panels and all associated connection details.

.3 Roughing-in requirements for mechanical and electrical services.

.4 Installation details.

.5 Shop drawings should include a wiring schematic drawing.

.2 Commissioning/Start-Up Report:

.1 Submit start up report indicating refrigerant type/ quantity, degrees of sub cooling, degrees of superheat, compressor amp draw, site glass observation, suction pressure, suction temperature, discharge pressure, discharge temperature and ambient temperature.

.3 Provide operation and maintenance data for incorporation into manual.

1.03 QUALITY CONTROL

.1 Qualifications: Equipment shall be manufactured and installed, by a company having personnel skilled in the manufacturing and installing of prefab walk-in freezers and coolers and having continuous proven experience within last five years.

1.04 WARRANTY

.1 Extended Warranties:

.1 Submit a warranty for the fabrication and installation of units specified in this Section as specified in the General Conditions to the Contract, except that warranty period is extended to five years for compressor parts.

PART 2: PRODUCTS

2.01 MANUFACTURERS

.1 Walk-in cooler

All prefabricated walk-in cooler work in this section shall be by the refrigeration sub-contractor.

.2 Condenser/Compressor and Evaporators:

.1 **Keeprite Refrigeration**
159 Roy Blvd.
Brantford, Ontario
N3R 7K1
519-751-0444

.2 **Heatcraft Refrigeration (Bohn)**
Delta T Components,
P.O. Box 81130
Ancaster, Ontario,
L9G 4X1
P. 905-648-0445
F. 905-648-0392

.3 Or approved alternate.

.3 Refrigeration and Free Cooling Control

.1 **Airstream Free Cooling Control**
Virta Energy Management Services Inc.
416-410-3478 ex#1

.2 Or approved alternate.

2.02 MATERIALS

.1 Stainless steel sheet: To ASTM A167, type 302/304 with No. 4 finish.

.2 Galvanized steel sheet: Commercial grade to ASTM A653/A653M, with zinc coating (galvanized).

.3 Panel sheets: Prefinished steel colour Antique Linen on interior and White on exterior.

.4 Aluminium sheet: Utility sheet with "stucco" pattern finish on exterior panels and smooth finish on interior panels.

.5 Galvalume: Steel sheet with aluminium zinc alloy coating with baked on polyester finish.

.6 Sealant: To CAN/CGSB-19.13, colour to match panel.

.7 Isolating coating: To manufacturer’s recommendations.

.8 Insulation for panels and screeds: To ASTM E84, Class 3, poured type foamed-in-place polyurethane (urethane), 75 mm thick. R-Value: 29.

.9 All fluorescent lights shall receive Ultra Violet filters Encapsulite G-l0-S shields manufactured by Encapsulite Products, lengths to suit lamp size, or T12 U.V. filtering tubes by Ardco Inc.

.10 Compressors – As per COMPRESSOR/CONDENSING section
.11 Goose neck vents, refer to attached Sketch (SK01 - 11 41 20).

2.03 FABRICATION

.1 Manufacture in accordance with configurations shown on drawings and in conjunction with abutting and connected equipment and fixtures. Provide shop drawings for review.

.2 Panel sections: precision die formed metal pans accurately spaced and insulated. Panel edges and corners to have tongue and grooves, formed-in-place, to assure airtight, vapour proof joints using gaskets or sealants.

.3 Wall and ceiling panels: Nominal 280 mm, 584 mm and 1194 mm widths.

.4 Corner panels: 280 x 280 mm wide externally where applicable.

.5 Door panels: Insulated and finished as per exterior and interior panels (for door sizes Clear opening to be 7' high x 5' wide for sliding doors. For swing doors, confirm with Project Coordinator), reinforced to prevent door panels from twisting, racking or warping. Ensure that doors will close and seal opening. Equip each door panel with:

.1 Swing type:

.1 One, infitting flush mounted type, door (swing as indicated) to fit door opening, insulated and finished same as panels, having 1220 mm high x 1.6 mm thick (16 ga.) stainless steel push/kick-plates on both exterior and interior and having soft thermoplastic gasket with magnetic steel core at top and both sides, adjustable rubber wiper gasket at bottom. Gaskets to be oil, fat, water and sunlight resistant and be replaceable.

.2 Hinges, spring loaded, self-closing type, with stainless steel pin and nylon cam-type bearing, of satin bright polished finished aluminium.

.3 One latch, to match hinges, for opening door by breaking force of trigger-action door closer and magnetic gasket. Latch to have inside safety release handle capable of opening door from within regardless of whether door is padlocked or not.

.2 Sliding type:

.1 Insulated and finished same as panels, having 1220 mm high x 1.6 mm thick (16 ga.) stainless steel push/kick-plates on both exterior and interior.

.2 Extruded aluminium wall mounted guides with brackets, nylon clad, hardened steel ball bearing rollers and leading edge door-stay.

.3 Anti-lift feature, adjustable side-mounted door hangers and extra-duty steel door stops with rubber bumpers.

.4 Stainless steel, large exterior pull handle, recessed inside pull handle and hands-free foot treadle complete with padlocking hardware and inside safety release.

.5 Gasket kit and closing door rolls "down and in" to close with a positive seal against gaskets.

.3 Reach-In Cooler Doors:

.1 Submit Shop Drawings illustrating all door and accessory features and installation configuration in accordance with Section 01 33 00

.2 Anthony International with electric anti-sweat door heaters and Optimax LED lighting, or approved alternate.

.1 Double pane, fully tempered safety glass

.2 Sag adjustable, reversible doors

.3 Self closing door hinges, as recommended by manufacturer.

.4 Adjustable shelving system, refer to LCBO standard details. Finishes as per details.

.5 Full length LED light fixtures

.6 Handles: Chrome plated, 350mm long x 19mm wide x 38mm deep, Profile: Contoured

.7 Additional options: confirm with LCBO Project Coordinator

.6 Door Frame: to suit doors and as recommended by manufacturer.

.7 One digital thermometer to provide temperature readings from -51°C to 27°C and mounted on hinge side of panel approximately 1524 mm from floor. Cover sensing bulb with protective stainless steel moulding.

.8 Lighting: Refer to Reflected Ceiling Plan:

.1 Refer to Reflected Ceiling Plan for layout.

.2 Refer to Electrical Drawings for Luminaire types.

.9 Equipment Nameplates: Minimum 1.6 mm thick 2-ply laminated coloured plastic plates, minimum 12 mm x 50 mm for smaller items such as damper motors and control valves, and minimum 25 mm x 65 mm for equipment. Each nameplate is to be complete with bevelled edges and engraved wording to completely identify the equipment with no abbreviations. Wording is generally to be as per the drawings but must be reviewed prior to engraving. Name plates shall include LCBO Store Number, equipment tag number as per drawings, and electrical panel number the unit is fed from. Supply stainless steel screws for securing nameplates in place.

.1 Fit up contractor to install nameplates on all landlord supplied equipment.

.10 Surface mounted vapour tight junction box, complete with ½" liquid tight conduit, stubbed out past exterior wall (or sleeve for conduit) for fire alarm, alarm device(s).

.11 Ceiling panels: reinforced internally and externally as required, to support evaporator and suspended ceiling and lighting. Where external reinforcement is needed and through fasteners are used, fasteners to be of low heat conducting material such as Teflon. Insert fasteners in Teflon sleeves to prevent compressing of insulation.

.12 Panel thickness and finish for exterior and interior panels exposed to normal view, 8mm core galvanized steel, factory painted, colour white for ceiling, Antique Linen for walls

.13 Locking devices shall be panel sections to have cam-action locking devices, spaced at maximum 915 vertically, 610 mm horizontally. Male and female lock pockets.

.14 Removable closure panels: Extend from lower edge of erected prefabricated ceiling panels to finished building ceiling. Extend cover strips or angles from building floor to ceiling closure panels between exposed ends of walk-in boxes and building wall.

.15 Rub rails: 75 mm x 200 mm x 1.6 mm (16 ga.) stainless steel on exposed exterior panels, mounted 300 mm from centre of rail to finished building floor. Where rub rail is at external corner, mitre joint and weld. Box open ends. Top and vertical ends where rail makes contact with wall panels are to be sealed. Rub rails are not required at doors, door panels or within 200 mm of internal angles of walls.

.16 Ticket Mouldings are to be attached without exposed rivets or fasteners, should be painted same colour as fridge shelf, and should be sized to receive LCBO tickets.

.17 Relays: For electrical controls refer to Electrical Division.

.18 Refer to Division 26 Electrical for service requirements, confirm if single or 3 phase.

.19 Reinforce all opens to building structure as required.

2.04 REFRIGERATION EQUIPMENT

.1 Free Cooling Refrigeration Control Description:

.1 Airstream Free Cooling Controller is the thermostat control for the refrigeration equipment and the free cooling. It controls the operation of the condenser/compressor and the evaporators and the circulating fan (s) and the intake and exhaust fans. The controller has the capability to turn off and on multiple refrigeration circuits with individual compressors and evaporators. The Airstream control turns off the compressor and evaporator when the outside air temperature is cooler then the inside temperature of the walk-in cooler, and Free Cools. The system brings in outside air through intake fans and utilizes exhaust fans to remove the warmer air out. The system also utilizes circulating fans instead of the evaporator fans for circulating the air when the compressor is off. The control has the capability of controlling two or more circuits including compressors and evaporators, during high refrigeration loads the control can turn on the second refrigeration circuit to help refrigerate quicker, and as a backup if one of the circuits fails. The Airstream Controller is fully programmable, and has the capability of lead/Lag compressor control for equal hourly usage of each circuit. The control is also used to maintain minimum ventilation requirements year round as per the Ontario Building Code and ASHRAE Standard 62.1, adjustable to meet the minimum fresh air requirements in CFM and with an optional CO sensor for control. The controller also has the capability of night time temperature setback, and BACnet monitoring and control.

.2 Equipment Detail

.1 Airstream Free Cooling Controller: Controller to be equipped with five (5) temperature sensors, 1-foot and 15-foot extension cables, 2 evaporator fans (2 circuits), Two (2) inside cooler thermostats , One (1) outside Thermostat. One (1) humidity sensor. One (1) CO sensor. The Airstream system comes with circulating fans, pump down solenoid control, door heater (2 circuits)

control, alarm and lights, and outside air intake and exhaust fans, with dampers and intake filter box.

.2 Safety Tested: ETL listed, or CSA or equivalent

.3 Building Automation System (BAS) - Capability with BACnet monitoring and control, and internet monitoring capabilities.

.4 Electrical Enclosure: 16 gauge steel box; to be mounted on wall outside walk-in cooler, 60" from floor, with good air circulation around it.

.5 Electrical Rating: 120V, 60Hz. The Cooler Controller circuit is protected by a fuse (250V, 15A, slow-blow), accessible in front of the controller.

.6 Features: An LCD screen on temperature sensor in cooler, displaying temperatures inside and outside temperature, evaporator temperature for 2 or more circuits, and defrost cycle and control. Fully programmable with password protection.

.7 Temperature Sensors: Thermister-type; Accuracy: + or - 1/2°F.; for evaporator coils to control defrost cycles. A second sensor can remotely measure the outside air temperature when outside air is used. Optional sensors on custom length extension cables are available.

.8 Installation: Wiring between all line voltage components and the Cooler Controller should be done in rigid or flexible metal or PVC conduit, in accordance with all electrical codes.

.9 Electrical wiring can be done after any holes have been cut and all the components mounted. For a dry location, use flexible or rigid, PVC or metal, liquid-tight conduit and connectors, with insulated #12 AWG,THHN, stranded copper conductors to connect all free cooling system 120 volt connected components.

.10 An Airstream Free Cooling Controller should not be used in a wet location, and therefore should not be used where water will be encountered, such as from spray from a hose. All electrical wiring for intake and exhaust fans is done outside of the cooler box.

.11 Wiring: The Airstream Free Cooling Controller is designed to control the compressor system, evaporators, the door anti-sweat heaters, the outside air system, circulating fans and the alarm. It is set up to bring both the hot and the neutral wires directly from the 120 volt service, and then distribute this power to the various loads. Please refer to the Cold room drawings for details.

.12 Airstream Free Cooling Controller Circuit: This circuit supplies power to the Cooler Controller itself, each of the outside air intake and exhaust fans, and to the compressor control, (The 120 volt coil of a liquid line solenoid valve). Minimum 10 amp circuit has enough capacity to power up to 6 intake fans @ 150 watts each, 6 exhaust fans @ 36 watts each, and a 15 watt solenoid valve. If the number or size of the fans to be controlled causes the load to exceed the maximum allowable amperage, the controller circuit can be used to energize the coil of an appropriately-sized relay or contactor. Because the

intake and exhaust fans do not always switch on and off together, both circuits cannot be energized from the same set of contacts.

.13 The Airstream Free Cooling Controller serves as the compressor system's thermostat; it is not a switch like a simple thermostat. The compressor control contacts don't close, but energize the control device. This device is the liquid line solenoid valve on a "pump down system". The Airstream can control two (2) or more refrigeration circuits with separate compressors and evaporators, with programmable scheduling for lead/lag operation, and high load conditions. Do not connect the compressor control contacts directly to the compressor or to any energized circuit other than the Cooler Controller circuit.

.3 Circulating fans:

.1 Airstream Circulating Fan: The circulating fans are to be installed as per the drawing. The circulating fans circulate air down from the ceiling to the floor when the evaporator fans are off.

.2 Installation: Mount Circulating Fans in 2'x 2' drop ceiling, as per drawing, and attach safety chains to each fan. The Circ Fans are to be hard-wired back to the Cooler Controller, use flexible or rigid, PVC or metal, liquid-tight conduit and connectors, with insulated #12 AWG, THHN, stranded copper conductors.

.4 Free Cooling Intake and Exhaust Fans

.1 Airstream Free Cooling Intake Fan: The Intake fan is a metal inline centrifugal fan; 115 volts; CSA listed; galvanized steel housing; To be mounted outside cooled space to prevent condensation.

.2 Airstream Free Cooling Intake Damper Housing: to be mounted inside the walk-in cooler in the ceiling. Fully insulated and with gasket for minimal air leakage, with 20 gauge galvanized housing.

.3 Airstream Free Cooling Intake Filter Housing: 20 gauge galvanized sheet metal housing; a gasket flange all around for wall, floor, or ceiling mounting; 1" rigid fiberglass insulation for mounting the housing inside a heated space between the walk-in cooler and the outside. Gasket sealed, double hinged filter doors for both sides of filter box, 1" rigid fiberglass insulation for heated space-mounting Important: at least 406mm (16") of unobstructed room must be left in front of one of the filter access door for removing and replacing the filter.

.4 Airstream Free Cooling Exhaust Fan & Housing:
To be mounted inside the walk-in cooler in the ceiling. Fully insulated and with gasket for minimal air leakage. Housing: 20 gauge galvanized housing with, mounting ring flange; insulated aluminum back draft dampers open with fan pressure; spring-closed. Fan: 115 volts; UL Component Recognized and CSA Certified; finger guard. Fan is mounted so that insulated dampers are between it and the walk-in cooler so that condensation is avoided.

.5 Installation: Cutting the Holes for the Intake and Exhaust:

.1 Locate the center of the 264mm (10-3/8") diameter hole to be cut through the ceiling. Keep the center at least 205mm (12") from any corner. Cut holes as per Cold Room Drawings. Check both sides before cutting the holes

.2 Installing the intake fan: Be sure the fan is securely fastened to either the duct or the intake damper housing that is itself securely fastened in place.

.3 Installing the Intake and Exhaust Damper Units:
Leave 50mm (2") of duct projecting from the surface. Allowing room to attach an insulated duct, or the intake fan.

.4 Flat Roof Vent Install both the intake and exhaust caps one (1) m above any potential snow build-up on the roof, add appropriate lengths of 10" (or as per Cold Room Drawing) 24 gauge galvanized round pipe until a sufficient height is reached. Make the penetrations of the flat roof absolutely watertight (May be done by others check Cold Room drawing).

.5 Refrigeration Equipment:

.1 With R- 404A OR R-507 refrigerant, fully automatic in operation, and to conform to following minimum requirements:

.6 Condensing Units

.1 Comply with ARI Standard 520. Air cooled, motor driven integral compressor, motor starter, condenser, receiver, common base, and safety/operational controls. Receiver capacity shall be not less than 125 present of system refrigerant charge. For Walk-in Coolers minimum of two separate condensing units used for refrigeration redundancy.

.2 Provide positive oil lubrication and oil level indicating device for each compressor.

.3 Pressure Switches: Automatic reset low pressure switch and automatic or manual reset high pressure cut-out.

.4 Air Cooled Condensing Units: High efficiency Scroll type (Minimum 11.0 EER) compressor piped and automatically controlled to operate at lower head pressures during low ambient temperature conditions, designed and weather-proofed for outdoor installation, to operate satisfactorily at winter ambient temperatures down to -30 degrees C, and be provided with crankcase and receiver heaters. See drawing for condenser/compressor info.

.5 Motors: EC type. Provide condensing fan motors with thermal overload protection.

.6 Controlled by: Pump down solenoid, controlled by Airstream Free Cooling Control. The Airstream can control two (2) or more refrigeration circuits with separate compressors and evaporators, with programmable scheduling for lead/lag operation, and high load conditions. Do not connect the compressor control contacts directly to the compressor or to any energized circuit other than the pump down solenoid.

.7 Voltage rating: as per cold room drawing.

.8 Horsepower rating shown are to serve as guide only. It is contractor's responsibility to include in his base quotation, units of sufficient capacity to maintain temperatures as indicated 40^0F

.7 Unit Coolers

.1 Comply with ARI Standard 420. Units shall be UL listed, forced-ventilation type, See drawing for evaporator info.

.2 Provide drip pan complete with pump assembly (if required) and line to sanitary drain or janitor sink. Acceptable material: Pump Little Giant submersible pump complete with drain switch for automatic operation.

.3 Motors: EC type. Provide motors with thermal overload protection. Provide manual starting switch.

.4 Drain Pans: Galvanized sheet steel. Provide additional drain pans under uncovered refrigerant connections, and interconnect them with main drain pan.

.5 Defrost Provision: Walk-in Coolers; Defrost shall occur during compressor off cycle with evaporator fans off, controlled by Airstream Free Cooling Controller

.6 Power and control of evaporator circuit provided by Airstream Free Cooling Controller.

.7 All Drains from drain and drip pans must use Type M copper pipe and fittings. Drains must be supported every 1.8 meters with proper copper, copper plated or vinyl coated trapeze hangers to prevent sagging and securely attached to the cooler ceiling with threaded 10 mm rod hangers. With minimum 10mm slope per linear meter of horizontal copper drain pipe.

.8 Room Temperature Control

.1 Thermostat: Airstream fully programmable digital thermostat, with inside and outside temperature, 2 or more evaporator temperatures, defrost cycle, monitoring and control with password protection.

.2 Temperature setting: Walk-in Retail Cold Area/Alcove (Party Zone/Cooler area): 10° C. It is the refrigeration contractors or the controls contractors responsibility to calibrate the equipment and ensure that the specified temperatures and defrost cycles, as approved by LCBO, are set.

.9 Room Temperature Alarms

.1 Use the Airstream Free Cooling Controller to provide a local audible and visual over-temperature alarm with silencer switch. Where shown on the drawings provide an additional remote alarm located in an adjacent corridor.

.10 Ventilation Requirements

.1 Use the Airstream Free Cooling Controller for fresh air ventilation year round. In the winter 100% of the cooling is done with fresh air in the shoulder and summer seasons, the Airstream can be programmed to meet the minimum ventilation air requirements of the cold room in CFM, and or with a CO2 sensor to meet local City by-laws.

.11 Refrigerant tubing: Refer to Division 23.

2.05 IDENTIFICATION

.1 Equipment Nameplates: Minimum 1.6 mm thick x [25 mm x 65 mm] [12 mm x 50 mm], 2-ply laminated coloured plastic plates,
- .1 Bevelled edges and engraved wording to completely identify the equipment with no abbreviations.
- .2 Wording to include but not limited to:
  - .1 Name, make and manufacturer model number
  - .2 LCBO Store Number and equipment tag number as per drawings
  - .3 Overall equipment capacity, cubic footage available, surface available
  - .4 Overall product dimensions.
- .3 Use stainless steel screws for securing nameplates in place.

PART 3: EXECUTION

3.01 WORKMANSHIP

.1 Erect work true-to-line, plumb, square and level with all joints aligned. Fit joints and intersecting members accurately and in true planes adequately fastened.

3.02 INSTALLATION OF COLD ROOM

.1 Insulate to prevent electrolysis between metal and concrete by applying coating of asphaltic paint to metal surface, applied in accordance with manufacturer's instructions. Insulation to be dry before assembling panels in place.

.2 Unless otherwise indicated, install units within 25 mm of building walls, with minimum 25 mm clearance between top of unit and room ceiling. Fasten screeds to building and/or wearing floor in accordance with manufacturer's instructions.

.3 Caulk around perimeter of panels after installation on floor slab, where applicable.

.4 Cut or drill holes in panels, as required, to accommodate electrical and mechanical services, runs or connections. Insert Teflon sleeves into holes and seal. After installation of services, fill remaining space with insulation.

.5 Cap wrench access holes with an in-fitting, flush, stainless steel removable plug.

.6 Install removable closure panels, cover strips, and angles.

.7 Supervise installation of thresholds, heaters and urethane insulation for floors.

.8 Site Dimensions must be verified on site before start of fabrication. Report any discrepancies in writing to Consultant.

.9 Installation Timing - To be co-ordinated with other trades involved with this section.

.10 Compressor to be roof mounted on sleepers in accordance with manufacturer's requirements. Co-ordinate with Divisions 7, 22, 23 and 26 and ensure a weather tight installation.

.11 Ensure all openings in Work by this Section are sealed to CRCA Guidelines.

.12 Install Condensing Units on roof on sleepers as per Cold Room Drawings.

.13 Install Evaporator Units in Cooler as per Cold Room Drawings.

.14 Install all necessary ducts for intake and exhaust for free cooling system, as per cold room drawings. Roof penetrations shall be as per CRCA guidelines. Refer to 23 31 00 for sealing of ducts exposed to outdoors.

.15 Install all necessary electrical wiring both line voltage and low voltage for; pump down solenoid, condensing units, evaporator units, circulating fans, intake fans, exhaust fans, anti-sweat door heaters, Airstream Free Cooling Controller, and all sensors.

.16 Provide goose neck roof vents and associated counter-flashing. Refer to Sketch (SK01 - 11 41 20)

3.03 CLEANING AND ADJUSTING

.1 Upon completion of work, clean equipment and apparatus, remove protective coverings and test and adjust operating equipment. Re-finish damaged coatings and finishes.

3.04 POWER REQUIREMENTS

.1 Voltage requirements: as per Cold Room and Electrical Drawings.

.2 120V provision for evaporators, anti-sweat heaters for glass doors and Airstream Free Cooling system.

3.05 SOUND LEVEL READINGS FOR REFRIGERATED CASES AND TEST PROCEDURE:

.1 All LCBO refrigerated cases are required to have a sound level with fans in operation no more than 63 – 70 dBA. At no time is a level greater than 70 dBA acceptable.

.2 Sound level measurements to be obtained using a handheld sound level meter [SLM]. The SLM must comply with at least the minimum Type 2 requirements of ANSI S1.4 or IEC 61672. Take three sound level readings, one inch from the air intake grill of each of the refrigerated cases. This will be at the lowest height just inside the front face of the unit. Take one reading on each side, approximately three inches from the end of the unit and one reading in the middle. Readings will be the average sound level over a one minute time frame with the circulation fans in operation.

END OF SECTION

PART 1: GENERAL

1.01 APPLICATION

This Section specifies requirements, products, common criteria and characteristics, and methods and execution that are common to one or more Sections of Mechanical Work Divisions, and it is intended as a supplement to each Section and is to be read accordingly.

1.02 DOCUMENTS

The mechanical Specification and the mechanical drawings are an integral part of the Contract Documents and are to be read accordingly.

Comply with the requirements of the General Requirements Section of this Specification.

The mechanical drawings are performance drawings, diagrammatic, and show approximate locations for equipment and materials. The drawings are intended to convey the scope of work and do not necessarily show architectural and structural details. The locations of materials and equipment shown may be altered (when revised layouts have been submitted and approved), to meet requirements of the material and/or equipment, other equipment and systems being installed, and of the building. Provide all fittings, offsets, transformations, and similar items required as a result of obstructions and other architectural or structural details but not shown on the mechanical drawings.

1.03 PLANNING AND LAYOUT OF WORK

The exact locations and routing of mechanical and electrical services are to be properly planned, coordinated and established with all affected trades prior to installation such that the services will clear each other as well as any obstructions. Generally, give the right-of-way to piping requiring uniform pitch and locate and arrange other services to suit.

All shut-off valves, balancing devices, air vents, equipment and similar products, particularly such products located above suspended ceilings, must be located for easy access for servicing and/or removal. Products which do not meet this location requirements are to be relocated at no cost.

1.04 CO-OPERATION & RELATIONSHIP WITH OTHER WORK AND TRADES

Co-operate fully with all trades in such a manner as to not interfere with other work being carried on in the building. Where other work and equipment has to be installed along with mechanical work, arrange with other trades to install this work to best suit the particular condition.

Examine the architectural, structural, and electrical drawings and specifications in conjunction with the mechanical drawings and specifications and be satisfied that the mechanical work as shown and specified can be performed without changes to the building.

Co-operate and co-ordinate with the Building Commissioning Consultant (BCC) hired by LCBO.

1.05 QUALIFICATION OF TRADESMEN

Maintain at the job site, at all times, qualified personnel and supporting staff, with proven experience in erecting, supervising, testing and adjusting projects of comparable nature and complexity.
All apprentices must always be supervised by a qualified journeyman.

1.06 CODES AND STANDARDS

All work is to be executed in accordance with all governing Codes, Standards, and By-laws.
Where any Code, Regulation, By-law, or Standard is quoted it means the current edition including all revisions or amendments at the time of the Contract. Where references are made to printed directions or recommendations, it means the current edition of such directions and recommendations.
All mechanical piping system work, including equipment, must comply in all respects with requirements of the Ontario Technical Standards and Safety Authority.
Where required, fittings, valves, equipment, etc., must bear a CRN number.
All electrical items associated with mechanical equipment are to be CSA (or equivalent agency) certified electrically, or bear a stamp to indicate ESA approval.

1.07 SHOP DRAWINGS

Submit shop drawings in accordance with the requirements of Division 01.
Show on shop drawings:

.1 Clear and obvious notes of any proposed changes from Drawings and Specifications.
.2 Fabrication and erection dimensions.
.3 Provisions for allowable construction tolerances and deflections provided for live loading.
.4 Details to indicate construction arrangements of the parts and their connections, and interconnections with other work.
.5 Location and type of anchors, and exposed fastenings.
.6 Materials and finishes.
.7 Physical dimensions of materials including thickness and gauges.
.8 Descriptive names of equipment.
.9 Mechanical and electrical characteristics when applicable.
.10 Information to verify that superimposed loads will not affect function, appearance, and safety of the work detailed as well as of interconnected work.
.11 Assumed design loadings, and dimensions and material specifications for load-bearing members.
.12 Dimensions and dimensioned locations of proposed chases, sleeves, cuts, and

holes in structural members.

.13 All shop drawings of structural components or components that are to withstand dead loads, live loads and/or wind/horizontal loads shall be sealed and signed by a registered professional engineer.

LIST OF REQUIRED SHOP DRAWINGS TO BE SUBMITTED IN A TIMELY MANNER BY CONTRACTOR TO LCBO DESIGN CO-ORDINATOR, COPIED TO ALL RELEVANT DESIGN CONSULTANTS: (This list may not reflect all shop drawings required. It is the responsibility of the contractor to insure that all requirements for submittals are met as specified.)

Shop Drawings required:

.1 Refrigeration – **piping layout drawings must be manufacturer-designed and engineer-stamped.**
.2 Drains
.3 Plumbing Specialties
.4 Fans
.5 Fire Dampers
.6 Grilles and Diffusers
.7 Split System Air Conditioning Units
.8 Smoke Detector (installed in Ductwork)
.9 Controls for A/C Units, Fans, etc.

Catalogue cuts required:

.1 Plumbing
.2 Drains
.3 Grilles and Diffusers
.4 Controls for A/C Units, Fans, etc.

1.08 PERMITS, CERTIFICATES AND FEES

Apply for, obtain and pay for all permits, licenses, inspections, examinations and fees required.

Arrange for inspection of all work by authorities having jurisdiction. On completion of the work, present to the Owner the final unconditional certificates of approval of the inspecting authorities.

Before starting any work, submit the required number of copies of drawings and Specifications to the authorities for their approval and comments. Comply with any changes required as part of the Contract but notify the Consultant immediately of such changes for proper processing of these requirements. Prepare and furnish any additional drawings, details or information as may be required.

1.09 RECORD DRAWINGS

Record, as the Work progresses, work constructed differently than shown on Contract Documents. Record all changes in the Work caused by site conditions; by Owner, Consultant, consultant, Contractor, and Subcontractor originated changes;

and by site instructions, supplementary instructions, field orders, change orders, addendums, correspondence, and direction of jurisdictional authorities. Accurately record location of concealed structure, and mechanical and electrical services, piping, valves, conduits, pull boxes, junction boxes and similar work not clearly in view, the position of which is required for maintenance, alteration work, and future additions. Do not conceal critical work until its location has been recorded.

White prints will be provided by the Consultant at no cost to the Contractor for each Section in which record drawings are required. Record changes in the Work on these prints in red ink.

Dimension location of concealed work in reference to building walls, and elevation in reference to floor elevation. Indicate at which point dimension is taken to concealed work. Dimension all terminations and offsets of runs of concealed work. Make records in a neat and legibly printed manner with a non-smudging medium. Identify each record drawing as "Project Record Copy". Maintain drawings in good condition and do not use them for construction purposes.

Maintain Project record drawings in a state current to Project. Such state will be considered a condition precedent for validation of applications for payment. The Consultant's visual inspection will constitute proof that record drawings are current. Provide Consultant with accurate record drawings, in hard copy with red-line mark-ups, with application for Certificate of Substantial Performance. Final acceptance of the Work will be predicated on receipt and approval of record drawings.

1.10 INSTRUCTION TO OWNER

Instruct the Owner’s representatives in all respects of the operation and maintenance of mechanical systems and equipment. Obtain in writing from the Consultant a list of the Owner’s representatives qualified to receive instructions.

Arrange for, and pay for services of service engineers and other manufacturers’ representatives required for instruction on specialized portions of the installation.

Submit to Consultant at the time of final inspection, a complete list of systems, stating for each system:

.1 date instructions were given to the Owner’s staff
.2 duration of instruction
.3 name of persons instructed
.4 other parties present (manufacturer’s representative, consultants, etc.)

The minimum time to be allocated to training shall be 16 hours. The Contractor shall provide a schedule, a list of systems and equipment for which training will be provided, names of people who will provide the training and an agenda for each session.

1.11 OPERATION AND MAINTENANCE MANUALS

Submit three (3) copies of Project Data Book at completion of Project on application for Certificate of Substantial Performance.

Submit with Project Data Book, one copy of each final approved shop drawing

issued for Project on which have been recorded changes made during fabrication and installation caused by unforeseen conditions.
Submit with Project Data Book extended warranties together in one report binder.
The Project Data Book shall:

.1 Consist of a hard-cover, black, vinyl-covered, loose-leaf, letter size binder.
.2 Have a title sheet, or sheets preceding data on which shall be recorded Project name, date, list of contents, and Contractor's and Subcontractors' names and addresses.
.3 Be organized into applicable Sections of work with each Section separated by hard paper dividers with plastic covered tabs marked by Section.
.4 Contain only typed or printed information and notes, and neatly drafted drawings.
.5 Contain maintenance and operating instructions on all mechanical equipment.
.6 Contain maintenance instructions.
.7 Contain brochures and parts lists on all equipment.
.8 Contain a list of manufacturers and trade names of finishes and coatings applied.
.9 Contain sources of supply for all proprietary products used in the work.
.10 Contain lists of supply sources for maintenance of all equipment in Project of which more detailed information is not included above.
.11 Contain finished hardware schedule.
.12 Contain charts, diagrams and reports.

Operations and Maintenance Manuals shall be submitted and reviewed by the Consultant of Record and BCC before training shall commence.

1.12 EXISTING CONDITIONS

Before submitting tenders, carefully examine the drawings, Specifications and the job site to determine and confirm the existing conditions which will or may affect the proposed work. Claims for extra payment because of failure to fulfil this condition will not be considered. Existing conditions include, without being limited to, such items as: electrical power characteristics and location; water supply and sewer sizes and location; soil conditions and space limitations.
Note work performed by the Landlord and all work not performed by him as part of the Contract.

1.13 WORKPLACE SAFETY

Comply with requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding the use, handling, storage and disposal of hazardous materials.
Comply with all requirements of Ontario Regulation 213/91, Occupational Health and Safety Act and Regulations for Construction Projects.
Submit WHMIS MSDS (Material Safety Data Sheets) for all products where required, and maintain one copy at the site in a visible and accessible location and

available to all personnel.

1.14 WORK WARRANTY

Include for an overall 12 month warranty period for all mechanical work materials and workmanship. The warranty period is to commence at substantial completion. All warranty work shall be scheduled with LCBO who will determine when the work shall commence. The work to be performed shall be documented and provided to the Consultant for review. All equipment, materials and systems shall conform to the specification requirements. The cost of all work shall be the responsibility of the Contractor.

1.15 EQUIPMENT WARRANTIES

Warrant all mechanical equipment against defect in material and workmanship for a period of two years from the date that the LCBO occupies the property.
The equipment installer/seller is to provide for the duration of the warranty and extended warranty periods, any and all of the prescribed maintenance to any and all of the supplied components which might limit the term or otherwise invalidate the warranty.
Should the Consultant determine that testing and balancing will be required after warranty work has been completed, the Contractor shall schedule and pay for the Agency who will conduct this work. Submit report to the Consultant for review.

The warranty of any systems that is commissioned after the substantial performance date shall begin when that system has been commissioned and accepted by the Consultant.

1.16 PRODUCT AND PRODUCT MANUFACTURER REQUIREMENTS

Products scheduled and/or specified have been selected to establish a performance and quality standard, and, in some instances, a dimensional standard. In most cases, acceptable manufacturers are stated for any products specified by manufacturer's name and model number. The tender price may be based on products supplied by any of the manufacturers named as acceptable for the particular product. If acceptable manufacturers are not stated for a particular product, base the tender price on the products supplied by the specified manufacturers.
If products supplied by a manufacturer named as acceptable are used in lieu of the manufacturer specified, be responsible for ensuring that the substituted product is equivalent in performance and operating characteristics (including energy consumption if applicable) to the specified product, and, it is to be understood that any additional costs, and changes to associated or adjacent work resulting from provision of products supplied by a manufacturer other than the specified manufacturer is included in the tender price.
Products required to have ASME, CSA, ULC, GCA or other approval are to be properly marked or labelled indicating that the product has been approved.

1.17 ELECTRICAL POWER CHARACTERISTICS

Unless otherwise shown or specified the permanent power supply is to be 600 volt, 3 phase, 4 wire, and 120/208 volt, 3 phase, 4 wire for final use.
Confirm the characteristics of construction power supply.

1.18 SEASONAL EQUIPMENT/SYSTEM START UP

Provide start up, testing and commissioning of any system that requires seasonal commissioning. For example if the acceptance period for the project was during the Winter then schedule start-up of the air conditioning during the Spring of the following season. Provide the necessary labour from the equipment supplier and the Balancing Contractor and the Controls Contractor. Schedule the work with LCBO and the BCC. Provide reports to the Consultant and the BCC for review.

PART 2: PRODUCTS

2.01 PIPE SLEEVES

Minimum 0.635 mm thick galvanized steel with an integral flange at one end to secure the sleeve to formwork construction.
Factory fabricated, flanged, high density polyethylene sleeves with reinforced nail bosses.

Schedule 40 mild galvanized steel pipe with a welded-on square steel anchor and water stop plate at the sleeve midpoint.

2.02 PIPE ESCUTCHEON PLATES

One-piece chrome plated brass or #4 finish type 302 stainless steel plates with screws, each sized to cover the pipe sleeve or wall or slab opening, and to fit tightly around the pipe or pipe insulation.

2.03 PIPING HANGERS AND SUPPORTS

Pipe hanger and support materials, including accessories, are to be in accordance with the Manufacturers Standardization Society (MSS) Standard Practice Manual ANSI/MSS SP- 58, Pipe Hangers and Supports – Materials, Design and Manufacture, and where possible, MSS designations are to be indicated with each product. **Hangers and supports for insulated piping are to be sized to fit around the insulation.** Unless otherwise specified, all ferrous hangers and supports are to be electro-galvanized.

Horizontal Suspended Piping: Hangers and supports are to be:

.1 adjustable steel clevis hanger – Anvil Fig. 260

.2 swivel ring band type hanger – Anvil Fig. 69

Horizontal Pipe On Vertical Surfaces: Supports are to be:

.3 steel offset pipe clamp – Myatt Fig. 170

.4 heavy-duty steel pipe clip – Myatt Fig. 161 or 162
.5 single steel pipe hook – Myatt Fig. 156

Vertical Risers Through Floors: supports are to be:

.6 copper tubing riser clamp – Anvil Fig. CT-121C
.7 Heavy-duty steel riser clamp – Anvil Fig. 261

Vertical Piping on Vertical Surfaces: Supports are to be:

.8 steel offset pipe clamp – Myatt Fig. 170
.9 heavy-duty steel pipe clip or soil pipe bracket – Myatt Fig. 161 and 162

Special Hangers and Supports: Special hangers and supports for various applications are as follows:

.10 for groups of pipes having the same slope – Anvil Fig. 195 welded steel brackets, Anvil Fig. 46 universal trapeze assemblies, or Unistrut or equal support assemblies, all with U-bolts, clamps, etc., to secure pipes in place
.11 for sections of piping connected to vibration isolated equipment – hangers and supports as specified above but complete with Anvil Fig. 247 spring hangers
.12 for piping on an existing roof – Portable Pipe Hangers (Canada) Inc. "PP" Series prefabricated portable pipe support system components to suit the pipe, complete with all required accessories including bases, galvanized structural steel frames, and galvanized steel pipe hangers and/or supports conforming to MSS SP-58
.13 for piping on new roofs – Lexcor "Flash-Tite" or Thaler Roofing Specialties Products Inc. "MERS" Series insulated aluminium support risers with diameter, height, securement method and flashing to suit the application, all required accessories, channel type aluminium cross members, and galvanized steel pipe hangers and/or supports
.14 for fire protection piping – generally as above but ULC listed and/or FM approved, and in accordance with Chapter 2 of NFPA No. 13
.15 for bare horizontal copper piping – generally as above but factory vinyl coated to prevent direct copper/steel contact
.16 for bare copper vertical – corrosion resistant ferrous clamps with flexible rubber materials (**not tape**) to isolate the pipe from the clamp
.17 insulation protection shields – equal to Anvil "Rib-lock" Fig. 168 galvanized steel shields with ribs to keep the shield centred on the hanger

Hanger Rods: Galvanized carbon steel (unless otherwise specified), round, threaded, to ASTM A36, complete with captive machine nuts with washers at hangers, sized to suit the loading in accordance with Table 3 in MSS SP-58, but in any case minimum 9.5 mm diameter.

Acceptable Manufacturers: Acceptable hanger and support material manufacturers are:

.18 E. Myatt & Co. Inc.
.19 Anvil International Inc.
.20 Empire Tool & Mfg. Co. Inc.

.21 Hunt Manufacturing Ltd.
.22 Or approved alternate.

2.04 ACCESS DOORS

.1 Prime coat painted steel (unless otherwise specified) flush access doors, each complete with a minimum 1.5 mm thick frame, minimum 1.2 mm thick door panel, heavy-duty rust-resistant concealed hinges, a positive locking screwdriver lock, and mounting and finishing features to suit the particular construction in which is to be installed.

.2 Access door sizes are to suit the concealed work for which they are supplied, and wherever possible they are to be of a standard size for all applications, but in any case they are to be minimum 250 mm x 250 mm.

.3 Access doors in fire rated construction are to be ULC listed and labelled and of a rating to maintain the fire separation integrity.

.4 Where access doors are located in surfaces where special finishes are required, they are to be of a recessed door type capable of accepting the finish in which they are to be installed so as to maintain the final building surface appearance throughout.

.5 Acceptable manufacturers are Lettage, Zurn, and Pedlar.

2.05 ELECTRIC MOTORS

Motors, unless otherwise specified, are to meet all requirements of EEMAC Standard MG1, applicable IEEE Standards, and applicable CSA C222 Standards and shall be of Canadian Manufacture.

Single Phase Motors: Unless otherwise specified, motors smaller than 0.373 kW (½ HP) are to be 115 volt, continuous duty capacitor start type with an EEMAC 48 or 56 frame size, solid base, heavy-gauge steel shell with solid die-cast end shields, dynamically balanced die-cast rotor, integral automatic reset thermal overload protection, Class “B” insulation, and a 1.15 service factor at 40° C ambient temperature.

Three Phase Motors: Unless otherwise specified, motors 0.373 (½ HP) and larger are to be totally enclosed, fan cooled, 3 phase, T-frame, high efficiency squirrel cage continuous duty induction motors suitable for voltages indicated on the Drawings, EEMAC Design “B” for normal starting torque or Design “C” for high starting torque as required by the application, each complete with Class “B” insulation, a 1.5 service factor at 40° C ambient temperature, regreasable open ball bearings with grease fittings to permit relubrication without dismantling the motor, a cast iron frame with cast iron feet where required, cast iron end bracket and precision machined bearing fit, and balanced carbon steel shaft assembly with die-cast aluminium rotor windings.

Motor connection boxes are to be located on the side of the motor most easily accessible for maintenance and remote from belts, gears or driven equipment. If boxes are located on the wrong side of motor they are to be relocated.

Each multi-speed motor and associated switching device is to be circuited such that

the overload device in the starter protects the motor on each step of the multi-speed switch. As an alternative to this requirement the motor may have integral overload protection.

Shop drawings are to be submitted for all electric motors and are to include the following information:

.1 horsepower
.2 voltage
.3 frequency
.4 speed
.5 staring current and torque characteristics
.6 full load current
.7 class of insulation
.8 enclosure type
.9 service factor
.10 ambient temperature reference
.11 type of bearings
.12 location of connection box
.13 manufacturer

Acceptable Manufacturers: Acceptable motor manufacturers are:

.14 Westinghouse Canada Inc.
.15 Canadian General Electric
.16 Baldor
.17 U.S. Motors
.18 Weg
.19 Marathon
.20 Magnatech
.21 Toshiba
.22 Or approved alternate

2.06 ELECTRICAL WIRING MATERIALS AND COMPONENTS FOR MECHANICAL EQUIPMENT AND SYSTEMS

Refer to Division 26.

Conduit, Conductors, and Wiring Accessories for power and control wiring which is to be done as part of the mechanical work (see Part 3 of this Section) is to be as specified in Division 26. Components such as motor starters, disconnect switches, etc., are to be as specified below.

Motor Starters – 3 Phase: Equal to Allen-Bradley full voltage, non-reversing, across-the-line combination magnetic starters selected to suit the size and voltage of the associated motor, and capable of starting the motor under the imposed load. Starters are to be complete with the following:

.1 a moulded case magnetic circuit breaker
.2 three-phase, ambient compensated, thermal overload relays with heaters sized

in accordance with motor nameplate rating

.3 a 120 volt secondary control transformer sized 50 VA larger than the associated motor standard volt ampere requirement

.4 a minimum of two N/O and two N/C auxiliary contacts wired to terminals

.5 push-to-test type pilot lights for motors, a hand-off-auto selector switch

.6 for automatically, controlled motors, a hand-off-auto selector switch

.7 an EEMAC 2 sprinkler-proof enclosure

Motor Starters – 1 Phase: Unless otherwise specified, starters for 1 phase motors are to be equal to Allen-Bradley Bulletin 600, 115 volt, thermal overload protected manual starting switches with a neon pilot light, a surface or flush mounting EEMAC enclosure to suit the application, and where automatic operation is required, a separate "hand-off-automatic" selector switch in an enclosure to match the starter enclosure.

Disconnect Switches: Heavy-duty, front operated switches, each in accordance with requirements of CSA C22.2 No. 4 and complete with:

.8 a red operating handle which can be padlocked in the off position

.9 a hinged front cover with mechanical interlock to prevent door opening when the switch is on

.10 a quick-make, quick-break, non-teasible, positive acting switch mechanism with visible blades and line terminal shields

.11 for fused switches, fuse clips suitable for HRC fuses as specified for motor starters

.12 an enamelled steel enclosure, EEMAC 3, galvanized where located outdoors, EEMAC 2 sprinkler-proof where located indoors

2.07 MECHANICAL WORK IDENTIFICATION MATERIALS

Equipment Nameplates: Laminated plastic (Lamacoid) white-black-white (black text on white background unless otherwise noted). Minimum 1.6 mm thick, minimum 12 mm x 50 mm for smaller items such as damper motors and control valves, and minimum 25 mm x 65 mm for equipment. Each nameplate is to be complete with bevelled edges and engraved wording to completely identify the equipment with no abbreviations. Wording is generally to be as per the drawings but must be reviewed prior to engraving. Name plates shall include equipment tag number as per drawings, and electrical panel number the unit is fed from. Lamacoids for any electrical outlets and switches must be placed above the cover plate (not on the cover plate). Refer to Table 1 below for more details. Supply stainless steel screws for securing nameplates in place.

.1 Fit up contractor to install nameplates on all landlord supplied equipment.

Valve Tags: Coloured, 40 mm square, 2-ply laminated plastic with bevelled edges, red-white, yellow-black, etc., to match the piping classification colour, each complete with a 3.2 mm diameter by 100 mm long brass plated steel bead chain, and four lines of engraved maximum size identification wording, i.e.:

.2 VALVE V2
.3 20 mm
.4 DOMESTIC COLD WATER
.5 NORMALLY OPEN

Standard Pipe Identification: Standard pipe identification is to be equal to Smillie McAdams Summerlin Ltd. "Coil-Mark" consisting of coloured, coiled, semi-rigid vinyl plastic of a length to wrap completely around the pipe, and indoor/outdoor type vinyl ink lettering and directional arrows.

Duct Identification: Custom made Mylar stencils with a 50 mm high lettering to accurately describe the duct service, i.e. "AHU-1 SUPPLY", complete with a directional arrow, and coloured inks with ink pads and roller applicators. Ink colours are to contrast with the lettering background.

Table 1: Lamacoid Label Details

Item	Text to be Listed on Lamacoid	Text Height (mm)
Electrical Outlets	Panel and circuit number *(Example: 2A-12).*	3
Staff Rm Exhaust Fan Switch	EXHAUST FAN TIMER	3
Washroom Light Switches	MANUAL–ON AUTO-OFF	6
Washroom Wall Mounted Occupancy Sensors	AUTO-ON AUTO-OFF	6
Emergency Test Light Button	EMERGENCY LIGHTS – PUSH TO TEST *(This lamacoid shall be red with white text).*	6
Security Shutters	SECURITY SHUTTER #X *(please note, #1 is closest to the office)*	3
Sun Shade	SUN SHADE	3
Hydro Meter	LCBO HYDRO METER	6
Warehouse Ceiling Fan Switch	CEILING FANS, panel and circuit number	6 for name, 3 for panel and circuit number
Rooftop Exhaust Fans	EF-X, panel and circuit number *(note "X" will depict the item number)*	6 for name, 3 for panel and circuit number
Roof Top Unit	RTU-X, panel and circuit number	6 for name, 3 for panel and circuit number
Rooftop Refrigeration Unit (Kooljet), Walk-In Coldroom	WIC-AC-X, panel and circuit number	6 for name, 3 for panel and circuit number
Rooftop Condensing Unit, Walk-In Coldroom	WIC-CU-X, panel and circuit number	6 for name, 3 for panel and circuit number
Rooftop Refrigeration Condenser – Reach-	RIC-CU-X, panel and circuit number	6 for name, 3 for panel and circuit number

In Case Refrigerator		
Warehouse Unit Heater	UH-X, panel and circuit number	6 for name, 3 for panel and circuit number
Gas Meter	LCBO GAS METER	6
Water Meter	LCBO WATER METER	6
Domestic Water Shut-Off Valve	LCBO WATER SHUT-OFF	6
Trap Seal Primer	TRAP SEAL PRIMER, panel and circuit number	6 for name, 3 for panel and circuit number
Eye Wash Mixing Valve	EYE WASH MIXING VALVE	6
Battery Unit	BU-X, panel and circuit number *(This lamacoid shall be red with white text).*	6 for name, 3 for panel and circuit number
Reach-In Case Refrigerator Indoor Units	RIC-EVAP-X, panel and circuit number	6 for name, 3 for panel and circuit number
Open / Cold Beer Sign's Switch	OPEN/COLD BEER SIGN, panel and circuit number	6 for name, 3 for panel and circuit number
Electrical Panels	Panel and Voltage *(example: PANEL-2A, 208V)*	6
THC Unit and THC Remote Condenser	THC, panel and circuit number	6 for name, 3 for panel and circuit number
Phase Loss Box	PHASE LOSS	6
TVSS	TVSS, panel and circuit number	6 for name, 3 for panel and circuit number
Kooljet PLC	WIC-HMI, panel and circuit number	6 for name, 3 for panel and circuit number
Retail Area Sensors	Item identification *(note, labels supplied and installed by BAS contractor)*	**3**
Office Lights	OFFICE LIGHTS	3
Vestibule Electric Heater	VEST-HTR, panel and circuit number	6 for name, 3 for panel and circuit number
Vestibule Supply Fan	VEST-SF, panel and circuit number	6 for name, 3 for panel and circuit number
Vestibule Supply Fan Filter	FAN FILTER	6
Baseboard Heaters	BBH-X, panel and circuit number	6 for name, 3 for panel and circuit number
Domestic Hot Water Heater	HWT-X, panel and circuit number	6 for name, 3 for panel and circuit

		number
Forced Flow Heater	FFH-X, panel and circuit number	6 for name, 3 for panel and circuit number
Heat Pumps	HP-X, panel and circuit number	6 for name, 3 for panel and circuit number
Fan Coil Units	FCU-X, panel and circuit number	6 for name, 3 for panel and circuit number
Thermostat / Remote Sensors	Item identification	3

2.08 THERMOMETERS

.1 Thermometers are to be Trerice BX or BX9 Series, 200 mm scale with brass separable sockets. Sockets to have extension necks for pipes with insulation. For air ducts use perforated stems.

.2 Thermometers are to be Trerice, Taylor or Weksler.

2.09 PRESSURE GAUGES

Pressure gauges are to be 115 mm diameter, Trerice No. 600. Pressure gauges are to be complete with 2.0 Mpa isolating valve and are to suit fluid pressure measured. Gauges installed in pump suction and discharge pipes are to have impulse dampeners, Trerice No. 870 or approved equal.
Pressure gauges are to be Trerice, Ashcroft, Winters, U.S. Gauge.

PART 3: EXECUTION

3.01 GENERAL PIPING AND DUCTWORK INSTALLATION REQUIREMENTS

Unless otherwise specified, locate and arrange horizontal pipes and ducts above or at the ceiling on floors on which they are shown, arranged so that under consideration of all other work in the area, the maximum ceiling height and/or usable space is maintained.
Unless otherwise specified, install all work concealed in finished spaces, and concealed to the degree possible in partially finished and unfinished spaces. Refer to and examine the Architectural drawings and room finish schedules. to determine finished, partially finished, and unfinished area. Note that walls which are painted are considered finished.
Install all pipes and ducts parallel to building lines.
Neatly group and arrange all exposed work.
Locate all valves, dampers and any other equipment which will or may need maintenance or repairs and which are installed in accessible construction so as to be easily accessible from access doors. Where valves, dampers and similar piping or ductwork accessories occur in vertical services in shafts, pipe spaces or partitions, locate the accessories at the floor level.
Make all connections between pipes of different materials using proper approved

adapters. Provide cast brass dielectric type adapters at connections between steel and copper pipe.
Ensure that equipment and material manufacturers' installation instructions are followed unless specified herein or on the drawings, and unless such instructions contradict governing codes and regulations.
Carefully clean all ducts, pipe and fittings prior to installation. Temporarily cap or plug ends of pipe, ducts and equipment which are open and exposed during construction.
Install piping and ductwork which are to be insulated so that they have sufficient clearance to permit insulation to be applied continuously and unbroken around the pipe or duct, except at fire barriers, in which case the insulation will be terminated at each side of the fire barrier.

3.02 INSPECTION AND CLEANING

Inspect surfaces and structure prepared by other trades before performing your work. Verify that surfaces or the structure to receive your work have no defects or discrepancies which could result in poor application or cause latent defects in installation and workmanship. Report defects in writing. Installation of work will constitute acceptance of such surfaces as being satisfactory.

Ensure that exposed ferrous metal products, except ductwork and piping, have at least one factory prime coat, or paint such ferrous metal products with one prime coat on the job.
Clean and wire brush ferrous metal products before applying the prime coat. For factory applied finishes, repaint or refinish surfaces damaged during shipment, erection or construction work.

3.03 INSTALLATION OF PIPE SLEEVES

Where pipes pass through concrete and/or masonry surfaces provide pipe sleeves as follows:

.1 in poured concrete slabs, unless otherwise specified – minimum 0.635 mm thick flanged galvanized steel or, where permitted by governing authorities, factory fabricated plastic sleeves

.2 in concrete or masonry walls – Schedule 40 galvanized steel pipe

Size sleeves, unless otherwise specified, to leave 12 mm clearance around the pipes, or where pipe is insulated, a 12 mm clearance around the pipe insulation.
Pack and seal the void between the pipe sleeves and the pipe or pipe insulation for the length of the sleeves as follows:

.3 pack sleeves in non-fire rated interior construction with mineral wool and seal both ends of the sleeves with non-hardening silicone base caulking compound

.4 pack sleeves in exterior walls above grade with mineral wool and seal both ends of the sleeves water-tight with approved non-hardening silicone base

caulking compound unless mechanical type seals have been specified

Sleeves in fire rated construction will be packed and sealed as part of the work specified in Division 07.

Where sleeves are required in masonry work, accurately locate and mark the sleeve position, and turn the sleeves over to the trade performing the masonry work for installation.

Terminate sleeves for piping which will be exposed so that the sleeve is flush at both ends with the wall, partition or slab surface so that the sleeve may be completely covered by an escutcheon plate.

3.04 DUCT OPENINGS

Duct openings, air inlet and outlet openings, fire damper and similar openings will be provided in poured concrete work, masonry drywall and other building surfaces by the trade responsible for the particular construction in which the opening is required.

3.05 SLEEVE AND FORMED OPENING LOCATION DRAWINGS

Prepare and submit for review and forwarding to the concrete reinforcement detailer, drawings indicating all required sleeves, recesses and formed openings in poured concrete work.

Such drawings are to be complete and accurately dimensioned and relate sleeve, recesses, and formed openings to suitable grid lines and elevation datum.

Begin to prepare such drawings immediately upon notification of acceptance of Tender and award of Contract.

3.06 INSTALLATION OF PIPE ESCUTCHEON PLATES

Provide escutcheon plates suitable secured over all exposed piping passing through finished building surfaces. A finished building surface is any surface with a factory finish or that receives a site applied finish.

3.07 INSTALLATION OF FASTENING AND SECURING HARDWARE

Provide all fastening and securing hardware required for mechanical work to maintain installations attached to the structure or to finished floors, walls and ceilings in a secure and rigid manner capable of withstanding the dead loads, live loads, superimposed dead loads, and any vibration of the installed products.

Use fasteners compatible with structural requirements, finishes and types of products to be connected. Do not use materials subject to electrolytic action or corrosion where conditions are liable to cause such action.

Where the floor, wall or ceiling construction is not suitable to support the loads, provide additional framing or special fasteners to ensure proper securement to the structure that is to support the products. Provide reinforcing or connecting supports where required to distribute the loading to the structural components.

Obtain written consent before using explosive actuated fastening devices. If consent

is obtained, comply with requirements of CSA Standards CAN3-Z166.1 and 2-M85.

3.08 INSTALLATION OF PIPE HANGERS AND SUPPORTS

Provide all required pipe hangers and supports. Provide any additional structural steel channels, angles, inserts, beam champs and similar accessories required for hanging or supporting pipe. Unless otherwise shown or specified, hang or support pipes from the structure only.

For insulated pipe, size the hanger support to suit the insulated pipe and install the hanger or support on the outside of the insulation and insulation finish.

Underground Piping: Support requirements for underground piping as follows:

.1 support underground pipe, unless otherwise specified, on a well compacted bed of dry, natural, undisturbed earth free from rocks or protrusions of any kind, or on compacted material as specified

.2 support underground service piping penetrating building exterior walls or foundations to prevent pipe damage if minor building settlement occurs

.3 ensure that all bedding and supports for underground pipes are flat and true and that allowances are made for pipe hubs, couplings, or other protrusions so that no voids are left between the pipe and the bedding

Horizontal Above Ground Piping: Unless otherwise shown or specified, hang and/or support horizontal pipe above ground by means of hangers and/or supports specified in Part 2 of this Section. Unless otherwise shown or specified, hangers for suspended pipe to and including 25 mm dia. are to be clevis type or adjustable ring type, and hangers for suspended pipe 40 mm dia. and larger are to be adjustable clevis type. Space hangers and supports in accordance with the following:

.4 cast iron pipe: hang or support at every joint with maximum 2.4 m spacing

.5 plastic pipe: conform to pipe manufacturer's recommended support spacing

.6 copper and steel pipe: hang or support at spacing in accordance with the following schedule:

PIPE DIA. (mm)	MAX. SPACING STEEL (meters)	MAX. SPACING COPPER (meters)
to 32	2.1	1.8
40	2.7	2.4
50	3.0	2.7
65	3.6	3.0
75	3.6	3.0
90	3.6	3.6
100	4.2	3.6
250	6.0	

.7 changes in direction: where pipes change direction, either horizontally or

vertically, provide a hanger or support on the horizontal pipe not more than 300 mm from the elbow, and where pipes drop from tee branches, support the tees in both directions not more than 50 mm on each side of the tee.

.8 grouped piping: when pipes with the same slope are grouped and a common hanger or support is used, space the hanger or support to suit the spacing requirement of the smallest pipe in the group and secure pipes in place on the common hanger or support.

Vertical Piping: Unless otherwise shown or specified, support vertical piping by means of supports specified in Part 2 of this Section, spaced in accordance with the following:

support vertical pipes at maximum 3 m intervals

for sections of vertical piping with a length less than 3 m support the pipe at least once

for all vertical cast iron plan end pipe (mechanical joint type), secure the riser or pipe clamp around the pipe under a flange integral with the pipe for vertical support purposes, or provide a length of hub and spigot pipe to facilitate proper support

Piping On the Roof: Support piping on the roof as follows:

.9 on existing roof – provide support members as specified in Part 2 of this Section spaced as per the schedule above and of a type to suit the application, and, for each support, carefully scrape away the roofing gravel, bed the support in a heavy covering of roofing mastic, then scrape the gravel back up around the support – secure pipes to supports

.10 on new roof – supply manufactured roof supports as per Part 2 of this Section to accommodate the piping involved and support spacing specified above, and hand the supports to the roofing trade on the roof for installation as part of the roofing work, then secure piping in place on the supports

Isolation for Bare Copper Tubing: Each hanger, support or securement for horizontal bare copper tubing is to be plastic coated to prevent direct contact between the pipe and the ferrous hanger. Each wall or floor clamp for vertical bare copper piping is to be isolated from the pipe by means of strips of flexible rubber inserts. The use of painted ferrous hangers and supports, including those painted with copper coloured paint, is not acceptable. Site application of tape or other types of isolation is not acceptable.

Insulation Protection Shields: For insulated horizontal piping to and including 40 mm diameter, provide galvanized steel insulation protection shields between the insulation and the hanger or support. Install shields immediately after the pipe is insulated.

Pipe Support from Steel Deck: Do not support piping from steel deck without written consent from the Structural Consultant.

3.09 ACCESS DOORS

Supply access doors to give access to all mechanical work which may need maintenance or repair but which is concealed in inaccessible construction, except as

otherwise specified herein or on the drawings.
Locate access doors inconspicuously in walls and partitions and arrange mechanical work to suit. Arrange mechanical work in ceiling spaces to suit approved access door locations.
Group piping and ductwork to ensure the minimum number of access doors is required. Access doors will be installed by the trades responsible for the particular type of construction in which the doors are required.

3.10 MECHANICAL WORK IDENTIFICATION

Exposed Piping & Ductwork: Identify exposed piping and ductwork as per Part 2 of this Section in locations as follows:

.1 at every end of every piping or duct run
.2 adjacent to each valve, strainer, damper and similar accessory
.3 at each piece of connecting equipment
.4 on both sides of every pipe and duct passing through a wall or partition
.5 at 6 m intervals on pipe and duct runs exceeding 6 m in length
.6 on each side of special valves, special fittings and branch connections
.7 at least once in each room, and at least once on pipe and duct runs less than 6 m in length

Concealed Piping & Ductwork: Identify concealed piping and ductwork as per Part 2 of this Section in locations as follows:

.8 at points where pipes or ducts enter and leave rooms, shafts, pipe chases, furred spaces, and similar areas
.9 at maximum 6 m intervals on piping and ductwork above suspended accessible ceilings, and at least once in each room
.10 at each access door location
.11 at each piece of connected equipment, automatic valve, etc.

Equipment: Provide an identification nameplate for each piece of equipment, including items such as control valves, motorized dampers, instruments, and similar products. Secure nameplates in place with stainless steel screws unless such a practice is prohibitive, in which case use epoxy cement applied to cleaned surfaces. Locate all nameplates in the most conspicuous and readable location. Locate all nameplates of thermostat and sensors on the wall.

Valve Tagging & Chart: Tag valves and prepare a valve tag chart in accordance with the following requirements:

.12 attach a valve tag to each new valve, except for valves located immediately at the equipment they control
.13 prepare a typed or computer printed valve tag chart to list all tagged valves, with, for each valve, the tag number, location, valve size, piping service, and valve attitude (normally open or normally closed)
.14 if an existing valve tag chart is available at the site, valve tag numbering is to be an extension of existing numbering and the new valve tag chart is to incorporate the existing chart

.15 frame and glaze one copy of the chart and affix same to a wall where later directed at the site

.16 include a copy of the valve tag chart in each copy of the operating and maintenance instructions

3.11 PIPE LEAKAGE TESTING

Before new piping has been insulated or concealed, and before equipment, fixtures and fittings have been connected, test all piping for leakage. All tests are to be witnessed, by LCBO Project Coordinator and BCC Representative and test forms to be submitted to Consultant for review, arrange prior to testing for all representatives availability.

Drainage & Vent Piping: Securely close all openings and pipe ends and fill piping with water up to the highest level, and ensure that the water stands at the same level for a minimum of two hours. After the fixtures and fittings are set and the pipes connected to the building drain or drains, turn on water into all pipe, fixtures, fittings and traps in order to detect any imperfect material or workmanship. Make a smoke test if required by the Municipality.

Domestic Water Piping: Test piping with cold water at a pressure of 1 ½ times normal working pressure and maintain the pressure for a minimum of two hours.

Sprinkler System Piping: Test all system piping with cold water in accordance with requirements of NFPA No. 13, "INSTALLATION OF SPRINKLER SYSTEMS", and in accordance with any additional requirements of governing authorities.

Natural Gas Piping: Test piping in accordance with the requirements of CAN 1-B149.1. After completion of the verification test, locate the required tag stating the results of the verification test at the point of entry of the gas main into the building, affixed to the pipe in a secure manner. Check all piping joints and connections for leaks with a water/soap solution while the piping is under pressure.

Refrigerant Piping: Test refrigerant piping for leakage and dehydrate in accordance with requirements of Chapter 18 of the 1997 ASHRAE HANDBOOK – FUNDAMENTALS.

Temporarily remove or valve off all piping system specialties or equipment which may be damaged by test pressures prior to pressure testing the systems, and flush piping to remove foreign matter.

Make tight leaks found during tests while the piping is under pressure, and if this is impossible, remove and refit the piping and reapply the test until satisfactory results are obtained.

Where leaks occur in threaded joints in steel piping, no caulking of these joints will be allowed under any conditions.

Tests may be done in sections, as later approved.

In addition to the leakage tests specified above, demonstrate proper flow throughout the systems including mains, connections and equipment, as well as proper venting

and drainage. Include for any necessary system adjustments to achieve the proper conditions.
Refer to Section 23 31 00 for duct pressure test.

3.12 ELECTRICAL WORK FOR MECHANICAL EQUIPMENT AND SYSTEMS

The supply of electrical motors, starters, controls, relays, thermostats float switches, pressure switches, flow switches, pilot lights, remote control stations, safety devices, aquastats, control transformers, disconnects for control circuits, and interlocks is part of the mechanical work.
Mounting of the above equipment is also part of the mechanical work except for line voltage wall thermostats, disconnect switches, and starters, which will be mounted as part of the electrical work.
Division 26 will mount isolation disconnect switches where required for safe servicing of motors, as well as disconnects at electrical panels of all factory assembled package equipment, e.g. rooftop units, condensing units, air conditioning units.
In the case of roof mounted exhaust fans, safety isolation switches are to be factory mounted within the fan, complete with wiring from switch to motor.
Division 26 will provide all power wiring as defined herein.
All control and interlock wiring for mechanical equipment, including connection to equipment and to source of supply is to be done as part of the mechanical work.
Power wiring is defined as all single or three phase wiring carrying the full current of the mechanical equipment, including wiring of full equipment current carrying line voltage controls and isolation disconnects in line between the source and the mechanical equipment, and connection to the equipment.
Control and interlock wiring is defined as all mechanical equipment wiring other than power wiring outlined above.
Detailed wiring diagrams for each motor are to be provided as part of the mechanical work.
Unless specifically indicated otherwise, all damper motor power and control wiring is to be done as part of the mechanical work.
To obtain line voltage supply for motorized dampers, motorized valves or other controls, provide wiring to the nearest lighting or power panel, including connection to same, unless shown otherwise on the drawings.
Where low voltage supply source is required, obtain line voltage supply as described previously and also provide control transformers of necessary voltage and wattage to suit the low voltage equipment and controls.

Unless specifically indicated otherwise, all wiring for damper motor power and control from nearest lighting panel except where the drawings indicate power outlets by Division 26, is to be done as part of the mechanical work, and for these instances, wire from the outlet to the damper motor.
All power wiring shall be installed and run parallel to the building lines.

3.13 INSTALLATION OF PRESSURE GAUGES AND THERMOMETERS

Provide pressure gauges and thermometers where shown and/or specified on the drawings.

Installation Requirements: Conform to the following installation requirements:

.1 for installation of thermometers in piping wells, provide a coat of metallic base heat transfer paste or grease in the piping well

.2 for pressure gauges in piping at equipment locations, install the pressure gauge between the equipment and the first pipe fitting

.3 locate, mount and adjust all instruments so they are easily readable

.4 where pressure gauges and/or thermometers are located at high level or in an area where they cannot be easily seen, provide remote reading instruments

3.14 CONCRETE WORK FOR MECHANICAL SERVICES

Provide all concrete work, including reinforcing and formwork required for mechanical work.

All concrete work is to be in accordance with requirements of Division 03 unless otherwise specified.

3.15 CUTTING AND PATCHING FOR MECHANICAL WORK

All cutting and patching of building surfaces required for mechanical work, including core drilling walls and slabs for piping, will be done as part of another Division of the work, however, the cost for such cutting and patching is to be included in the cost for the mechanical work.

3.16 EXCAVATION AND BACKFILL FOR MECHANICAL WORK

Do all excavation and backfill, including pipe bedding, required for mechanical work.

All excavation and backfill work is to be in accordance with requirements of Division 02 unless otherwise shown or specified.

3.17 QUALITY CONTROL AND COMMISSIONING

Refer to Section 01 45 00 and 01 45 00 1.11 for the quality control and commissioning requirements.

The mechanical systems to be commissioned shall include:

.1 Drainage and plumbing system

.2 Domestic boilers

.3 All mechanical equipment

.4 Air handling units

.5 Controls and BAS

.6 Sprinkler System

.7 Hydronic System (if applicable)

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 CAN/ULC S700 Series, Standards For Thermal Insulation.

.2 CAN/ULC S102, Surface Burning Characteristics of Building Materials and Assemblies.

.3 NFPA 96, Standard For Ventilation Control and Fire Protection of Commercial Cooking Equipment.

.4 CAN/CGSB-51.2, Thermal Insulation, Calcium Silicate, for Piping, Machinery and Boilers.

.5 WHMIS, Workplace Hazardous Materials Information System.

.6 Refer to Section 20 05 00.

1.02 INSULATION SYSTEM SAMPLES AND PRODUCT DATA SHEETS

.1 At least four weeks prior to insulation work commencing, submit a sample of each type of insulation (and insulation accessories and finish), in applied form, for approval. Mount the samples on a rigid plywood board. Identify each product with the manufacturer's name and insulation type, and the proposed use of the insulation. Include a product data sheet for each insulation sample.

.2 Include samples of all insulation jacket materials, each identified as to intended use, and product data sheets for protective coatings.

1.03 QUALITY ASSURANCE

.1 Mechanical insulation is to be applied by a licensed journeyman insulation mechanic who is a member of Union Local 95, or by a Local 95 apprentice under direct, daily, on-site supervision of a journeyman mechanic.

.2 The Company with the sub-contract for mechanical insulation work is to be a member in good standing of the Thermal Insulation Association of Canada.

PART 2: PRODUCTS

2.01 FIRE HAZARD RATINGS

.1 All insulation materials are to meet requirements of CAN/ULC S700 Series Standards.

.2 Unless otherwise specified, all insulation system materials inside the building must have a fire hazard rating of not more than 25 for flame spread and 50 for smoke developed when tested in accordance with CAN/ULC S102.

2.02 PIPE INSULATION MATERIALS

.1 **Flexible Foam Elastomeric:** Closed cell, tubular foamed plastic pipe insulation, 25/50 flame spread/smoke developed rated, with all required installation accessories. Acceptable products are:

.1 Armstrong World Industries "AP Armaflex"

.2 Nomaco Inc. "NOMALOCK" or "NOMAGARD"

.3 Or approved alternate.

.2 **Premoulded Mineral Fibre:** Rigid, sectional, sleeve type insulation with a factory applied vapour barrier jacket. Acceptable products are:
- .1 Johns Manville. "Mico-Lock AP-T Plus"
- .2 Knauf Fibre Glass "Pipe Insulation" with "ASJ-SSL" jacket
- .3 Manson Insulation Inc. "ALLEY K APT"
- .4 Or approved alternate.

.3 **Pipe Insulation @ Hangers & Supports:** Insulation is to be a 300 mm long piece of sectional pipe insulation with a thickness equal to the adjacent insulation, a foil and glass reinforced kraft paper vapour barrier jacket, and a minimum 0.80 mm thick G60 galvanized steel shield the same length as the insulation. The insulation is to be:
- .1 Johns Manville "Thermo-12 Gold" or Pabco Insulation "SUPER CALTEMP GOLD 1200" rigid calcium silicate
  or
- .2 Belform Insulation Ltd. "Koolphen K" closed cell phenolic foam
- .3 Or approved alternate.

2.03 EQUIPMENT INSULATION MATERIALS

.1 **Blanket Mineral Fibre:** Blanket type roll form insulation with a factory applied vapour barrier facing. Acceptable products are:
- .1 Knauf Fibre Glass Blanket Insulation with multi-purpose "FSK" facing
- .2 Manson Insulation Inc. "ALLEY WRAP FSK"
- .3 Johns Manville Type 150 "Microlite"
- .4 Or approved alternate.

2.04 DUCTWORK SYSTEM INSULATION MATERIALS

.1 **Rigid Mineral Fibre Board:** Preformed board type insulation with a factory applied reinforced aluminum foil and kraft paper facing. Acceptable products are:
- .1 Knauf Fibre Glass Insulation Board with FSK facing
- .2 Manson Insulation Inc. "AK BOARD FSK"
- .3 Johns Manville Type 814 "Spin-Glas"
- .4 Or approved alternate.

.2 **Blanket Mineral Fibre:** Blanket type roll form insulation, 40 mm thick, with a factory applied vapour barrier facing. Acceptable products are:
- .1 Knauf Fibre Glass Blanket Insulation with multi-purpose "FSK" facing
- .2 Manson Insulation Inc. "ALLEY WRAP FSK"
- .3 Johns Manville Duct Wrap Type 150 "Microlite"
- .4 Or approved alternate.

.3 **Premoulded Calcium Silicate:** Rigid block and sheet insulation. Acceptable products are:
- .1 Johns Manville "Thermo-12 Gold"

.2 Pabco Insulation "SUPER CALTEMP GOLD 1200"
.3 Or approved alternate.

.4 **Flexible Foam Elastomeric Sheet:** Sheet form, closed cell foamed plastic pipe insulation, 25/50 flame spread/smoke developed rated. Acceptable products are:
.1 Armstrong World Industries "AP Armaflex"
.2 Nomaco Inc. "NOMAPLY"
.3 Or approved alternate.

2.05 FIRE RATED DUCT WRAP

.1 3M Fire Protection Products "Fire Master" (Thermo Fire Systems Inc. 905-469-0063) flexible, non-combustible, blanket type mineral fibre duct wrap completely encapsulated in reinforced foil, 40 mm thick, suitable for installation with zero clearance to combustibles, and ULC tested and listed to ULC Design FRD-4 for kitchen exhaust duct to facilitate a 1 or 2 hour fire resistance rating to kitchen grease exhaust duct in accordance with requirements of NFPA-96.

2.06 INSULATION FASTENINGS

.1 **Wire:** Minimum 1.8 mm dia. galvanized annealed wire.

.2 **Wire Mesh:** Minimum 1.8 mm dia. galvanized annealed wire factory woven into 25 mm hexagonal mesh.

.3 **Duct Insulation Fasteners:** Weld-on 2 mm dia. zinc coated steel spindles of suitable length, complete with minimum 40 mm square plastic or zinc plated steel self-lock washers.

.4 **Tape Sealant:** Equal to MACtac Canada Ltd. ULC listed and labelled 25/50 rated self-adhesive insulation tapes, types PAF, FSK, ASJ, or SWV as required to match the surface being sealed.

.5 **Adhesive – Mineral Fibre Insulation:** Clear, pressure sensitive, quick setting brush consistency adhesive, non-flammable when wet, fire resistive when dry, suitable for a temperature range of -20º C to 82º C and compatible with the type of material to be secured, and WHMIS classified as non-hazardous.

.6 **Adhesive – Flexible Elastomeric Insulation:** Armstrong World Industries Inc. #520 air-drying contact adhesive.

.7 **Lagging Adhesive:** White (or coloured), brush consistency, ULC listed and labelled, 25/50 fire/smoke rated lagging adhesive for canvas jacket fabric, complete with fungicide and washable when dry.

2.07 INSULATION JACKETS AND FINISHES

.1 **Canvas:** S. Fattal Canvas Inc. "Thermocanvas Classic" or Robson Thermal Mfg. Ltd. "FLAMEX FR CANVAS" ULC listed and labelled 25/50 rated roll form canvas jacket material.

.2 **Insulation Cement:** Heat resistant, trowel consistency thermal insulating and finishing cement to CAN/CGSB 51.12, and suitable in all respects for the application.

.3 **Protective Coating – Flexible Foam Elastomeric Insulation:** Equal to Armstrong World Industries "WB Armaflex" white, water based latex enamel, semi-gloss.

PART 3: EXECUTION

3.01 GENERAL INSULATION APPLICATION REQUIREMENTS

.1 Unless otherwise specified, do not insulate the following:
- .1 factory insulated equipment and piping
- .2 branch domestic water piping located under counters to serve counter mounted plumbing fixtures and fittings
- .3 exposed chrome plated domestic water angle supplies from concealed piping to plumbing fixtures and fittings

.2 Install insulation directly over pipes and ducts and not over hangers and supports.

.3 Do not apply insulation unless leakage tests have been satisfactorily completed.

.4 Ensure that all surfaces to be insulated are clean and dry.

.5 Ensure that the ambient temperature is minimum 13º C for at least one day prior to the application of insulation, and for the duration of insulation work, and that relative humidity is and will be at a level such that mildew will not form on insulation materials.

.6 Install piping insulation continuous through pipe openings and sleeves.

.7 Install duct insulation continuous through walls, partitions, and similar surfaces except at fire dampers.

.8 **Pipe insulation at hangers and supports** is to consist of minimum 300 mm long sections of calcium silicate or phenolic foam sectional insulation with vapour barrier jacket and galvanized steel shields between the insulation and the hanger or support for all pipe 50 mm dia. and larger.

.9 When insulating "cold" piping and equipment, extend insulation up valve bodies and other such projections as far as possible, and protect the insulation jacketing from the action of condensation at its junction with the metal.

.10 When insulating vertical piping risers 75 mm diameter and larger, use insulation support rings welded directly above the lowest pipe fitting, and thereafter at 4.5 m centres and at each valve and flange. Insulate as per Thermal Insulation Association of Canada National Insulation Standards, Figure No. 9.

.11 Where existing insulation work is damaged as a result of a new mechanical work, repair the damaged insulation work to new work standards.

.12 Where mineral fibre rigid sleeve type insulation is terminated at valves, equipment, unions, etc., neatly cover the exposed end of the insulation with a purpose made PVC cover on "cold" piping, and with canvas jacket on "hot" piping.

3.02 PIPE INSULATION REQUIREMENTS – MINERAL FIBRE

.1 Insulate the following pipe with mineral fibre insulation of the thickness noted:
- .1 domestic hot and cold water piping inside building and above ground –

25 mm thick

.2 storm drainage piping from roof drains to the point where main vertical risers extend straight down, without offsets, and connect to horizontal mains – 25 mm thick

.3 condensate drainage piping inside the building from cooling equipment drain pans to drainage discharge points or to main vertical drain risers – 25 mm thick

.4 steam piping from humidifier cabinets to duct mounted steam manifolds – 25 mm thick

.5 condensate piping from duct steam manifolds to humidifier cabinets or drain points – 25 mm thick

.6 refrigerant suction piping (between compressor and evaporator coil) inside building – 20 mm thick

.7 refrigerant hot gas piping (between compressor and condenser0 inside building – 13 mm thick

.8 refrigerant hot gas by-pass piping (between compressor discharge and evaporator coil) inside building – 13 mm thick

.2 **Piping:** Ensure that the overlap flap of the section insulation jacket is secured tightly in place. Cover section to section butt joints with tape sealant.

.3 **Fittings:** Insulate fittings with sectional pipe insulation mitred to fit tightly, and cover butt joints with tape sealant.

.4 **"Cold" Piping Valves, Strainers, Etc.:** Insulate valves, strainers, and similar piping system accessories in "cold" piping such as domestic water piping with cut and tightly fitted segments of sectional pipe insulation with all joints covered with tape sealant.

.5 **Concealed Rough-In piping at Plumbing Fixtures:** Take special care at concealed domestic water rough-in piping at plumbing fixtures to ensure that the piping is properly insulated. If necessary due to space limitations, use 12 mm thick sectional pipe insulation in lieu of 25 mm thick insulation.

3.03 PIPE INSULATION REQUIREMENTS – FLEXIBLE FOAM ELASTOMERIC

.1 Install flexible elastomeric pipe insulation in strict accordance with the manufacturer's published instructions to suit the application, and using adhesive, joint sealants and finish to produce a water-tight installation. Insulate the following pipe with flexible elastomeric pipe insulation of the thickness noted.

.1 refrigerant piping outside the building – 25 mm thick

3.04 PIPE INSULATION REQUIREMENTS – FIRE RATED INSULATION

.1 Where pipe which is to be insulated as specified above penetrates fire rated walls and slabs, provide fire-rated, non-combustible sectional mineral wool insulation on the portion of pipe in the fire barrier and for a distance of 50 mm on either side of the fire barrier. Insulation thickness is to be as specified, but in any case minimum 25

mm.

3.05 EQUIPMENT INSULATION REQUIREMENTS – BLANKET TYPE MINERAL FIBRE

.1 Insulate the following equipment with mineral fibre blanket type insulation of the thickness noted:

.1 roof drain sumps where inside the building – 25 mm thick

.2 water meter – 40 mm thick

.2 Wrap the equipment to a thickness and insulating value equal to an equivalent thickness of rigid sectional pipe insulation. Laminate the insulation in place with adhesive and secure with wire. Apply a jacket of the insulation vapour barrier material secured in place with adhesive or sealant tape.

.3 Cover roof drains sumps with purpose made PVC fitting covers.

3.06 DUCTWORK INSULATION REQUIREMENTS – MINERAL FIBRE

.1 Insulate the following ductwork systems with mineral fibre insulation of the thickness noted:

.1 all fresh air intake ductwork inside the building – 40 mm thick

.2 supply air ductwork outward from fans, except for supply ductwork exposed in the area it serves – 25 mm thick rigid board or 40 mm thick flexible blanket, including where ceiling space is used as a return air plenum.

.3 exhaust discharge ductwork inside the building for a distance of 3 m downstream (back) from exhaust openings to atmosphere – 25 mm thick rigid board or 40 mm thick flexible blanket. Otherwise, return/exhaust ductwork does not require insulation.

.4 any other ductwork, casing, plenums or sections specified or detailed on the drawings to be insulated – thickness as specified

.2 Insulation for exposed rectangular ductwork is to be rigid board type. Insulation for round ductwork and concealed rectangular ductwork is to be blanket type.

.3 Liberally apply adhesive to all surfaces of the ductwork. Provide weld-on pins at 450 mm centres on the bottom duct surface only where blanket insulation is to be applied, and at 450 mm centres on bottom and side surfaces of ducts where board insulation is to be applied. Secure the insulation in place with tight circumferential and longitudinal joints. Secure and seal all joints with 75 mm wide tape sealant. Install self-lock washers over pins and cut off any excess pin length. Ensure that the insulation does not sag or bulge.

.4 At each trapeze type duct hanger under rectangular ductwork to be insulated with blanket type insulation, provide a 100 mm wide full length piece of rigid mineral fibre board insulation between the duct and the hanger and over joints with strips of tape sealant.

.5 At each band type duct hanger around round ductwork to be insulated, provide a 100 mm wide section of sleeve or scored board type mineral fibre insulation and cover joints with tape sealant.

3.07 DUCTWORK INSULATION REQUIREMENTS – FLEXIBLE ELASTOMERIC

.1 Insulate all exposed exterior ductwork (except fresh air intake ductwork) with 40 mm thick flexible elastomeric sheet insulation applied in two 20 mm thick layers with staggered tightly butted joints.

.2 Install the insulation in strict accordance with the manufacturer's published instructions to produce a weather-proof installation. Seal sheet metal work joints watertight with duct sealer prior to applying insulation.

3.08 DUCTWORK INSULATION REQUIREMENTS – CALCIUM SILICATE

.1 Insulate the Demo Kitchen exhaust hood ductwork from the hood to the exhaust fan with 40 mm thick calcium silicate block insulation.

.2 Secure the insulation in place with adhesive, and with wire on 450 mm centres. Point all gaps and joints with insulating cement. Where ductwork is exposed, cover the insulation with wire mesh secured to the wire and with edges laced together, and apply a coat of finished cement trowelled smooth. Use drywall type metal corner bead for duct edges where finishing cement is applied.

3.09 DUCT WRAP REQUIREMENTS – FIRE RATED MATERIAL

.1 As an alternative to calcium silicate insulation as specified above, provide blanket type fire rated duct wrap system material for the Demo Kitchen exhaust hood ductwork from the hood to the exhaust fan to produce a 2 hour rating.

.2 Install the duct wrap material in accordance with ULC design requirements and the wrap supplier's recommendations.

.3 Arrange and pay for the duct wrap supplier to examine the completed duct wrap system at the site. Submit a letter from the supplier to certify that the duct wrap system has been properly installed.

3.10 INSULATION FINISH REQUIREMENTS

.1 **Canvas:** Unless otherwise shown and/or specified, jacket all exposed mineral fibre and calcium silicate insulation work inside the building with canvas secured in place with a full 100% covering coat of lagging adhesive. Accurately cut canvas with scissors or a knife. Do not rip or tear canvas to size. Remove lagging adhesive splatter from adjacent uninsulated surfaces.

.2 **Protective Coating – Flexible Elastomeric Insulation:** Apply two heavy coats of the specified coating to all flexible elastomeric insulation exposed above grade.

.3 Provide UV protective coating for all exterior insulation finishes.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 ULC, Underwriters Laboratories Canada.

.2 ANSI/NFPA 10, Portable Fire Extinguishers.

.3 Refer to Section 20 05 00.

1.02 SHOP DRAWINGS

.1 Submit product data shop drawings for fire extinguishers and cabinets.

PART 2: PRODUCTS

2.01 PORTABLE FIRE EXTINGUISHERS

.1 ULC listed 3A:20BC rated 5 lb. fire extinguishers in accordance with ANSI/NFPA 10, complete with wall brackets.
Acceptable manufacturer: Evergreen Fire and Safety Services, Tel: 1-866-727-1299 or equal.

2.02 FIRE EXTINGUISHER CABINETS

.1 Recessed, prime coat painted metal fire extinguisher cabinets with safety glass panel doors.

PART 3: EXECUTION

3.01 INSTALLATION OF FIRE EXTINGUISHERS

.1 Provide portable fire extinguishers in accordance with Code requirements, but in any case a minimum of seven.

.2 Provide additional fire extinguishers in the Demo Kitchen area as required.

.3 Unless otherwise shown or specified, locate fire extinguishers as per local authority.

.4 All fire extinguishers must be in place, fully charged, when the space is occupied by the LCBO.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 ASTM B88, Specification For Seamless Copper Water Tube.
.2 ANSI/AWWA B300, Hypochlorites.
.3 AWWA, C601, Disinfecting Water Mains.
.4 Refer to Section 20 05 00.

1.02 SHOP DRAWINGS

.1 Submit shop drawings for all valves.

PART 2: PRODUCTS

2.01 PIPES, FITTINGS AND JOINTS

.1 **Hard Copper:** Type L hard drawn seamless copper to ASTM B88, complete with forged copper solder type fittings to suit the pipe, and soldered joints using 95% tin, 5% Antimony or Silvabrite 100 solder.

.2 **Soft Copper:** Type K soft copper to ASTM B88, supplied in a continuous coil with no joints if possible, and complete with, if joints are required, compression type flared joint couplings.

.3 **Polyethelene:** Semi-rigid high density polyethylene tubing, 12 mm dia., 1380 kPa rated, supplied in continuous lengths with no underground joints.

2.02 SHUT-OFF VALVES

.1 Class 600, 4140 kPa WOG rated full port ball type valves, each complete with a forged brass body with solder ends, forged brass cap and blowout-proof stem, forged brass chrome plated ball, “Teflon” or “PTFE” seat, and a removable lever handle. Acceptable products are:
  .1 Toyo Valve Co. Fig. 5049A
  .2 Milwaukee Valve Co. #BA-155
  .3 Kitz Corporation Code 59
  .4 Apollo #77-200
  .5 Or approved alternate.

2.03 CHECK VALVES

.1 Class 125, bronze, 1380 kPa WOG rated horizontal swing type check valves with solder ends. Acceptable products are:
  .1 Toyo Valve Co. Fig. 237
  .2 Milwaukee Valve Co. #1510
  .3 Kitz Corporation Code 23
  .4 Apollo #61-600
  .5 Or approved alternate.

2.04 DRAIN VALVES

.1 Minimum 2070 kPa water rated, 20 mm dia. straight pattern full port bronze ball

valves, each complete with a threaded outlet suitable for coupling connection of 20 mm dia. Garden hose, and a cap and chain. Acceptable products are:

.1 Toyo Valve Co. Fig. 5046
.2 Dahl Brothers Canada Ltd. Fig. No. 50.430
.3 Kitz Corporation Code 5866
.4 Apollo #78-100 or #78-200
.5 Or approved alternate.

2.05 CHLORINE

.1 Javex Manufacturing Canada "JAVEX-12" or equal sodium hypochlorite to ANSI/AWWA B-300.

PART 3: EXECUTION

3.01 PIPING INSTALLATION REQUIREMENTS

.1 Provide all required domestic water piping.
.2 Piping, unless otherwise specified, is to be as follows:
  .1 for underground piping to above ground inside the building, except as noted below, type K soft copper
  .2 for pipe inside the building and above ground – type L hard copper
  .3 for underground trap seal primer water piping to floor drains – semi-rigid polyethylene tubing
.3 Slope all piping so that it can be completely drained.
.4 Provide proper dielectric unions in all connections between copper pipe and ferrous pipe or equipment.

3.02 INSTALLATION OF SHUT-OFF AND CHECK VALVES

.1 Provide shut-off valves to isolate all domestic water piping connections to equipment, and to isolate all branch piping off mains.
.2 Provide check valves in piping at slop sink connections.
.3 Ensure that all valves are located for easy access.

3.03 INSTALLATION OF DRAIN VALVES

.1 Provide a drain valve at the bottom of domestic water piping risers and at all other piping low points.
.2 Locate drain valves so that they are easily accessible.

3.04 FLUSHING AND DISINFECTING PIPING

.1 Flush and disinfect domestic water piping after leakage testing is complete.
.2 Flush piping with a sufficient flow of domestic water to produce a velocity of 1.5mps for ten minutes, or until all foreign materials have been removed and the flushed water is clear. Provide connections and pumps as required. Open and close valves, faucets, hose bibs, and service connections to ensure thorough flushing.
.3 When flushing is complete, disinfect the piping with a solution of chlorine in

accordance with AWWA C601.

.4 Take samples and submit certified copies of water sample test analysis to indicate pure water in the system.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 AWWA C700, Standard For Cold-Water Meters, Displacement Type, Bronze Main Case.

.2 CSA, Canadian Standards Association.

.3 Refer to Section 20 05 00.

1.02 SUBMITTALS

.1 **Shop Drawings**: Submit shop drawings for all products specified in Part 2 of this Section.

.2 **Hydrant Keys:** Prior to application for Substantial Performance, submit a minimum of three identified operating keys for key operated hydrants.

PART 2: PRODUCTS

2.01 FLOOR DRAIN TRAP SEAL PRIMERS

.1 For Trap seal primers serving 1 to 2 drains, provide P.P.P. INC. Model PR-500 Automatic Trap Seal Primer Valve, serving 1 or 2 individual or remote area drains (primer automatically activated when there is a pressure drop in the system) with 1/2" (12.7mm) NPT (MtoF) connections with strainer and integral back flow preventer & vacuum breaker. (For two drain primer provide unit with assembly DU-2/SS8)

.2 For Electronic Trap Priming Manifold to serve multiple drains, provide P.P.P. INC Model PT-4, PT-8, PT-12, PT-16, PT-20, PT-24 or PT-30, Electronic Trap Priming Manifold, where four or more traps requiring priming are within 100 feet (30.8m) proximity to each other, the unit shall supply a minimum of 10 oz. (0.3L) of water per opening, in each 24 hour period or as selected with adjustable recycle timer on a 24 hour period based on a system pressure of 60 PSI (412kpa). Factory assembled with a bronze body ball valve, solenoid valve, atmospheric vacuum breaker and a type L copper manifold c/w compression fitting. Electronic single point power connection 120V 1AMP Draw, manual override switch. Provide access panel 'PTD' .

2.02 WATER HAMMER ARRESTORS

.1 Piston type, sealed, pressurized water hammer arrestors suitable for either horizontal or vertical installation, each complete with a hard drawn copper body, “O”-ring piston seals, an air charge, an inlet opening equal to the diameter of the pipe in which the arrestor is required, and sized to suit the number and type of fixtures in the grouping. Acceptable products are:

- .1 Zurn #Z-1705
- .2 Ancon SG Series “SHOK-GARD”
- .3 Precision Plumbing Products Inc. SC or SWA Series
- .4 Watts Regulator Series 15
- .5 Or approved alternate.

2.03 DOMESTIC WATER THERMAL EXPANSION TANK

.1 Pre-charged domestic water thermal expansion tank in accordance with Section VIII of the ASME Boiler and Pressure Code, carbon steel outer shell construction and complete with fixed butyl rubber bladder to prevent water from contacting shell interior, top NPT stainless steel system connection, 0.301"-32 charging valve connection and prime painted exterior. Acceptable products are

.1 Watts Industries (Canada) Inc. Series DETA;

.2 Zurn/Wilkins Model WTTA;

.3 Or approved alternate.

PART 3: EXECUTION

3.01 INSTALLATION OF TRAP SEAL PRIMERS

.1 Provide 115 volt electronic trap seal primers to automatically maintain a water seal in floor drain traps. Size the primer(s) and manifold(s) to suit the number of floor drains involved.

.2 Ensure that a 115 volt 15 ampere circuit to each assembly is part of the electrical work of Division 26 and extended from the nearest suitable panelboard.

.3 Connect trap primer tubing to each floor drain. Do not terminate the tubing in the throat of the floor drain.

.4 Provide access door (fire rated if required by Code).

3.02 INSTALLATION OF WATER HAMMER ARRESTORS

.1 Provide accessible water hammer arrestors in domestic water piping at groups of plumbing fixtures and at the top of risers as required to prevent piping water hammer. Ensure that each arrestor is accessible for service or replacement.

.2 Install each unit in a piping tee either horizontally or vertically in the path of potential water shock in accordance with the manufacturer's published instructions and details.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 CAN/CSA B182.2, PVC Sewer Pipe and Fittings.
.2 ASTM BA306, Copper Drainage Tube (DWV).
.3 ASTM B88, Specification For Seamless Copper Water Tube.
.4 CAN/CSA B70, Cast Iron Soil Pipe, Fittings and Means of Joining.
.5 Refer to Section 20 05 00.

PART 2: PRODUCTS

2.01 PIPE, FITTINGS AND JOINTS

.1 **PVC Sewer:** Equal to Ipex "Ring-Tite" DR35 rigid hub and spigot pattern sewer pipe and fittings to CAN/CSA B182.2, complete with gasket joints assembled with pipe lubricant.
.2 **PVC-DWV:** Equal to Ipex System 15 rigid PVC drain, waste and vent pipe and fittings to CAN/CSA B181.2, complete with solvent weld joints.
.3 **Hard Copper:** Type DWV hard temper copper to ASTM B306, with forged copper solder type drainage fittings and 95% tin, 5% Antimony solder joints, or, type L hard copper to ASTM B88, complete with forged copper solder type fittings and 95% tin, 5% Antimony solder joints.
.4 **Cast Iron:** Class 4000 cast iron plain end pipe and fittings to CAN/CSA B70, complete with mechanical joints equal to Husky SD 4000.

PART 3: EXECUTION

3.01 PIPING INSTALLATION REQUIREMENTS

.1 Provide all required drainage and vent piping. Pipe, unless otherwise noted, is to be as follows:
  .1 for underground pipe inside the building and to points 1.5 m outside the building – rigid PVC sewer pipe, minimum 100 mm dia. and buried a minimum depth of 600mm.
  .2 for pipe inside the building and above ground in sizes to 75 mm dia., except as noted below – type DWV copper
  .3 for pipe inside the building and above ground in sizes 75 mm dia. and larger – Class 4000 cast iron or XFR PVC.
  .4 for condensate drainage piping above ground – type L hard copper. Condensate lines from cold room evaporators to be 1 ¼"
  .5 for concealed pipe inside the building and above ground in lieu of DWV copper and cast iron, where and to the extent permitted by governing Codes and Regulations – rigid PVC DWV
.2 Unless otherwise shown or specified slope horizontal drainage piping above ground in accordance with Code requirements.
.3 Install and slope underground drainage piping to inverts or slopes indicated on the Drawings to facilitate straight and true gradients between the points shown. Verify available slopes before installing the pipes.

.4 Unless otherwise shown or specified, all floor drains, hub drains, and funnel floor drains are to be vented through the roof by Landlord's base-building contractor. Adjustments, including any necessary additional vent piping, are to be performed by LCBO's contractor where required.

.5 For plumbing fixtures, a vent stub shall be provided terminating 600mm above the slab and a roof penetration complete with cone for venting to be provided by landlord's base-building contractor. Piping for plumbing fixtures' vents to be installed by LCBO's contractor in addition to adjustments required to stubs and sealed penetrations.

.6 Unless otherwise shown or specified, slope horizontal branches of vent piping down to the fixture or pipe to which they connect with a minimum pitch of 25mm in 1.2m.

.7 Extend vent stacks up through the roof generally where shown but with exact locations to suit site conditions. Terminate vent stacks above the roof in vent stack covers.

.8 Provide proper die-electric unions at connections between copper pipe and ferrous pipe or equipment.

.9 Temporarily plug floor drains during construction procedures. Remove plugs during final cleanup work and demonstrate free and clear operation of each drain. Replace any damaged grates. Do not dispose of any mortar or grout down the drains.

.10 For existing base building underground, sub-slab or below-deck drainage and vent piping, chip or cut existing concrete slab to adjust existing locations or level of pipes, drain flanges, cleanouts, trap seal primers, and vents as required. Make good floor finish. Contractor to carry a cost to chip/cut slab up to four square feet to allow for adjustments.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 PDI-G101, Grease Interceptor Standard.

.2 Refer to Section 20 05 00.

1.02 SHOP DRAWINGS

.1 Submit shop drawings for all products specified in this Section.

PART 2: PRODUCTS

2.01 CLEANOUTS

.1 **Horizontal Piping:** TY pipe fitting with an extra heavy brass plug screwed into the fitting.

.2 **Vertical Piping:** Bronze or copper cleanout tees in copper piping, each complete with a bronze ferrule, and, for cast iron piping, baked epoxy coated cast iron cleanout tees, each gas and water-tight, complete with an ABS tapered thread plug.

.3 **Urinal(s):** Wall access cleanout assemblies, each complete with a tapered plug, threaded brass insert, urethane rubber seal, and polished stainless steel access cover with vandalproof stainless steel securing screw.

2.02 FLOOR CLEANOUT TERMINATIONS

.1 Baked epoxy coated cast iron terminations, each complete with a solid gasketed access cover to suit the floor finish, a cleanout plug, and captive stainless steel securing hardware. Acceptable products are:

.1 Zurn # ZN1400 Series

.2 Jay R. Smith #4020-F-C Series

.3 Watts CO-100-C Series

.4 Or approved alternate.

.2 All cleanout terminations in areas with a tile or sheet vinyl finish are to be as above but with a square top in lieu of a round top. Refer to the Room Finish Schedule.

2.03 FLOOR DRAINS

.1 Baked epoxy coated cast iron body vandalproof drains, each suitable in all respects for the application and complete with a 12 mm diameter trap primer connection.

.2 Acceptable manufacturers are Zurn, J.R. Smith, and Watts.

.3 All floor drains in areas with a tile or sheet vinyl finish are to be as above but with a square grate in lieu of a round grate. Refer to the Room Finish Schedule.

.4 All floor drains provided for indirect drainage pipe terminations are to be complete with funnels.

.5 All floor drains shall be height adjustable to match finished floor elevation.

PART 3: EXECUTION

3.01 INSTALLATION OF CLEANOUTS

.1 Provide cleanouts in drainage piping in locations as follows:

.1 in the building drain or drains as close as possible to the inner face of the

outside wall, and, if a building trap is installed, locate the cleanout on the downstream side of the building trap

.2 at or as close as practicable to the foot of each drainage stack

.3 at maximum 15 m intervals in horizontal pipe 100 mm dia. and smaller

.4 at maximum 30 m intervals in horizontal pipe larger than 100 mm dia.

.5 in the wall at each new urinal or bank of urinals in a washroom

.6 wherever else shown on the Drawings

.2 Cleanouts are to be the same diameter as the pipe in piping to 100 mm dia., and not less than 100 mm dia. in piping larger than 100 mm dia.

.3 Cleanout in vertical piping are to be cleanout tees, cast iron in piping 75 mm dia. and larger, copper or bronze in piping smaller than 75 mm dia.

.4 Cleanouts in horizontal piping are to be TY fittings with removable plugs.

.5 Where cleanouts are concealed behind walls or partitions, install the cleanouts near the floor and so that the cover is within 25 mm of the finished face of the wall or partition.

3.02 INSTALLATION OF FLOOR CLEANOUT TERMINATIONS

.1 Where cleanouts occur in horizontal inaccessible underground piping, extend the cleanout TY fitting up to the floor and provide a cleanout termination set flush with the finished floor.

.2 In waterproof floors, ensure that each cleanout termination in equipped with a flashing clamp device.

.3 In the Warehouse, cleanout termination covers are to be screw type nickel-bronze heavy-duty covers with a scoriated finish.

.4 In finished areas, covers are to be brass adjustable recess type to accommodate the floor finish.

.5 Do not locate cleanouts in underground piping in the retail area unless absolutely necessary. Where cleanouts are required locate in an inconspicuous location to the approval of the LCBO representative, with a termination type also approved by the LCBO representative.

3.03 INSTALLATION OF FLOOR DRAINS

.1 Provide floor drains where shown on the Drawings.

.2 Equip each drain with a trap.

.3 In equipment rooms and similar areas, exactly locate floor drains to suit the location of mechanical equipment and equipment indirect drainage piping.

.4 Confirm the exact location of drains prior to roughing in.

.5 Temporarily plug floor drains during construction procedures. Remove plugs during final cleanup work and demonstrate free and clear operation of each drain. Replace any damaged grates.

END OF SECTION

PART 1: GENERAL

1.01 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 Performance testing and balancing of heating, ventilating, air conditioning and hydronic systems.

.2 Measuring and reporting all specified space noise levels. Noise level to be below NC35.

.3 Measuring and reporting all specified vibration isolation levels.

.4 Rechecking of testing and balancing during the alternate (heating/cooling) season.

.2 Section Excludes:

.1 The following systems do not require air and water balancing

.1 Domestic cold water.

.2 Domestic hot water (except balancing valve on connections to hot water recirculation piping).

.3 Natural gas (except natural gas metering as part of heating equipment performance test).

.4 Beer cold room.

.2 The following equipment does not require air and water balancing:

.1 Hydronic and electric convection heaters (baseboards).

.2 Hydronic and electric unit heaters.

.3 Hydronic radiant panel heating units

.3 Unless stated otherwise, Testing, Adjusting and Balancing Services shall be included in the General Contractor's scope of work.

.1 General Contractor is responsible for all coordination.

.2 All direct costs for balancing are to be included in the General Contractor's Scope of Work.

.3 The following are approved Testing, Adjusting and Balancing Services vendors:

.1 Air & Water Precision Balancing
47 Ted Reeve Dr.
Toronto, ON M4E 3X1
Ph: 647-896-5353
Email:matt@awpbgroup.com

.2 DesignTest
70 East Beaver Creek Rd.
Richmond Hill, ON L4B 3B2
Ph: 905-886-6513
Email: ssahota@designtest.ca

.3 Dynamic Flow Balancing
1200 Speers Rd.

Oakville, ON L6L 2X4
Ph: 905-338-0808
Email:emolnar@dynamicflowbalancing.com

.4 Pro Air Testing
21 Goodrich Rd Unit #13
Toronto ON M8Z 4Z8
Ph: 416-252-3232
Email: abdo-proairtesting@bellnet.ca

.5 Vital Canada Group
1143 Bancroft Dr
Mississauga, ON L5V 1B7
Ph: 905-848-1000
Email: info@vitalcanada.com

.6 VPG Associates
2062 King Rd
King City, ON L7B 1K9
Ph: 905-833-4334
Email: mail@vpgassociates.com

1.02 RELATED WORK IN OTHER SECTIONS

.1 Factory testing, and calibrating of equipment or control systems.

.2 Testing and checking of equipment supplied by other Divisions, except where such equipment forms an integral part of the mechanical systems.

1.03 QUALIFICATIONS

.1 Perform testing and balancing of air and water systems by an accredited Testing and Balancing Firm who is a member of the Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB).

.1 Acoustic and vibration measurements may be performed by a specialist sub-contractor to the Testing and Balancing Firm.

1.04 PERFORMANCE STANDARDS

.1 Perform testing and balancing in accordance with the current issue of:

.1 Associated Air Balance Council Standards for Total System Balance.

.2 SMACNA “Testing, Adjusting and Balancing” guidelines.

.2 Instruments: recently calibrated; state date of calibration in the report.

1.05 COORDINATION

.1 General

.1 Review with affected trades before fabrication, the location of balancing devices, test connections and access openings and report conditions which could affect optimum system performance.

.2 By inspection, assure that all testing, balancing and metering devices are installed properly and in pre-selected locations.

.3 The Mechanical Contractor will obtain the approval of the testing and balancing firm and the mechanical engineer before relocating these devices due to field conditions.

.4 Coordinate efforts so that items requiring replacement and/or delivery time (sheaves, motors, etc.) are tested as early as possible.

.2 The Mechanical Contractor and/or associated sub-contractors will provide the following assistance and/or services to the testing and balancing firm.

.1 Schedule sufficient time so that initial testing and balancing can be completed before occupancy begins and coordinate with trades involved.

.2 Keep testing and balancing firm informed of any major changes made during construction and furnish same with a set of project drawings and reviewed Shop Drawings.

.3 Furnish balancing devices, test connections access openings, balancing probe inlets and plugs.

.4 Clean and pre-run all equipment, filters, etc. and place all heating, ventilating and air conditioning systems into full operation and continue same during each working day of testing and balancing.

.5 Provide immediate labour from pertinent mechanical trades and tools, equipment and materials to make equipment and system alterations and adjustments, as required including control adjustments.

.6 Building Automation System technical representative to operate the BAS during air and water balancing testing.

.7 Make available all equipment data (Shop Drawing Performance Data and operating instructions) to the Testing and Balancing Firm.

.8 Refrigeration machine manufacturer service representative for performance testing of the refrigeration equipment. Testing and Balancing Firm witnesses and records all test results.

.9 Fuel fired heating equipment manufacturer service representative, or other qualified service company technical representative, for performance testing of heating equipment. Testing and Balancing Firm witnesses and records all test results.

.3 The General Contractor is to contact the TAB contractor to coordinate testing. All required equipment and devices must be complete and in place for this test. Should return visits be required by the TAB contractor as a result of incomplete work, the costs of return visits by the TAB contractor will be retained from the General Contractor. The General Contractor shall arrange for elevated platforms for the balancing. This includes but is not limited to scissor lifts, scaffolding and approved ladders.

.4 The Consultant shall provide reproducible mechanical drawings and refrigeration (cold room) drawings for the TAB contractor's and Commissioning Agent's review at the 60%-90% design stage.

1.06 DEFINITIONS

.1 Balancing: To proportion and regulate flows within the distribution system (subsystems, branches, mains, terminals, etc.) at appropriate pressures in accordance with the design intent. This includes setting discharge volume and patterns of terminal devices, and individual return and exhaust air volumes.

2. Testing: To measure, interpret and report in writing, such parameters as may be required to verify design compliance and as specified herein

1.07 SUBMITTALS

.1 Submit in accordance with the requirements of Division 01.

.2 Submit layout drawings and Report Format a minimum 14 days prior to start of air and water balancing on-site.

.1 Layout Drawings:

.1 Identify specific locations of all adjusting, balancing and permanent measuring devices, neatly marked on a set of plans for approval by the Consultant. A set of reproducible mechanical drawings and refrigeration (cold room) drawings will be furnished by the Consultant for this purpose.

.2 Propose, for review by the Consultant, additional devices deemed advisable for satisfactory operation and completion of the work of mechanical division.

PART 2: PRODUCTS

2.01 NOT USED

.1 Not used.

PART 3: EXECUTION

3.01 REQUIRED REPORTS

.1 Provide the following Start-Up and Performance Testing reports:

.1 Air and water balancing report (where applicable).

.2 Acoustic survey report.

.3 Alternate season test report

.2 Report Format

.1 Include the following header information for each test report:

.1 Owner Name

.2 Project Name

.3 Contractor Name

.4 Consultant Name

.5 Name of Test Report

3.02 AIR AND WATER BALANCING

.1 Site Visits

.1 Visit the site as required prior to testing and balancing systems and advise respective trades of this Section's requirements for probe inlets etc. Submit a report to the Consultant after each site visit

.2 Balancing Tolerances

.1 Balance all systems to the performance parameters indicated on drawings and in the specifications.

.2 If interpretation, clarification or additions to performance parameters are required, request such information from the Consultant

.3 Balancing Tolerances

.1 Air Flow Rates

Under 236 L/S (500 CFM)	10% of flow
Over/at 236 L/S (500 CFM)	5% of flow

.4 Drawing Review

.1 Review all pertinent plans, specifications, Shop Drawings, interference drawings and other documentation to become fully familiar with the systems and their specified and intended performance.

.5 Air Systems

.1 Test relative barometric pressures in various building areas, as deemed necessary by the Consultant and at least in all areas served by different systems.

.2 Operate, test and balance all air systems over their entire design range of operation including minimum and maximum fresh air, return air and supply air.

.3 Balancer is responsible for sheave changes and setting motor speeds.

.4 Simulate full heating and cooling conditions. Record sufficient data to verify compliance with design requirements.

.5 Balance air systems within acceptable tolerances before water systems are balanced.

.6 Rooftop Unit LGH 5-ton or smaller: Adjust torque % on controller to achieve design air flow capacity.

.7 Rooftop Unit LGH 6-ton or larger: Adjust sheaves or pulleys to achieve design air flow capacity. Adjustment shall not been done at VFD or controller.

.6 Hydronic Systems (where applicable)

.1 Operate, test and balance all water systems over their entire design range of operation.

.2 Simulate full heating and cooling conditions. Record sufficient data to verify compliance with design requirements.

.3 Balance water systems within acceptable tolerances before air systems are balanced.

.7 Continuous Recording
- .1 Set-up trend logs on the Building Automation System to record on a temperature and humidity levels on a 24-hour basis, in areas as directed by the Consultant.

.8 Data Required
- .1 Submit the following data as a minimum. If contractor's standard forms provide for additional data, also submit such additional data. Indicate if tests were not specifically made. Do not repeat design data or other values not specifically tested.
- .2 Hydronic heating equipment (boilers, heaters, etc.)
  - .1 Manufacturer and model
  - .2 Gas and fuel oil input flow rating
  - .3 Gas and fuel oil input pressure rating
  - .4 Gas pressure regulator inlet and outlet pressure
  - .5 Entering and leaving water temperature - design and actual
  - .6 Entering and leaving water pressure - design and actual
  - .7 Water flow rate - design and actual
  - .8 Steam flow rate and pressure - design and actual
  - .9 Combustion efficiency test at maximum rated capacity; including flue gas analysis
  - .10 Combustion efficiency test - as per Ministry of Environment Guideline A-9, corrected to 3% O2, for fuel input ratings exceeding 10 MMBtu/h (2932 kW)
  - .11 Thermal efficiency, based on ASME short form power test code, for fuel input ratings exceeding 10 MMBtu/h (2932 kW)
- .3 Motors:
  - .1 Manufacturer
  - .2 Model or serial number
  - .3 Rated amperage and voltage
  - .4 Rated horsepower
  - .5 Rated RPM
  - .6 Corrected full load amperage
  - .7 Measured amperage and voltage
  - .8 Calculated BHP (kW)
  - .9 Measured RPM
  - .10 Sheave size, type and manufacturer
- .4 Fans:
  - .1 Manufacturer
  - .2 Model or serial number
  - .3 Rated CFM (L/S)
  - .4 Rated RPM
  - .5 Rated pressures (suction and discharge)
  - .6 Measured CFM (L/S)

.7 Measured RPM
.8 Measured pressures (suction and discharge)
.9 Pulley size, type and manufacturer
.10 Belt size and quantity

.5 Pumps:
.1 Manufacturer
.2 Model or serial number
.3 Rated GPM (L/S)
.4 Rated Head
.5 Rated pressures
.6 Measured discharge pressure (full flow and no flow)
.7 Measured suction pressure (full flow and no flow)
.8 Measured gpm (L/s) at operating conditions
.9 Operating head
.10 Operating RPM

.6 Air Systems
.1 Grille, register or diffuser reference number and manufacturer
.2 Grille, register or diffuser location
.3 Design velocity
.4 Design cfm (L/s)
.5 Effective (or free) area factor and size
.6 Measured velocity
.7 Measured cfm (L/s)

.7 Heat transfer equipment:
.1 Manufacturer and type
.2 Design inlet and outlet temperatures
.3 Design pressure drop
.4 Design flow rate
.5 Measured inlet and outlet temperatures
.6 Measured pressure drop
.7 Measured flow rate

3.03 DEFICIENCIES

.1 Immediately report to Consultant, any deficiencies in the systems or equipment performance resulting in design requirements being unobtainable.

3.04 DRAFT REPORTS

.1 On completion of the start-up, testing, adjusting and balancing of all systems, submit to the project team, a hand-written, legible draft report on all tests, adjustments, and balancing performed. Submit the report not more than 2 days after testing and include the following:
.1 Summary of all systems
.2 Testing methods and instrumentation

.3 Air systems testing and balancing data
.4 Liquid systems testing and balancing data
.5 Acoustic survey report
.6 Attachments including systems schematics with numbered terminals for referring to data above

.2 After review by the Consultant and at the Consultants direction, retest up to 10% of all measurements in locations as directed by the Consultant, at no cost extra to the contract.

3.05 FINAL REPORTS

.1 Submit to Consultant following completion of alternate season testing and balancing. Final report to be in PDF format and submitted not more than 7 days after testing. General Contractor to include final TAB report in Operation Maintenance manuals.

3.06 SPOT CHECKS

.1 Before acceptance of the air and water balancing report, the Consultant may request to witness spot-checks of the report results.

.2 If results indicate unusual testing inaccuracy, omissions, or incomplete balancing/ adjustment, in the opinion of the Consultant, re-balance entire affected system(s) at no increase in Contract Price.

3.07 ACCEPTANCE

.1 The Substantial Performance of the Mechanical Work will be considered reached when the initial Start-Up and Performance Testing report is accepted by the Consultant and in the opinion of the Consultant all systems have been satisfactorily installed, operated tested, balanced, and adjusted to meet the specified and intended performance.

.2 The substantial performance will not depend upon alternate season testing, however, make such relevant repairs or modifications deemed necessary during this re-checking as part of the guarantee of the work.

.3 The total performance of the Mechanical Subcontract (Contract) will not be considered reached until the alternate season testing and balancing is completed and the final report submitted and accepted by the Consultant

3.08 ADDITIONAL TESTING

.1 The Consultant may request such additional testing in connection with this project as he deems necessary.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 ASHRAE Standard 15, Safety Code For Mechanical Refrigeration.
.2 UL 207, Refrigerant – Containing Components and Accessories, Non-Electrical.
.3 UL42, Electrical Operated Valves.
.4 ASTM B280, Specification For Seamless Copper Tube For Air Conditioning and Refrigeration Field Service.
.5 ANSI B16.22, Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.
.6 ASTM B32, Specification For Solder Metal.
.7 ANSI B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings.
.8 ASTM A126, Specification For Grey Cast Iron Castings For Valves, Flanges and Pipe Fittings.
.9 ARI 760, Solenoid Valves for Use With Volatile Refrigerants.
.10 ASHRAE Standard 17, Method of Testing Capacity of Thermostatic Refrigerant Expansion Valves.
.11 ASHRAE Standard 63, Method of Testing Liquid Line Refrigerants.
.12 ARI 495, Standard for Refrigerant Liquid Receivers.
.13 ANSI B31.5, Refrigerant Piping.
.14 ANSI A13.1 Scheme For Identification of Piping Systems.
.15 ANSI Z53.1, Safety Colour Code.
.16 ANSI/ASME 31.5, Refrigerant Piping and Heat Transfer Components.
.17 Refer to Section 20 05 00.
.18 Refer to Section 20 07 00.
.19 Supply and installation of this section of work has been contracted by LCBO with an approved vendor.

1.02 QUALITY ASSURANCE

.1 Comply with ASHRAE Standard 15. The application of this Standard is intended to assure the safe design, construction, installation, operation, and inspection of every refrigerating system employing a fluid which normally is vaporized and liquefied in its refrigerating cycle.
.2 Comply with ASME Boiler and Pressure Vessel Code: Section IX: Welding and Brazing Qualifications.
.3 All products are to comply with UL 207, or UL 429, Electrical Operated Valves.
.4 **Refrigerant piping work of this Section is to be done as part of the food service equipment and walk-in cooler/freezer work specified in Division 11 by journeyman refrigeration mechanics.**

1.03 SHOP DRAWINGS

.1 Submit shop drawings and/or product data sheets for system components to present sufficient information to confirm compliance with the Specification. Shop drawings and/or product data sheets are required for the following:
  .1 tubing and fittings

.2 valves
.3 strainers
.4 moisture-liquid indicators
.5 filter-driers
.6 flexible metal hose
.7 liquid-suction interchanges
.8 oil separators (when specified)
.9 gauges
.10 refrigerant and oil
.11 pipe/conduit roof penetration cover
.12 soldering and brazing materials

.2 Submit schematic dimensioned layout shop drawings of refrigerant piping and accessories, including flow capacities, valve locations, oil traps, slopes of horizontal runs, floor/wall/roof penetrations, and equipment connection details.

1.04 START-UP REPORTS

.1 Submit start-up reports for refrigeration equipment specified in Division 11. As a minimum each report is to include:
.1 refrigerant type/quantity used
.2 degrees of sub-cooling
.3 degrees of superheat
.4 compressor ampere draw
.5 site glass observations
.6 suction pressure
.7 suction temperature
.8 discharge pressure
.9 discharge temperature
.10 ambient temperature

PART 2: PRODUCTS

2.01 PIPING AND FITTINGS

1. **Refrigerant Piping**: Copper refrigerant tube, ASTM B280, cleaned, dehydrated and sealed, marked ACR on hard temper straight lengths, tagged ASTM B280 on coils by the manufacturer.
2. **Condensate Drainage Piping**: Copper tube as per Section 22 13 16 or PVC / CPVC schedule 40 plastic drain pipe.
3. **Fittings, Valves and Accessories:**
.1 solder joints: wrought copper fittings, ANSI B16.22
.1 solder, refrigerant tubing: Cadmium free, AWS A5.8, 45 percent silver brazing alloy, Class BAg-5
.2 solder, drain piping: 95-5 tin-antimony, ASTM B32 (95TA)
.2 flanges and flanged fittings: ANSI B16.24
.3 refrigeration valves:

.1 stop valves: brass or bronze alloy, packless, or packed type with gas tight cap, frost-proof, backseating

.2 pressure relief valves: forged brass with nonferrous, corrosion resistant internal working parts of high strength, cast iron bodies conforming to ASTM A126, Grade B - set valves in accordance with ASHRAE Standard 15

.3 solenoid valves: ARI 760, UL listed, two-position, direct acting or pilot-operated, moisture and vapor-proof type of corrosion resisting materials, designed for intended service, with solder-end connections, fitted with suitable NEMA 250 enclosure of type required by location and normally closed holding coil

.4 thermostatic expansion valves: brass body with stainless steel or non-corrosive non-ferrous internal parts, diaphragm and spring-loaded (direct-operated) type with sensing bulb and distributor having side connection for hot-gas bypass and external equalizer - size and operating characteristics as recommended by the manufacturer of evaporator and factory set for superheat requirements - solder-end connections - testing and rating in accordance with ASHRAE Standard 17

.5 check valves: brass or bronze alloy of the swing or lift type, with tight closing resilient seals for silent operation, designed for low pressure drop, and with solder-end connections- direction of flow is to be legibly and permanently indicated on the valve body

4. **Strainers**: Designed to permit removal of the screen without removing the strainer from the piping system, and equipped with screens 80 to 100 mesh in liquid lines up to 30 mm, 60 mesh in liquid lines over 30 mm, and 40 mesh in suction lines
5. **Refrigerant Moisture/Liquid Indicators**: double-ported type having heavy sight glasses sealed into a forged bronze body, screwed brass seal cap, and incorporating a means of indicating refrigerant charge and moisture indication
6. **Refrigerant Filter-Dryers**: UL listed, angle or in-line type conforming to ASHRAE Standard 63, complete with a heavy-gauge steel shell protected with corrosion-resistant paint, perforated baffle plates to prevent desiccant bypass - size as recommended by the manufacturer for the service and capacity of the system with connection not less than the line size in which it is installed - filter driers with replaceable filters are be furnished with one spare element of each type and size
7. **Flexible Metal Hose**: seamless bronze corrugated hose, covered with bronze wire braid and complete with standard copper tube ends
8. **Receivers**: conforming to ARI 495, of steel construction, equipped with tappings for liquid inlet and outlet valves, pressure relief valve, and liquid level indicator

2.02 PIPE CLAMPS

1. "Cushaclamp" style - channel mount, electro-dichromate steel, "controlled squeeze"

stud configuration with thermoplastic elastomer pipe cushion.

PART 3: EXECUTION

3.01 INSTALLATION OF REFRIGERANT PIPING SYSTEMS

.1 Provide complete systems of refrigerant piping with all required accessories to connect food service equipment, walk-in coolers/freezers, and compressor condenser equipment. Refer to Sections 11 40 00 and 11 41 20, and to sketch drawings SK01 - 23 23 00, SK02 - 23 23 00, and SK03 - 23 23 00 found at the end of this Section.

.2 Design and install refrigerant piping and refrigerant containing parts in accordance with ASHRAE Standard 15 and ANSI B31.5. Refrigerant piping is to be brazed with 15 percent silver solder in accordance with AWS A5.8.

.3 Design and install refrigeration piping with a pressure drop not to exceed 2F.

.4 Install piping as short as possible, with a minimum number of joints, elbows and fittings.

.5 Install piping with adequate clearance between pipe and adjacent walls and hangers to allow for service and inspection. Space piping (including insulation), to provide 25 mm minimum clearance between adjacent piping or other surfaces. Use proper pipe sleeves through walls, floors, and ceilings, sized to permit installation of pipes with full thickness insulation.

.6 Locate and orient valves to permit proper operation and access for maintenance of packing, seat and disc. Generally, locate valve stems in overhead piping in the horizontal position. Provide a union adjacent to one end of all threaded end valves. Control valves usually require reducers to connect to pipe sizes.

.7 Use copper tubing in protective conduit when installed below ground.

.8 Swab fittings and valves with the manufacturer's recommended cleaning fluid to remove oil and other compounds prior to installation.

.9 Install hangers and supports per ANSI B31.5 and the refrigerant piping manufacturer's recommendations.

.10 Protect refrigerant system during construction against the entrance of foreign matter, dirt and moisture. Cap open ends of piping and connections to compressors, condensers, evaporators and other equipment until assembly.

.11 Pass nitrogen gas through the pipe or tubing to prevent oxidation as each joint is brazed. Cap each system with a reusable plug after each brazing operation to retain the nitrogen and prevent the entrance of air and moisture.

.12 Pipe relief valve discharges to atmosphere for systems containing more than of refrigerant.

.13 Provide strainers in liquid lines serving each thermostatic expansion valve, and in suction lines serving each refrigerant compressor not equipped with an integral strainer.

.14 Provide flexible metal hose at the suction and discharge connection to each compressor.

3.02 SIGNS AND IDENTIFICATION

1. Equip each refrigerating system erected on the premises with an easily legible permanent sign securely attached and easily accessible, indicating thereon the name and address of the installer, the kind and total number of pounds of refrigerant required in the system for normal operations, and the field test pressure applied.
2. Systems containing more than 50 kg of refrigerant are to be equipped with durable signs in accordance with ANSI A13.1 and ANSI Z53.1, having letters not less than 12.7 mm in height designating:
   - .1 valves and switches for controlling refrigerant flow, the ventilation and the refrigerant compressor(s)
   - .2 signs on all exposed high pressure and low pressure piping installed outside the machinery room, with the name of the refrigerant and the letters HP or LP

3.03 FIELD QUALITY CONTROL

1. Prior to initial operation examine and inspect each piping system for conformance to the Specifications, reviewed shop drawings, and ASME 31.5. Equipment, material, or work rejected because of defects or non-conformance with the drawings, reviewed shop drawings, and Specifications are to corrected immediately.

3.04 FIELD TESTS

.1 After completion of piping installation and prior to initial operation, conduct tests on the piping systems in accordance with requirements specified in Section 20 05 00 and ASME B31.5. Perform tests in the presence of the LCBO and BCC representatives. If any test fails, correct defects and perform the test again until it is satisfactorily completed and all joints are proved tight.

.2 Every refrigerant-containing part of each system that is erected on the premises, except compressors, condensers, evaporators, safety devices, pressure gauges, control mechanisms, and systems that are factory tested, are to be tested and proved tight after installation, and before operation.

.3 The high and low side of each system is to be tested and proved tight at not less than the lower of the design pressure or the setting of the pressure-relief device protecting the high or low side of the system, respectively, except systems erected on the premises using non-toxic and non-flammable Group A1 refrigerants with copper tubing not exceeding 16 mm O.D. These may be tested by means of the refrigerant charged into the system at the saturated vapor pressure of the refrigerant at 20 degree C minimum.

.4 Test Medium: A suitable dry gas such as nitrogen is to be used for pressure testing. The means used to build up test pressure is to have either a pressure-limiting device or pressure-reducing device with a pressure-relief device and a gauge on the outlet side. The pressure relief device is to be set above the test pressure but low enough to prevent permanent deformation of the system components.

3.05 SYSTEM TESTING AND CHARGING

1. System Test and Charging: As recommended by the equipment manufacturer or as follows:
   .1 Connect a drum of refrigerant to charging connection and introduce enough refrigerant into system to raise the pressure to 70 kPa gauge. Close valves and disconnect refrigerant drum. Test system for leaks with halide test torch or other approved method suitable for the test gas used. Repair all leaking joints and retest.
   .2 Connect a drum of dry nitrogen to charging valve and bring test pressure to design pressure for low side and for high side. Test entire system again for leaks.
   .3 Evacuate the entire refrigerant system by the triplicate evacuation method with a vacuum pump equipped with an electronic gauge reading in mPa (microns). Pull the system down to 665 mPa (500 microns) and hold for four hours then break the vacuum with dry nitrogen (or refrigerant). Repeat the evacuation two more times breaking the third vacuum with the refrigeration to be charged and charge with the proper volume of refrigerant.

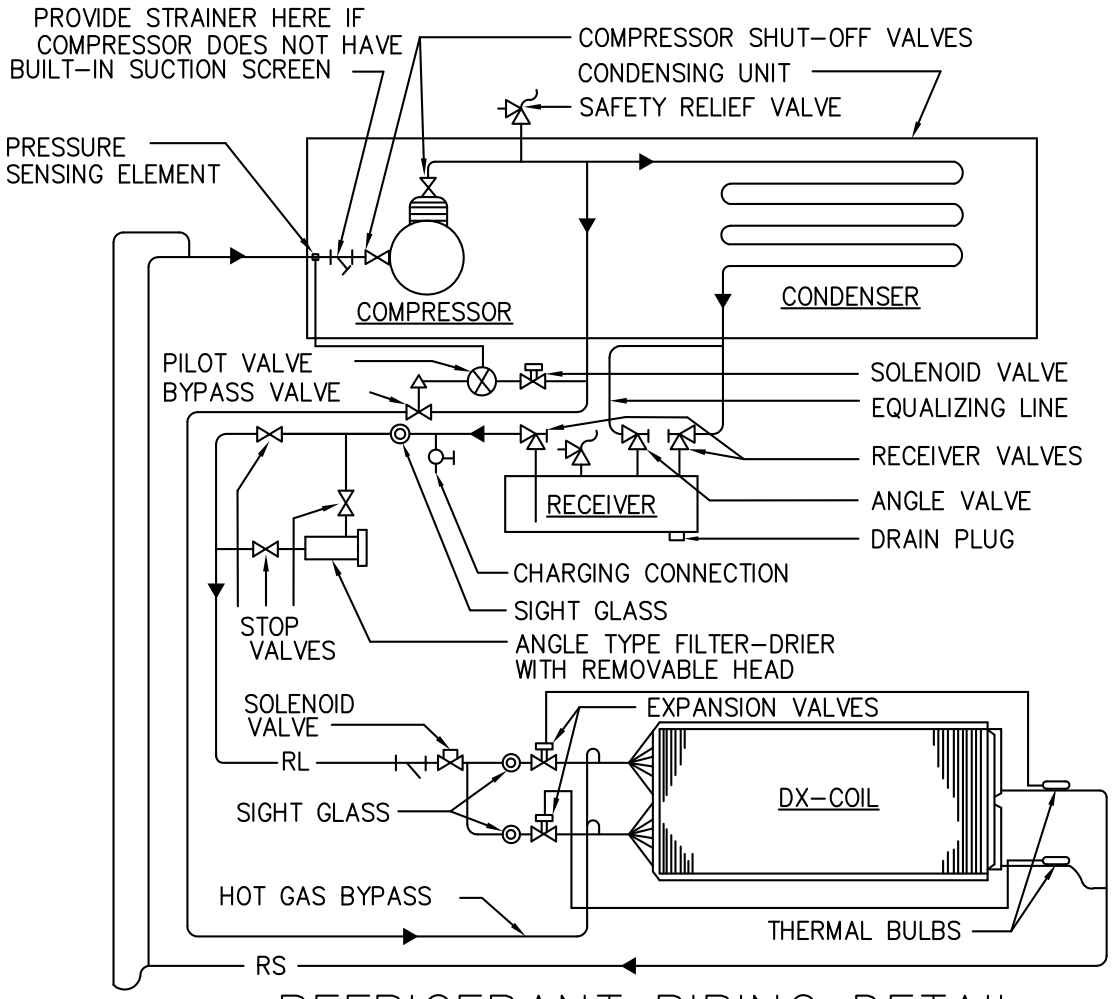
3.06 SYSTEM START-UP AND REPORTS

.1 When the installation of each refrigerant piping system is complete and tests have been successfully performed, start-up each system, check and test operation, pressures, temperatures, controls, safeties, etc., make any required adjustments, and leave each system in proper operation condition .

.2 Arrange and pay for equipment supplier representatives to be present to supervise and document start-up procedures, and to sign the start-up reports.

.3 Submit start-up reports as specified in Part 1 of this Section.

END OF SECTION



REFRIGERANT PIPING DETAIL (EVAPORATOR LOCATED LOWER/SAME LEVEL AS COMPRESSOR)

NOTES:

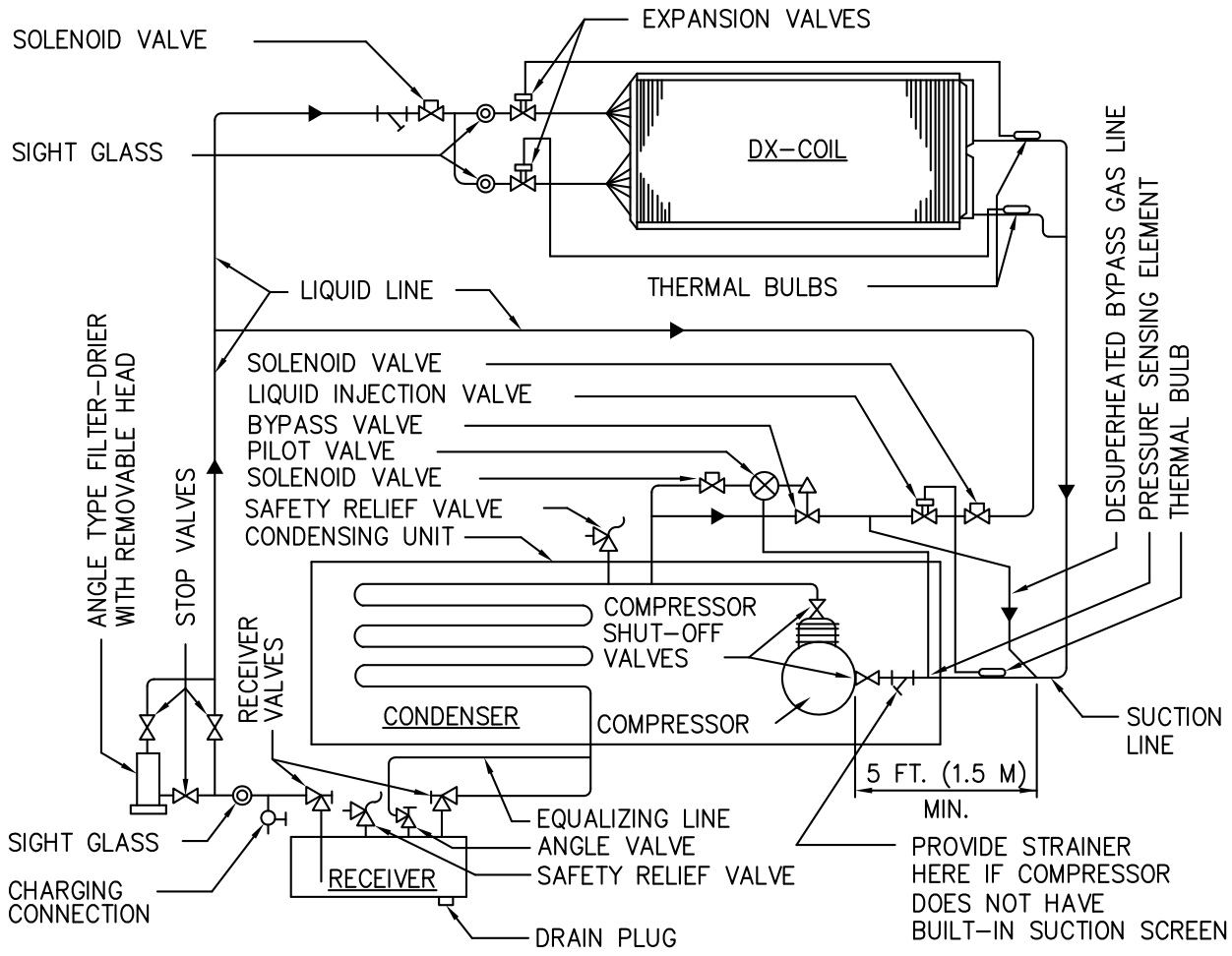
1. REFRIGERANT PIPING SIZES SHOWN ON PLANS ARE BASED ON R-22. REVISE PIPE SIZES IF ANOTHER REFRIGERANT IS USED.
2. DOUBLE REFRIGERANT SUCTION RISER IS SHOWN. PROVIDE DOUBLE RISER ONLY IF PLANS INDICATE. DOUBLE REFRIGERANT SUCTION RISERS TO BE SIZED BY MANUFACTURER OF EQUIPMENT DEPENDING ON COMPRESSOR UNLOADING CAPABILITIES. CROSS SECTIONAL AREA OF DOUBLE RISERS SHALL EQUAL OR EXCEED CROSS SECTIONAL AREA OF HORIZONTAL REFRIGERANT SUCTION PIPE SHOWN.
3. DETAIL SHOWS SINGLE CIRCUIT REFRIGERANT PIPING. DUPLICATE REFRIGERANT PIPING REQUIRED FOR DOUBLE CIRCUIT SYSTEMS.
4. HOT GAS BYPASS SHALL BE INOPERABLE UNTIL COMPRESSOR IS ON LOWEST CAPACITY STEP.
5. REFRIGERANT PIPING TO BE INSTALLED IN FIELD SHALL BE APPROVED BY MANUFACTURER OF EQUIPMENT BEFORE STARTING INSTALLATION.

LCBO

Title: REFRIGERANT PIPING DETAILS

Scale: 1/8"=1'-0" Date; MAY 2012

DWG NO.: SK01 23 23 00



REFRIGERANT PIPING DETAIL
(EVAPORATOR LOCATED HIGHER THAN COMPRESSOR)

NOTES:

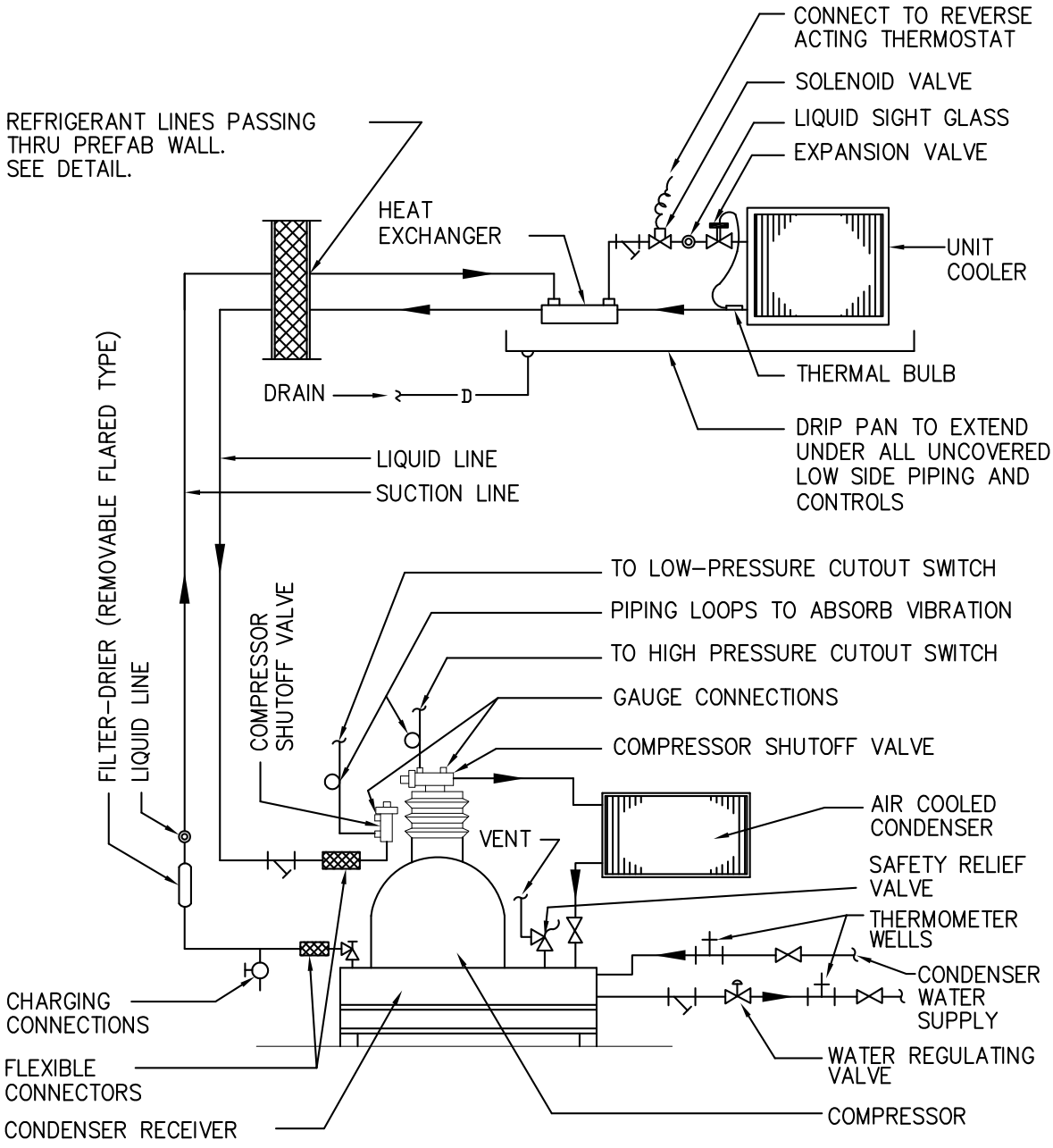
1. REFRIGERANT PIPE SIZES SHOWN ON PLANS ARE BASED ON R-22. REVISE PIPE SIZES, IF ANOTHER REFRIGERANT IS USED.
2. DETAIL SHOWS SINGLE CIRCUIT REFRIGERANT PIPING. DUPLICATE REFRIGERANT PIPING REQUIRED FOR DOUBLE CIRCUIT SYSTEMS.
3. HOT GAS BYPASS SHALL BE INOPERABLE UNTIL COMPRESSOR IS ON LOWEST CAPACITY STEP.
4. REFRIGERANT PIPING TO BE INSTALLED IN FIELD SHALL BE APPROVED BY MANUFACTURER OF EQUIPMENT BEFORE STARTING INSTALLATION.

LCBO

Title: REFRIGERANT PIPING DETAILS

Scale: 1/8"=1'-0" Date; MAY 2012

DWG NO.: SK02 23 23 00



REFRIGERANT PIPING DIAGRAM FOR (INDOOR FLOOR MOUNTED COMPRESSOR)

NOTE:

WHEN WATER COOLED CONDENSER IS USED IN LIEU OF COMBINATION AIR COOLED-WATER COOLED CONDENSER, REMOVE AIR COOLED CONDENSER FROM THIS DETAIL.

DO NOT SCALE DRAWINGS. DETAILS ARE PROVIDED TO EXPRESS DESIGN INTENT AND SHOULD BE ADAPTED TO SUIT SITE CONDITIONS.

ALL NECESSARY SAMPLES AND SHOP DRAWINGS SHALL BE SUBMITTED TO THE LCBO FOR APPROVAL PRIOR TO PROCEEDING WITH THE WORK.

LCBO

Title: REFRIGERANT PIPING DETAILS

.

Scale: 1/8"=1'-0" Date; MAY 2012

DWG NO.: SK03 23 23 00

PART 1: GENERAL

1.01 REFERENCES

.1 ASTM A653, Specification for Sheet Steel, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.

.2 ASTM A53, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

.3 SMACNA, Sheet Metal and Air Conditioning Contractors Association.

.4 CAN/ULC S102, Surface Burning Characteristics of Building Materials and Assemblies.

.5 ASTM A568, Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled.

.6 ASTM B209, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.7 CAN/ULC S112, Standard Method of Fire Test of Fire-Damper Assemblies.

.8 NFPA 96, Vapour Removal From Cooking Equipment.

.9 AABC, Associated Air Balance Council.

.10 Refer to Section 20 05 00.

1.02 SHOP DRAWINGS

.1 Submit shop drawings for the following:

- .1 manual balancing dampers
- .2 backdraft dampers
- .3 fusible link dampers

PART 2: PRODUCTS

2.01 DUCTWORK

.1 **Galvanized Steel – Rectangular:** Lock forming grade hot dip galvanized steel, ASTM A653, shop fabricated, with metal gauges in accordance with SMACNA HVAC Duct Construction Standards Metal and Flexible (minimum 0.478 mm -22 gge) to suit the duct configuration and working pressure classification. The steel thickness and zinc coating class is to be factory stencilled on the steel. Galvanizing for bare uncovered duct to be finish painted is to be G60. All other galvanizing is to be G90.

.2 **Galvanized Steel – Round (Spiral):** alpha industries limited "free-flow" or equivalent, prime lock forming quality to ASTM A525M, satin coated finish on ductwork to be painted, G60 coating on all other ductwork, spiral lockseam, factory fabricated fittings with fully welded seams and joints, with metal gauges in accordance with published SMACNA "HVAC duct construction standards metal and flexible" to suit the duct configuration and classification.

.3 **Flexible Metallic:** Spirally wound corrugated aluminum tube with continuous lock seams, SMACNA Form "M-UN", ULC listed and labelled as Class 1, constructed of aluminum alloy type 3003-0, supplied in 3 m lengths and suitable for air velocities up to 20.3 m/s and operating pressures from 1.50 kPa positive to 0.249 kPa negative. Acceptable products are:

.1 Flexmaster Canada Ltd. "T/L"
.2 Peppertree Air Solutions, Inc.
.3 Or approved alternate.

2.02 DUCT SYSTEM JOINT SEALANT

.1 ULC listed and labelled, premium grade, grey colour, water base, non-flammable duct sealer, brush or gun applied, with a maximum flame spread rating of 5 and smoke developed rating of 0.

2.03 ROUND TO RECTANGULAR DUCT CONNECTIONS

.1 Galvanized steel, flared, flanged or notched "SPIN-IN" round duct take-off collars in accordance with Fig. 2-6 of SMACNA HVAC Duct Construction Standards Metal and Flexible.

2.04 SPLITTER DAMPERS

.1 Minimum 0.95 mm thick (20 gge) damper blade constructed of the same material as the duct, reinforced as required to suit blade size, system velocity, and to prevent "chatter", and complete with operating hardware equal to Dyn Air Inc. #Q-50 "DYN-A-QUAP S-S" quadrant regulator with RW-50 backup washers to prevent leakage, long square bearing pin, and slide pin.

2.05 AIR TURNING VANES

.1 For square elbows - multiple-radius turning vanes, interconnected with bars, adequately reinforced to suit the pressure and velocity of the system, constructed of the same material as the duct they are associated with, and in accordance with SMACNA HVAC Duct Construction Standards Metal and Flexible.

2.06 MANUAL BALANCING (VOLUME) DAMPERS

.1 Flanged and drilled, single or parallel blade (depending on damper size) manual balancing dampers, each constructed of the same material as the connecting ductwork unless otherwise specified, each designed to maintain the internal free area of the connecting duct, and each complete with:
  .1 a hexagonal or square shaft extension through the frame
  .2 non-stick, non-corrosive synthetic bearings for rectangular dampers, flange stainless steel bearings for round dampers
  .3 blade stops for single blade dampers, designed to prevent the blade from moving more than 90^{o}
  .4 linkage for multiple blade dampers
  .5 a locking hand quadrant damper operator with 50 mm standoff mounting
.2 **Rectangular Dampers:** Ruskin # MD35-ASL, equipped with a reinforced channel type frame.
.3 **Round Dampers:** Ruskin # CDRS82, equipped with a minimum 200 mm deep frame, and blade stiffeners where required.

.4 Acceptable manufacturers are:
- .1 Ruskin
- .2 T.A. Morrison & Co. Inc. "TAMCO"
- .3 Nailor Industries Inc.
- .4 NCA Manufacturing Ltd.
- .5 Or approved alternate.

2.07 BACKDRAFT DAMPERS

.1 T.A. Morrison & Co. Inc. "TAMCO" Series 8000, insulated, counterbalanced backdraft dampers, 65 mm deep, sized as shown and complete with:
- .1 extruded aluminum frame and blades minimum 1.58 mm thick, with captive extruded TPE thermoplastic blade gaskets and side seals in slots integral with the aluminum extrusions
- .2 6.4 mm thick polyethylene foam insulation capped with a PVC liner for the interior side of each damper blade, and polyethylene foam insulation for the frame
- .3 damper blade counterweights internal to the frame and consisting of adjustable weights fastened to brackets which are riveted to the blades
- .4 dual PVC linkage tracks at each end of the blades, and non-corrosive linkage with Delrin pivot arm and Delrin bearings

2.08 FUSIBLE LINK DAMPERS

.1 Curtain blade type, dynamic, galvanized steel (unless otherwise specified) fusible link dampers, ULC classified to Standard CAN/ULC S112 and in accordance with NFPA 90A requirements, factory tested for closure under airflow, 1 1/2 hour or 3 hour rated as required, and complete with a constant force type 301 stainless steel closure spring, a blade lock assembly, a steel sleeve, and, unless otherwise specified, a 74 ^{O}C rated standard fusible link.

.2 Fusible link dampers are to be type "B" or type "C" (as required) with the folded curtain blade out of the air stream except where damper size or location requires the use of type "A" dampers with the curtain blade in the air stream.

.3 Acceptable manufacturers are:
- .1 Ruskin Manufacturing
- .2 Nailor Industries Inc.
- .3 Greenheck
- .4 NCA Manufacturing Ltd.
- .5 Or approved alternate.

2.09 FIRE STOP FLAPS

.1 Equal to Nailor Industries Inc. Model 0716 rectangular or Model 0722 round, ULC listed and labelled, blade type galvanized steel fire stop flaps, each complete with ceramic fibre insulation on both sides of the blade, and, unless otherwise specified, a 74° C fusible link.

2.10 THERMAL BLANKET MATERIAL

.1 Equal to Nailor Industries Inc. Model 0725 or Model 0726 ceramic fibre material with round or rectangular opening for a grille or diffuser neck.

2.11 FLEXIBLE CONNECTION MATERIAL

.1 Waterproof, indoor-outdoor type flexible connection material meeting requirements of NFPA 90A, consisting of woven glass fibre fabric coated on both sides with synthetic rubber. Acceptable products are:

- .1 Duro Dyne Canada Inc. "DUROLON"
- .2 Dyn Air Inc. "HYPOLON"
- .3 Or approved alternate.

.2 Waterproof, flameproof, high temperature flexible connection material meeting requirements of NFPA 90A, consisting of a woven glass fibre fabric coated on both sides with silicone rubber to produce a material with an operating temperature range of from 50°C to 260° C. Acceptable products are:

- .1 Duro Dyne Canada Inc. "Thermofab"
- .2 Dyn Air Inc. "SILICON HI-T"
- .3 Or approved alternate.

2.12 DUCT ACCESS DOORS

.1 In accordance with SMACNA HVAC Duct Construction Standards Metal and Flexible with sizes suitable in all respects for the purpose for which they are provided, and, unless otherwise specified, constructed of the same material as the duct they are associated with.

2.13 INSTRUMENT TEST PORTS

.1 Equal to Duro-Dyne of Canada Ltd. #1P1 or #1P2 (to suit insulation thickness where applicable), gasketed, leakproof instrument test ports for round or rectangular ducts as required, each complete with a neoprene expansion plug and a plug securing chain.

2.14 ACOUSTIC LINING

.1 Minimum 25 mm thick acoustic lining material meeting NFPA 90A requirements and flame spread and smoke developed fire hazard ratings of CAN/ULC S102 flexible for round ducts, board type for rectangular ducts, consisting of a bonded fiberglass mat coated on the inside (airside) face with a black fire-resistant coating.

.2 Acceptable manufacturers are:

- .1 Johns-Manville “Permacote Linacoustic”
- .2 Knauf
- .3 Manson Insulation Inc.
- .4 Or approved alternate.

2.15 BURGLAR BARS

.1 Minimum 150 mm x 150 mm x 12 mm dia. welded steel rod security grid sized to suit HVAC roof openings equal to or larger than 250 mm across (square or diameter).

.2 An approved factory supplied security grid will be acceptable.

2.16 OPEN ENDED DUCTWORK

.1 Bird screen to be installed on any open ended ductwork.

PART 3: EXECUTION

3.01 GENERAL RE: FABRICATION AND INSTALLATION OF DUCTWORK

.1 Unless otherwise specified, construct, install and seal ductwork in accordance with SMACNA HVAC Duct Construction Standards Metal and Flexible to suit the duct pressure class designation of 750 pa positive or 500 pa negative as applicable. Construct ductwork so the manufacturer's gauge markings are external.

.2 **All ductwork is to be sealed as per SMACNA Seal Class "A", except for round duct with self-sealing gasketed fittings and couplings.**

.3 **Rectangular Duct Support Inside Building:** Support horizontal rectangular ducts inside the building in accordance with SMACNA HVAC Duct Construction Standards Metal and Flexible, but use trapeze hangers with galvanized steel channels and galvanized steel hanger rods for all ducts that are exposed, and all concealed ducts wider than 500 mm.

.4 **Round Duct Support Inside Building:** Support round ducts inside the building in accordance with SMACNA HVAC Duct Construction Standards Metal and Flexible, but, unless otherwise specified, for both uninsulated and insulated ducts exposed in finished areas, use bands and secure at the top of the duct to a hanger rod, all similar to Ductmate Canada Ltd. type "BA". If the duct is insulated, size the strap to suit the diameter of the insulated duct.

.5 **Support of Roof Mounted Ducts:** As specified in this Section.

.6 **Application of Sealants:** Apply sealants by brush or gun to cleaned metal surfaces. Where bare ductwork is exposed apply neat uniform lines of sealant. Randomly brushed, sloppy looking sealant applications will be rejected and must be repaired or replaced with a neat application of the sealant.

.7 **Wall Flanges:** Provide neat sheet metal flanges around exposed ducts passing through walls.

3.02 INSTALLATION OF GALVANIZED STEEL DUCTWORK

.1 Provide all required standard galvanized steel ductwork. Unless otherwise shown or specified, ductwork is standard galvanized steel, round or rectangular as shown. Where rectangular duct is shown, round duct may be substituted with size conversion as per SMACNA or ASHRAE charts.

3.03 INSTALLATION OF FLEXIBLE DUCTWORK

.1 Provide maximum 3 m long lengths of flexible ductwork for connections between galvanized steel duct mains and branches, and necks of ceiling grilles and diffusers where shown.

.2 At rectangular galvanized steel duct, accurately cut holes and provide flanged or "Spin-in" round flexible duct connection collars. Seal joints with duct sealer.

.3 Install flexible ducts as straight as possible and support in accordance with requirements of SMACNA HVAC Duct Construction Standards Metal and Flexible, and secure at each end with nylon or stainless steel gear type clamps, and seal joints. Provide long radius duct bends where they are required.

.4 Do not penetrate fire barriers with flexible duct.

.5 Use metal draw bands and sealants to connect flexible ducts to collars at ducts and diffusers.

.6 Ensure that flexible ducts are supported so that they are perpendicular to the diffuser collars to ensure proper airflow to diffusers and at least 25mm of straight duct is connected to diffuser's neck.

.7 Ensure flexible ductwork enters a diffuser from a 90 degree bend with at least 25mm of straight duct.

3.04 INSTALLATION OF SPLITTER DAMPERS

.1 Provide splitter dampers in supply ductwork at branch duct connections off supply air mains, and wherever else shown and/or specified on the drawings. Install splitter dampers so they cannot vibrate and rattle and so that the damper operation mechanisms are in an easily accessible and operable location.

3.05 INSTALLATION OF TURNING VANES

.1 Provide turning vanes in ductwork elbows where shown on the drawings and wherever else required where, due to site installation routing and duct elbow radius, turning vanes are recommended in accordance with SMACNA HVAC Duct Construction Standards Metal and Flexible.

3.06 INSTALLATION OF MANUAL BALANCING (VOLUME) DAMPERS

.1 Provide manual balancing dampers in all open end ductwork, in all supply and return air duct mains, and wherever else shown and/or specified.

.2 Install the dampers so that the operating mechanism is accessible and positioned for easy operation, and so that the dampers cannot move or rattle.

.3 Confirm exact damper locations with personnel doing air quantity balancing testing work and install dampers to suit.

3.07 INSTALLATION OF BACKDRAFT DAMPERS

.1 Provide backdraft dampers where shown and for all exhaust fans.

.2 Install and secure the dampers so that they cannot move or rattle.

3.08 INSTALLATION OF FUSIBLE LINK DAMPERS

.1 Provide fusible link dampers where shown and/or specified on the drawings and as required in any rated assemblies and/or to satisfy authorities having jurisdiction. Ensure that the damper rating (1½ or 3 hr.) is suitable for the fire barrier it is associated with.

.2 Install dampers with retaining angles on all four sides of the sleeve on both sides of the damper and connect with ductwork in accordance with the damper manufacturer's instructions and details to meet Code requirements.

.3 Provide expansion clearance between the damper or damper sleeve and the opening in which the damper is required. Ensure that the openings are properly sized and located, and that all voids between the damper sleeve and the opening are properly sealed to maintain the rating of the fire barrier.

3.09 INSTALLATION OF FIRE STOP FLAPS AND THERMAL BLANKETS

.1 Provide fire stop flaps in the duct connection necks of grilles and diffusers installed in ULC fire rated suspended ceiling systems where shown on the drawings.

.2 Provide thermal blanket material to completely cover grille and/or diffuser pans above suspended ULC fire rated ceilings.

.3 Install and secure in place in accordance with the manufacturer's instructions and ULC requirements.

3.10 INSTALLATION OF FLEXIBLE CONNECTION MATERIAL

.1 Provide a minimum of 100 mm of flexible connection material where ducts connect to fans / HVAC air handling equipment and wherever else shown or specified.

.2 Rigidly secure a minimum of 75 mm of duct material (minimum 24 gge) to each edge of the flexible fabric and to the fan, duct, plenum, etc., in accordance with Fig. 2-17 in SMACNA HVAC Duct Construction Standards Metal and Flexible. Ensure that connections to the flexible fabric material are arranged and supported so as to not impose any external forces on the fabric.

.3 For kitchen exhaust ductwork use high temperature flameproof flexible connection material.

3.11 INSTALLATION OF DUCT ACCESS DOORS

.1 Provide access doors in ductwork for access to all components which will or may need maintenance and/or repair. Install in accordance with requirements of SMACNA HVAC Duct Construction Standards Metal and Flexible.

.2 Identify access doors provided for fusible link damper maintenance with "FLD" stencil painted or marker type red lettering and ensure that the doors are properly located for damper maintenance.

3.12 INSTALLATION OF INSTRUMENT TEST PORTS

.1 Provide instrument test ports in all main ducts at connections to air conditioning units and to fans, in all larger branch duct connections to mains, and wherever else required for proper air quantity balancing and testing.

.2 Locate test ports where recommended by personnel performing air quantity testing and balancing work.

3.13 INSTALLATION OF ACOUSTIC LINING

.1 Provide acoustic lining in locations as follows:

.1 in all transfer ducts unless factory lined

.2 wherever else shown and/or specified on the drawings

.3 minimum of 5 M downstream of all supply and return ducts connected to air handling equipment

.2 Install lining in accordance with requirements of SMACNA HVAC Duct Construction Standards Metal and Flexible, however, for all installations regardless of velocity, at leading and trailing edges of duct liner sections, provide galvanized steel nosing channel as per Detail "A" of Fig. 2-19, Flexible Duct Liner Installation, found in the SMACNA manual referred to above.

3.14 INSTALLATION OF BURGLAR BARS

.1 Provide a welded steel rod security grid in all HVAC roof openings equal to or larger than 250 mm across (square or diameter).

.2 Secure the grid to the building structure. Locate so as not to interfere with damper operation.

3.15 AIR QUANTITY TESTING AND BALANCING

.1 A qualified testing and balancing agency, certified and member in good standing of AABC and NEEB to perform Total System Balance,

.2 Refer to Section 23 08 16 for Testing, Adjusting and Balancing.

3.16 INSPECTION, TESTING AND BALANCING

.1 Cleaning:

.1 Prior to start-up of fans, blow out complete systems of duct work with high velocity air for not less than two hours using where possible the installed air handling equipment to full capacity and by blanking off duct sections to achieve required velocity. Do not install air filters prior to blow-out of duct work systems. Use auxiliary portable blowers for cleaning where installed fan systems are not adequate to blow out complete system free from dust and dirt

.2 After duct systems have been blown out, clean interior of plenums, coils, and register, grille or diffuser outlet collars with industrial type vacuum cleaner. On completion of cleaning process, install filters before placing systems in final operation.

.3 For renovation projects, contractor to submit no fewer than 10 photos at equal spacing along duct system to confirm cleanliness.

.2 Testing:

.1 Pressure test the following duct work systems:

.1 Duct work pressure class +/- 4" (1000 Pa) and over

.2 Supply air duct work class +3" (750 Pa) which is concealed in vertical risers

.3 Buried duct work

.2 Test Pressure: equal to duct work pressure class.

.3 Conduct pressure tests based on SMACNA Leakage Test Manual as follows:

.1 Allowable leakage per area of duct work: $F = C_L \times P^{0.65}$

F = leakage rate l/s /10 sq.m of duct surface area
CL = leakage class based on pressure class
P = static pressure, Pa

F = leakage rate cfm/100 sq.ft of duct surface area
CL = leakage class based on pressure class
P = static pressure, in.w.c.

.2 Leakage Class, C_L:

Duct Construction Class			
Duct Class	Up to 500 Pa	750 Pa	Over 750 Pa
Seal Class	C	B	A
Leakage Class, CL (Metric)			
Rectangular Metal	0.34	0.17	0.08
Round Metal	0.17	0.08	0.04
Duct Construction Class			
Duct Class	Up to 2"	3"	Over 3"
Seal Class	C	B	A
Leakage Class, CL (Imperial)			
Rectangular Metal	24	12	6
Round Metal	12	6	3

.4 Visually inspect duct work for air leakage at joints and connections to equipment, under normal operating conditions.

.5 Test duct work systems before they are insulated, painted or concealed.

.6 Immediately correct defects discovered during tests and retest systems to complete satisfaction of Consultant.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 AMCA, Air Movement and Control Association International Inc.
.2 ANSI/AMCA 210, Laboratory Methods of Testing Fans For Aerodynamic Performance Rating.
.3 ANSI/AMCA 211, Certified Ratings Programme – Fan Performance.
.4 AMCA 300, Reverberant Room Method For Sound Testing of Fans.
.5 AMCA 311, Certified Ratings Programme – Sound Performance.
.6 NFPA 90A, Installation of Air Conditioning and Ventilation Systems.
.7 AFBMA, Anti-Friction Bearing Manufacturers Association.
.8 OSHA, Occupational Safety and Health Administration.
.9 UL 705, Power Ventilators.
.10 UL 762, Restaurant Exhaust Fan.
.11 Refer to Section 20 05 00.
.12 Refer to Section 23 31 00.

1.02 SHOP DRAWINGS

.1 Submit shop drawings for fans and accessories.
  .1 Include the following:
    .1 certified fan performance curves
    .2 complete motor data, including manufacturer
    .3 product data sheets for all including disconnects, curbs, dampers, etc.

PART 2: PRODUCTS

2.01 CEILING EXHAUST FANS

.1 Ceiling exhaust fans as per the drawing schedule, each CSA certified and labeled, and each AMCA certified and labeled for air and sound performance in accordance with tests performed to AMCA Certification Programs 211 and 311. Fans are to be complete with:
  .1 **fan housing:** steel housing with electrical receptacle and box, electrical connection access cover, and an outlet duct connection collar with backdraft damper
  .2 **fan wheel/motor assembly:** removable fan-motor assembly with forward curved balanced centrifugal wheel direct connected to a permanently lubricated, overload protected and vibration isolated mot which is equipped with a length of prewired power cord with plug for plug-in connection/disconnection at the housing receptacle
  .3 **exhaust grille:** white, steel/aluminum exhaust grille
  .4 **accessories:** for fans as per the drawing schedule and/or details, factory supplied accessories as follows:
    .1 an exterior discharge accessory with integral birdscreen and backdraft damper
    .2 a washable aluminum mesh filter

.2 Acceptable manufacturers are:
- .1 Greenheck Fan Corp.
- .2 Loren Cook
- .3 Twin City Fan and Blower
- .4 Carnes
- .5 Or approved alternate.

PART 3: EXECUTION

3.01 INSTALLATION OF CEILING EXHAUST FANS

.1 Provide ceiling exhaust fans where shown.

.2 Rigidly secure each fan housing in place in the ceiling space and coordinate installation with the electrical work of Division 26 where electrical power connection to the housing receptacle is specified.

.3 Install fan-motor assemblies and plug into housing receptacles.

.4 Install accessories supplied loose.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 SMACNA, Sheet Metal and Air Conditioning Contractors Association.

.2 Refer to Section 20 05 00.

1.02 SHOP DRAWINGS

.1 Submit shop drawings for grilles and diffusers.

1.03 COLOUR SAMPLES

.1 Submit grille and diffuser finish colour samples to the Architect and LCBO Design Coordinator for approval.

PART 2: PRODUCTS

2.01 GRILLES AND DIFFUSERS

.1 Grilles and diffusers are to be complete with all required mounting and connection accessories to suit the construction in which they are installed.

.2 Noise generated by diffusers is to be such that room sound pressure level does not exceed noise criterion 32 with an 8 DB room attenuation, the sound power level reference to 10 to the –12 power watts.

.3 All air pattern devices are to be fully adjustable from the face of the diffuser or grille. Dampers are not to be located in the diffusers, or the neck of the diffusers.

.4 **Grille and Diffuser Finish and Colour:** Unless otherwise specified grilles and diffusers are to be finished with factory applied baked enamel. Unless otherwise specified, finish colours are to be as follows:

- .1 in t-bar ceilings – match colour of t-bar
- .2 in drywall ceilings or walls – match colour of ceiling /wall paint

.5 **Diffuser Types:** Unless otherwise shown or specified, grilles and diffusers are to be as follows:

- .1 supply diffusers – T-bar E.H. Price SCD (4 cone); Drywall E.H. Price SPD; retail E.H. Price 520D; warehouse vertical E.H. Price RCDA; Warehouse horizontal E.H. Price HCD1; E.H. Price RID (for high ceiling); E.H. Price PDF (for urban concept store)
- .2 exhaust and wall return grilles – steel fixed single deflection type complete with damper, E.H. Price 530D
- .3 ceiling linear supply/return grilles – E.H. Price SDS/SDR

.6 **Acceptable manufacturers are:**

- .1 E.H. Price
- .2 Titus
- .3 Nailor
- .4 Or approved alternate

PART 3: EXECUTION

3.01 INSTALLATION OF GRILLES AND DIFFUSERS

.1 Provide grilles and diffusers where shown and/or specified on the drawings. Wherever possible, grilles and diffusers are to be the product of one manufacturer (E.H. Price or Titus). Unless otherwise specified connect grilles and diffusers in accordance with requirements of SMACNA HVAC Duct Construction Standards Metal and Flexible.

.2 Exactly locate grilles and diffusers to conform to the final architectural reflected ceiling plans and detailed wall elevations, and to conform to the final lighting arrangement, ceiling layout, ornamental, and other wall treatment.

.3 Equip supply diffusers having a basic four-way or all around air pattern for operation in one, two, or three way pattern where indicated on the drawings.

.4 Provide diffusers with vertical discharge adjustment only in ceilings whose height requires such a device.

.5 Paint the visible internal surfaces behind each grille and diffuser flat black.

.6 Confirm grille and diffuser finishes prior to ordering.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 SMACNA, Sheet Metal and Air Conditioning Contractors Association.
.2 CSA, Canadian Standards Association.
.3 Refer to Section 20 05 00.
.4 Refer to Section 25 05 00.

1.02 SHOP DRAWINGS

.1 Submit shop drawings for all electric heaters and control components.
.2 Include certified power and control wiring schematics with each heater.

PART 2: PRODUCTS

2.01 CABINET TYPE MOTORIZED HEATER

.1 Wall mounting, CSA certified electric cabinet heater as per the drawing schedule, complete with:
  .1 a minimum gauge steel cabinet with rounded exposed corners, integral air inlet and discharge grilles, removable panel for access, glass fibre insulation, and a factory applied almond colour polyester powder coat baked finish over primer
  .2 a nickel-chrome resistance coil embedded in refractory material and enclosed in steel sheathing with brazed spiral steel extended fins
  .3 a statically and dynamically balanced, direct driver, mixed flow, aluminum propeller fan
  .4 a low voltage relay kit for BAS interface
.2 Acceptable manufacturer's are:
  .1 Chromalox
  .2 Stelpro
  .3 Thermolec
  .4 Or approved alternate

PART 3: EXECUTION

3.01 INSTALLATION OF CABINET HEATER

.1 Provide a wall mounting electric cabinet heater for the Entrance Vestibule where shown.
.2 Carefully coordinate installation with the electrical work of Division 26 where electrical connection of the heater is specified. Confirm exact location with the LCBO Design Coordinator prior to installation.
.3 Wall mount the sensor where shown. Confirm exact location prior to installation.
.4 Connect the relay to the heater with wiring in conduit to the wiring standards specified in Division 26 and in accordance with the heater manufacturer's instructions.
.5 When installation is complete, check and test operation, adjust as required, and leave in proper operating condition.

END OF SECTION

PART 1: GENERAL

1.01 APPLICATION

.1 This Section specifies requirements, products, common criteria and characteristics, and methods, and execution that are common to succeeding Sections of Divisions 26 and 28, and it is intended as a supplement to each Section and is to be read accordingly.

1.02 REFERENCES

.1 CAN/CSA C22.2 No. 83, Electrical Metallic Tubing.
.2 CSA C22.2 No. 45, Rigid Metal Conduit
.3 CSA C22.2 No. 56, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
.4 CSA C22.2 No. 38, Thermoset Insulated Wires and Cables.
.5 CSA C22.2 No. 75, Thermoplastic-Insulated Wires and Cables.
.6 CSA C22.2 No. 51, Armoured Cable.
.7 CSA C22.2 No. 127, Equipment and Lead Wires.
.8 CSA C22.2 No. 208, Fire Alarm and Signal Cable
.9 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes and Fittings.
.10 Ontario Electrical Safety Code.

1.03 DOCUMENTS

.1 The electrical Specification and the electrical drawings are an integral part of the Contract Documents and are to be read accordingly.
.2 Comply with the requirements of the General Requirements Section of this Specification.
.3 The electrical drawings are performance drawings, diagrammatic, and show approximate locations for equipment and materials. The drawings are intended to convey the scope of work and do not necessarily show architectural and structural details. The locations of materials and equipment shown may be altered (when revised layouts have been submitted and approved), to meet requirements of the material and/or equipment, other equipment and systems being installed, and of the building. Provide all fittings, offsets, conduit, boxes, conductors, and similar items required as a result of obstructions and other architectural or structural details but not shown on the electrical drawings.

1.04 PLANNING AND LAYOUT OF WORK

.1 The exact locations and routing of electrical and mechanical services are to be properly planned, coordinated and established with all affected trades prior to installation such that the services will clear each other as well as any obstructions.

.2 All boxes, receptacles, and similar products, particularly such products located above suspended ceilings, must be located for easy access for servicing and/or removal. Products which do not meet this location requirements are to be relocated at no cost.

1.05 CO-OPERATION & RELATIONSHIP WITH OTHER WORK AND TRADES

.1 Co-operate fully with all trades in such a manner as to not interfere with other work being carried on in the building. Where other work and equipment has to be installed along with electrical work, arrange with other trades to install this work to best suit the particular condition.

.2 Examine the architectural, structural, and mechanical drawings and specifications in conjunction with the electrical drawings and specifications and be satisfied that the electrical work as shown and specified can be performed without changes to the building.

1.06 QUALIFICATION OF TRADESMEN

.1 Maintain at the job site, at all times, qualified personnel and supporting staff, with proven experience in erecting, supervising, testing and adjusting projects of comparable nature and complexity.

.2 All apprentices must always be supervised by a qualified journeyman.

1.07 CODES AND STANDARDS

.1 All work is to be executed in accordance with all governing Codes, Standards, and By-laws.

.2 Where any Code, Regulation, By-law, or Standard is quoted it means the current edition including all revisions or amendments at the time of the Contract. Where references are made to printed directions or recommendations, it means the current edition of such directions and recommendations.

.3 All electrical items are to be CSA & CUL (or equivalent agency) certified electrically, or bear a stamp to indicate ESA approval.

1.08 SHOP DRAWINGS

.1 Refer to Division 01.

1.09 PERMITS, CERTIFICATES AND FEES

.1 Apply for, obtain and pay for all permits, licences, inspections, examinations and fees required.

.2 Arrange for inspection of all work by authorities having jurisdiction. On completion of the work, present to the Owner the final unconditional certificates of approval of the inspecting authorities.

.3 Before starting any work, submit the required number of copies of drawings and Specifications to the authorities for their approval and comments. Comply with any changes required as part of the Contract but notify the Consultant immediately of such changes for proper processing of these requirements. Prepare and furnish any additional drawings, details or information as may be required.

.4 Upon completion of the project, present to the Consultant a copy of all reports and a signed statement to the effect that all tests have been carefully carried out as required

by the Specifications and the manufacturer's recommendations and that the equipment and installations have been inspected by all jurisdictional authorities.

1.10 DOCUMENTS REQUIRED

.1 The following documents are to be submitted to the Consultant on completion of the project as described above:

- .1 Electrical Inspection Certificate
- .2 Fire Department Certificate
- .3 Fire Alarm Verification Certificate and report c/w sound level readings in dBA
- .4 As-Built Drawings and Disks
- .5 Data book
- .6 Guarantee
- .7 Service Equipment Coordination Certificates
- .8 Other Certificates Specified
- .9 Emergency lighting test report c/w light levels.

1.11 RECORD DRAWINGS

.1 Refer to Division 01.

.2 Show on the record drawings the installed invert of any underground electrical services entering and leaving the building and the property. Dimension underground services at key points of every run in relation to the structure and the building. Record elevations of the underground services in relation to the ground floor level of the building.

1.12 INSTRUCTION TO OWNER

.1 Instruct the Owner's representatives in all respects of the operation and maintenance of electrical systems and equipment. Obtain in writing from the Consultant a list of the Owner's representatives qualified to receive instructions.

.2 Arrange for, and pay for services of service engineers and other manufacturers' representatives required for instruction on specialized portions of the installation.

.3 Submit to Consultant at the time of final inspection, a complete list of systems, stating for each system:

- .1 date instructions were given to the Owner's staff
- .2 duration of instruction
- .3 name of persons instructed
- .4 other parties present (manufacturer's representative, consultants, etc.)

.4 The training shall be conducted over a minimum period of 16 hours and be completed prior to substantial performance. The Contractor shall provide a schedule, a list of systems and equipment for which training will be provided, names of people who will provide the training and an agenda for each session.

1.13 OPERATION AND MAINTENANCE MANUALS

.1 Refer to Division 01.

.2 Operations and Maintenance manuals shall be submitted and approved by the Consultant before training shall commence.

1.14 EXISTING CONDITIONS

.1 Before submitting tenders, carefully examine the drawings, Specifications and the job site to determine and confirm the existing conditions which will or may affect the proposed work. Claims for extra payment because of failure to fulfil this condition will not be considered. Existing conditions include, without being limited to, such items as: electrical power characteristics and location, soil conditions and space limitations.

.2 Note work performed by the Landlord and all work not performed by him as part of the Contract.

1.15 WORKPLACE SAFETY

.1 Comply with requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding the use, handling, storage and disposal of hazardous materials.

.2 Comply with all requirements of Ontario Regulation 213/91, Occupational Health and Safety Act and Regulations for Construction Projects.

.3 Submit WHMIS MSDS (Material Safety Data Sheets) for all products where required, and maintain one copy at the site in a visible and accessible location and available to all personnel.

1.16 WARRANTY

.1 Include for an overall 12 month warranty period for all electrical work materials and workmanship. The warranty period is to commence at Substantial Completion.

.2 Extended warranties, where applicable, are specified with equipment. Extended warranties will commence upon expiry of the standard 12 month warranty.

.3 All warranty work shall be scheduled with LCBO who will determine when the work shall commence. The work to be performed shall be documented and provided to the Consultant for review. All equipment, materials and systems shall conform to the specification requirements. The cost of all work shall be the responsibility of the Contractor.

1.17 PRODUCT AND PRODUCT MANUFACTURER REQUIREMENTS

.1 Products scheduled and/or specified have been selected to establish a performance and quality standard, and, in some instances, a dimensional standard. In most cases, acceptable manufacturers are stated for any products specified by manufacturer's name and model number. The tender price may be based on products supplied by any of the manufacturers named as acceptable for the particular product. If acceptable manufacturers are not stated for a particular product, base the tender price on the products supplied by the specified manufacturers.

.2 If products supplied by a manufacturer named as acceptable are used in lieu of the manufacturer specified, be responsible for ensuring that the substituted product is equivalent in performance and operating characteristics (including energy consumption if applicable) to the specified product, and, it is to be understood that any additional costs, and changes to associated or adjacent work resulting from provision of products supplied by a manufacturer other than the specified manufacturer is included in the tender price.

.3 Products required to have CSA, ULC, or other approval are to be properly marked or labelled indicating that the product has been approved.

1.18 ELECTRICAL POWER CHARACTERISTICS

.1 Unless otherwise shown or specified the permanent power supply is to be 600 volt, 3 phase, 4 wire, and 120/208 volt, 3 phase, 4 wire for final use.

.2 Confirm the characteristics of construction power supply.

PART 2: PRODUCTS

2.01 CONDUIT

.1 EMT (Thinwall), galvanized electrical metallic tubing to CSA C22.2 No. 83, complete with factory made bends where site bending is not possible, and joints and terminations made with compression gland type insulated connectors.

.2 Rigid galvanized steel to CSA C22.2 No. 45, with exterior zinc and interior enamel coatings, galvanized threads where factory cut, red lead coated threads where site cut, factory made bends where site bending is not possible, factory made and threaded fittings and connectors, and terminations made with rigid Ericson type couplings.

.3 Galvanized steel flexible liquid-tight metallic conduit to CSA C22.2 No. 56, complete with Ideal “Steel Tough” liquid-tight flexible conduit connectors at terminations.

.4 CSA approved and labelled rigid plastic (PVC) conduit complete with site made heat gun bends for conduit to 50 mm diameter, factory made elbows in conduit larger than 50 mm diameter, solvent weld joints, factory made expansion joints where required, and terminations made with proper and suitable connectors and adaptors.

2.02 UNDERFLOOR DUCT

.1 Wiremold Walkerduct No. 2 and No. 4 CSA certified galvanized steel underfloor duct system complete with 63 mm diameter preset service fittings, mud cap and all required supports, end closures, 90 degree elbows and conduit adapters at office wall termination and similar hardware. Refer to “Walker Duct” details enclosed. Alternate Manufacturer: Nocom ‘Multiduct” system.

2.03 WALL AND CEILING OUTLET BOXES

.1 CSA approved stamped galvanized steel outlet boxes, as follows:

.1 100 mm octagonal or square for ceiling boxes complete with 9.5 mm dia. fixture stud where required
.2 100 mm square with plaster rings for recessed switches and receptacle in plaster walls
.3 masonry boxes for recessed switch, receptacle, and similar device boxes in masonry walls

.2 For applications where outlet boxes will be exposed in the Retail Area, 100 mm, single-gang, die-cast aluminium box for wall or pole mounting complete with two spare entry plugs. Silver-grey powder coat paint finish. RDA Lighting Inc. D5634 3/4" or approved equal.

.3 Each outlet box must be suitable in all respects for the application, and complete with suitable securing lugs, connectors suitable for connected conduit, knockouts and, where necessary, suitable concrete rings, covers and any other required accessory.

2.04 NOT USED

2.05 FLOOR OUTLET BOXES

.1 Wiremold Walkerduct Series 880 floor boxes, each adjustable prior to and after the concrete pour, and each complete with a #895T brass duplex coverplate. Or equal by Nocom.

2.06 PULLBOXES AND JUNCTION BOXES

.1 Galvanized or prime coast plated steel, suitable in all respects for the application and complete with screw-on or hinged covers as required and connectors suitable for connected conduit.

.2 Crouse-Hinds Canada Ltd. “Condulet”, threaded cast Feraloy pull boxes and junction boxes of an exact type to suit the application, each complete with screw-on gasketed cover.

.3 The physical size of pullboxes is to be in accordance with requirements of the OESC to suit the number and size of conduits and conductors.

2.07 CONDUCTORS AND CONNECTORS

.1 “T90 Nylon” single copper conductor to CSA C22.2 No. 75, colour coded, 90 degrees C rated, PVC insulated and nylon covered.

.2 “RW90” CSA certified, single copper conductor to CSA C22.2 No. 38, 90 degrees C rated X-link polyethylene insulated, colour coded

.3 “AC-90” flexible armoured cable with “RW-90” conductors and bare copper ground conductor to CSA C22.2 No. 51 (Bulletin No. 994).

.4 Conductors to and including No. 12 AWG are to be solid. Conductors in sizes larger then No. 12 AWG are to be stranded. All branch circuit conductors are to be constructed of 98% conductive copper and are to be approved for 600 volts.

.5 Armoured cable connectors are to be proper squeeze type connectors and plastic anti-short bushings at terminations.

.6 Connectors for conductors in conduit are to be, unless otherwise specified, IDI Electric (Canada) Ltd. "Ideal" No. 451, No. 452 and No. 453, "Wing-Nut", CSA certified, 600 volts rated pressure type connectors.

2.08 LOW VOLTAGE (24 VOLT) CONDUCTORS

.1 ULC listed and labelled, CSA certified to C22.2 No. 127, No. 18 AWG "TEW" thermoplastic insulated, solid copper wire rated for 600 volt service, and 105 degrees C complete with the required number of copper conductors and colour coding.

.2 Alcatel Canada Wire Ltd. "Securex II", FAS 105, 300 volt, 105 degree C rated fire alarm system flexible armoured cable with solid copper conductor, flame retardant PVC insulation, and red colour outer jacket, ULC listed and labelled and CSA certified to C22.2 No. 208. Cable is to be complete with an overall jacket.

2.09 CONDUCTOR PULLING LUBRICANT

.1 IDI electric (Canada) Ltd. " Ideal Yellow 77" or "Wire Lube" as required.

2.10 LOCAL LIGHTING SWITCHES

.1 Unless otherwise specified, DECORA decorator rocker type switches, 20 ampere rated, 120 volt AC, premium quality, Specification grade, white, complete with matching faceplates. Acceptable manufacturers are:

.1 P & S
.2 Bryant
.3 Or approved alternate

2.11 NOT USED

2.12 NOT USED

2.13 SWITCH AND PILOT LIGHT

.1 Specification grade, premium quality, 15 ampere, 120 volt toggle type switch with a nylon faceplate (white) and a neon lamp with red lens, and connected such that the lamp is illuminated when the switch is on.

2.14 RECEPTACLES

.1 Unless otherwise specified, DECORA decorator type, U-ground, premium quality, heavy-duty, Specification grade, white, 15 ampere, 120 volt receptacles, single or duplex as shown, each suitable for side or back wiring and complete with captive mounting screws and a matching faceplate. Acceptable manufacturers are:

.1 P & S
.2 Bryant
.3 Lutron
.4 Or approved alternate

.2 As above but standard shape in lieu of decorator type.

.3 Specification grade, 15 ampere, 125 volt, duplex, premium quality, orange isolated ground receptacles, each suitable for side or back wiring and complete with a one-piece mounting strap and a white nylon faceplate.

.4 Specification grade, 15 ampere, 125 volt, duplex, premium quality, GFCI receptacles, each suitable for side or back wiring and complete with a one-piece mounting strap and a white nylon faceplate.

2.15 ACCESS DOORS

.1 Minimum No. 12 gauge prime coat painted steel flush access doors, each complete with a heavy frame and anchor, heavy duty rust-resistant concealed hinges, a positive locking screwdriver lock, and mounting and finishing provisions to suit the particular construction in which it is installed. Access door sizes shall suit the concealed work for which they are supplied. Access doors in fire rated ceilings, walls, partitions, structures, etc., are to be ULC listed and labelled and of a rating to maintain the fire separation integrity.

2.16 FASTENING AND SECURING HARDWARE

.1 Concrete fasteners – "WEJ-IT" anchors, lead cinch anchors and/or "STAR" or "PHILLIPS" self-drilling anchors.

.2 Masonry inserts – "WEJ-IT" expansion shields and machine bolts or, for light loads, fibre or lead plugs and screws.

.3 Drywall or plaster wall and/or ceiling fasteners – 2-wing spring toggles.

.4 Structural steel – Crane Canada Ltd., beam clamps.

2.17 IDENTIFICATION NAMEPLATES

.1 Laminated plastic (Lamacoid) white-black-white (black text on white background unless otherwise noted) with bevelled edges, stainless steel screws, and clear proper identification engraving. Each nameplate is to be sized to suit the equipment for which it is provided, and the required wording. Provide nameplates for all electrical service switches, sensors/mechanical controls, panels, contactors, office switches controlling lights, screens and security shutters. Lamacoids for any electrical outlets, controls and switches must be placed below the cover plate (not on the cover plate). Fit-up contractor to install nameplates on all landlord supplied equipment. Text height shall be 3mm for switches/outlets, 6mm for all other equipment and 25mm high with 6mm stroke width for warning/instruction nameplates. Refer to Table 1 below for details.

Table 1: Lamacoid Label Details

Item	Text to be Listed on Lamacoid	Text Height (mm)
Electrical Outlets	Panel and circuit number *(Example: 2A-12).*	3
Staff Rm Exhaust Fan Switch	EXHAUST FAN TIMER	3

Washroom Light Switches	MANUAL–ON AUTO-OFF	6
Washroom Wall Mounted Occupancy Sensors	AUTO-ON AUTO-OFF	6
Office Occupancy Sensor	CEILING - AUTO-ON AUTO-OFF VALENCE - MANUAL-ON AUTO-OFF	6
Emergency Test Light Button	EMERGENCY LIGHTS – PUSH TO TEST *(This lamacoid shall be red with white text).*	6
Security Shutters	SECURITY SHUTTER #X *(please note, #1 is closest to the office)*	3
Sun Shade	SUN SHADE	3
Power-Fail Phone Jack	POWER-FAIL PHONE JACK	3
Scanner Gun Outlet	SCANNER GUN OUTLET	3
Hydro Meter	LCBO HYDRO METER	6
Warehouse Ceiling Fan Switch	CEILING FANS, panel and circuit number	6 for name, 3 for panel and circuit number
Rooftop Exhaust Fans	EF-X, panel and circuit number *(note "X" will depict the item number)*	6 for name, 3 for panel and circuit number
Roof Top Unit	RTU-X, panel and circuit number	6 for name, 3 for panel and circuit number
Rooftop Refrigeration Unit (Kooljet), Walk-In Coldroom	WIC-AC-X, panel and circuit number	6 for name, 3 for panel and circuit number
Rooftop Condensing Unit, Walk-In Coldroom	WIC-CU-X, panel and circuit number	6 for name, 3 for panel and circuit number
Rooftop Refrigeration Condenser – Reach-In Case Refrigerator	RIC-CU-X, panel and circuit number	6 for name, 3 for panel and circuit number
Warehouse Unit Heater	UH-X, panel and circuit number	6 for name, 3 for panel and circuit number
Gas Meter	LCBO GAS METER	6
Water Meter	LCBO WATER METER	6
Domestic Water Shut-Off Valve	LCBO WATER SHUT-OFF	6
Trap Seal Primer	TRAP SEAL PRIMER, panel and circuit number	6 for name, 3 for panel and circuit number
Eye Wash Mixing Valve	EYE WASH MIXING VALVE	6
Battery Unit	BU-X, panel and circuit number *(This lamacoid shall be red with white text).*	6 for name, 3 for panel and circuit number

Reach-In Case Refrigerator Indoor Units	RIC-EVAP-X, panel and circuit number	6 for name, 3 for panel and circuit number
Open / Cold Beer Sign's Switch	OPEN/COLD BEER SIGN, panel and circuit number	3 for name, 3 for panel and circuit number
Electrical Panels	Panel and Voltage *(example: PANEL-2A, 208V)*	6
THC Unit and THC Remote Condenser	THC, panel and circuit number	6 for name, 3 for panel and circuit number
Phase Loss Box	PHASE LOSS	6
TVSS	TVSS, panel and circuit number	6 for name, 3 for panel and circuit number
Kooljet PLC	WIC-HMI, panel and circuit number	6 for name, 3 for panel and circuit number
Retail Area Sensors	Item identification *(note, labels supplied and installed by BAS contractor)*	**3**
Office Lights	OFFICE LIGHTS	3
Vestibule Electric Heater	VEST-HTR, panel and circuit number	6 for name, 3 for panel and circuit number
Vestibule Supply Fan	VEST-SF, panel and circuit number	6 for name, 3 for panel and circuit number
Vestibule Supply Fan Filter	FAN FILTER	6
Baseboard Heaters	BBH-X, panel and circuit number	6 for name, 3 for panel and circuit number
Domestic Hot Water Heater	HWT-X, panel and circuit number	6 for name, 3 for panel and circuit number
Forced Flow Heater	FFH-X, panel and circuit number	6 for name, 3 for panel and circuit number
Heat Pumps	HP-X, panel and circuit number	6 for name, 3 for panel and circuit number
Fan Coil Units	FCU-X, panel and circuit number	6 for name, 3 for panel and circuit number
Thermostat / Remote Sensors	Item identification	3

2.18 FIRESTOPPING AND SMOKE SEAL MATERIALS

.1 Asbestos-free elastomeric materials, test, listed and labelled by ULC in accordance with CAN 4-S115-M85, for installation in ULC designated firestopping and smoke seal systems to provide a positive fire, water and smoke seal and a fire resistance

rating (flame, hose stream and temperature) not less than the fire rating for surrounding construction.

.2 Materials are to be compatible with abutting dissimilar materials and finishes.

.3 Acceptable manufacturers are Instant Firestop Inc., Dow Corning Canada Inc., 3M Canada Inc. and Fire-Stop Systems (Canstrut Inc.).

2.19 NOT USED

2.20 NOT USED

PART 3: EXECUTION

3.01 GENERAL CONDUIT AND CONDUCTOR INSTALLATION REQUIREMENTS

.1 Unless otherwise specified, locate and arrange horizontal conduits and conductors above or at the ceiling on floors on which they are shown, arranged so that under consideration of all other work in the area, the maximum ceiling height and/or usable space is maintained.

.2 Unless otherwise specified, install all work concealed in finished spaces, and concealed to the degree possible in partially finished and unfinished spaces. Refer to and examine the Architectural drawings and room finish schedules to determine finished, partially finished, and unfinished areas. Note that walls which are painted are considered finished.

.3 Conduit and main distribution feeders (as approved by Consultant) may be exposed in unfinished areas such as electrical and mechanical rooms, unless otherwise noted on the drawings or specified herein.

.4 Install all conduits and conductors parallel to building lines.

.5 Neatly group and arrange all exposed work.

.6 Locate all electrical devices which will or may need maintenance or repairs and which are installed in accessible construction so as to be easily accessible from access doors.

.7 Ensure that equipment and material manufacturers' installation instructions are followed unless otherwise specified herein or on the drawings, and unless such instructions contradict governing codes and regulations.

.8 Temporarily pack all open boxes located in concrete, plaster and masonry to prevent debris from entering the box.

.9 All isolated ground circuits must contain separate phase, neutral and ground conductors (i.e.: common neutral configuration is unacceptable). Conductors are to be minimum No. 12 AWG and No. l0 AWG for runs longer than 15 m.

.10 Inspect surfaces and structure prepared by other trades before performing your work. Verify that surfaces or the structure to receive your work have no defects or discrepancies which could result in poor application or cause latent defects in installation and workmanship. Report defects in writing. Installation of work will constitute acceptance of such surfaces as being satisfactory.

3.02 INSTALLATION OF CONDUIT

.1 Unless otherwise specified, provide conduit for all conductors.

.2 Conduit is to be as follows:

.1 "AC-90" flexible armoured cable ("BX") – (MAXIMUM PERMITTED RUN 1.5m) in accessible suspended ceiling spaces, in stud wall construction to ceiling spaces and wherever else shown. Support "BX" armoured cabling with two hole cable straps to "Code" requirements for runs in celing space and in stud wall construction.

.1 all conduit exposed outside the building, all conduit inside the building for electric service conductors, and all other conduit exposed inside the building and less than 1.8 m above the finished floor – rigid galvanized steel

.2 all underground conduit – rigid PVC

.3 for short branch circuit connectors to motorized equipment and distribution transformers, minimum length 450 mm, maximum length 600 mm with 180 degree loop where possible – galvanized steel flexible liquid-tight conduit

.4 at points where conductors cross building expansion joints – galvanized steel flexible conduit

.5 for conduit except as noted above – EMT

.3 Provide a separate ground conductor in all plastic conduit.

.4 Support underground conduit on a well tamped flat bed of earth, free rocks or protrusions of any kind.

.5 Support and secure surface mounted and suspended single or double runs of metal conduit at support spacing in accordance with OESC requirements by means of galvanized pipe straps, conduit clips, ring bolt type hangers, or by other proper manufactured devices.

.6 Support multiple mixed size metal conduit runs with Unistrut Ltd., Electovert Ltd. "CANTRUSS" or Burndy Ltd. "FLEXIBLE" conduit racks spaced to suit the spacing
requirements of the smallest conduit in the group.

.7 Unless otherwise noted, conduit fittings are to be constructed of the same material as the conduit and are to suitable in all respect for the application.

.8 Provide proper adaptors for joining conduits of different materials.

.9 Cut square and properly ream all site cut conduit ends.

.10 Where conductor sizes are increased to suit voltage drop requirements, increase the scheduled of specified conduit size to suit.

.11 Site made bends for all conduit must maintain the full conduit diameter with no kinking, and conduit finishes must not flake or crack when the conduit is bent.

.12 Plug ends of roughed-in conduit which are exposed during construction with approved plugs.

.13 Ensure that all conduit systems which are left empty for future wiring are clean, clear, capped and properly identified at each termination point. Provide end bushing and suitable fish wire in all such conduit.

.14 Provide two 25 mm dia. empty conduits to ceiling spaces from flush mounted

panelboards located below and/or near a hung ceiling.

.15 Install horizontal conduit so that it can drain, without pockets in which water can collect.

.16 Locate conduits at least 150 mm clear of hot pipes, flues, and other such hot materials.

3.03 CONDUIT EXPANSION FACILITIES

.1 Wherever concealed or surface mounted conduits cross building expansion joints, and in maximum 30 m intervals in straight runs of conduit 30 m or longer, provide flexible conduit and expansion facilities to permit free movement without imposing additional stress or loading upon the support system, and to prevent excessive movement at joints and connections.

3.04 INSTALLATION OF UNDERFLOOR DUCT

.1 For all stores with five or more cash stations, provide underfloor duct. Provide one No. 2 duct for power and one No. 4 duct for combination voice/data/call bell wiring for each cash station. Confirm exact locations prior to installation. Refer to sketch drawings SK03 - 26 24 13, SK07 - 26 24 13 and SK09c - 26 24 13.

.2 Install duct using adjustable saddle supports at maximum 1.5 m spacing to align and level the ducts such that the top of the raceway duct inserts are within 3 mm of the surface of the finished concrete floor.

.3 Waterproof all duct joints at couplings, end enclosures, junction assemblies, etc., using waterproof compound supplied by the duct manufacturer and applied in accordance with manufacturer's recommendations and instructions.

.4 Prior to the concrete pour, ensure that the duct system is level and properly aligned and secured in place such that it will not float or move during the concrete pour, ensure that it is completely watertight, and ensure that it is clean and clear of all obstructions and moisture. Be present at the site during all concrete placement and finishing work to ensure that the duct is not damaged or displace during the concrete pour.

.5 Provide 76 mm diameter aftersets fittings and mud caps at each Cash and Customer Service desk.

.6 Provide separate ground conductors in all under floor ducts.

3.05 NOT USED

3.06 INSTALLATION OF WALL & CEILING OUTLET BOXES AND BACK BOXES

.1 Provide an outlet box or back box for each luminaire, wiring device, telephone outlet, fire alarm system component, communications systems components, and any other such outlet.

.2 Outlet boxes shall be flush mounted in interior construction and surface mounted in concealed interior locations. For applications where outlet boxes will be exposed in the Retail Area, outlet boxes shall be die-cast aluminum with silver-grey power coat

paint finish.

.3 Outlet boxes for surface mounted exterior lighting, receptacles, and other device outlets, boxes flush mounted in exterior building surfaces, and boxes mounted in interior device locations where the connecting conduit is rigid, and for boxes in perimeter walls where insulation and vapour barrier is present, are to be "FS" or "FD" Series cast boxes unless otherwise noted.

.4 Do not install outlet or back boxes "back-to-back" in walls and partitions. Stagger such outlets and seal against noise transmission. "Thru-wall" type boxes will not be permitted for any application.

.5 The horizontal location of switches, thermostats, sensors, outlets and control devices are shown diagrammatically only, and are subject to change without extra cost providing information is given prior to installation. Outlets may be relocated up to 3 m from the original location, without change in price, as directed by the Consultant or LCBO Design Coordinator. Architectural drawings and the Consultant's or LCBO Design Coordinator's instructions have precedence over electrical drawing diagrammatic layouts.

.6 The responsibility for ensuring that all switches, thermostats and other controls are kept as close to door jambs and other openings as possible and for checking door swings prior to installation and locating switches on the lock side of the door, rests with the Contractor.

.7 Provide blank coverplates in finished areas, on existing obsolete boxes which are to remain in position.

3.07 INSTALLATION OF FLOOR OUTLET BOXES

.1 Provide flush floor outlet boxes in concrete floors where shown or required for a work station or activation location.

.2 Accurately locate floor boxes and confirm exact locations prior to installation. Include brass "dead front" protection covers with receptacle covers and adjust so that the plates are flush with the finished floor. Confirm floor finish with the Consultant.

.3 For each floor box provide a 20 mm dia. empty PVC conduit to run from below the floor to the nearest building wall, up within the wall to minimum 3.9 m above the finished floor, then at least 2 m in towards the store open area. Include a fishwire in each conduit.

3.08 INSTALLATION OF PULLBOXES AND JUNCTION BOXES

.1 Provide pullboxes in conduit systems wherever shown on the drawings, and/or wherever necessary to facilitate conductor installations. Generally, conduit runs exceeding 30 m in length, or with more than three 90 degree bends are to be equipped with a pullbox installed at a convenient and suitable intermediate accessible location.

.2 Provide junction boxes wherever required and/or indicated on the drawings, including the following for the Manager's Office:

.1 a 200 mm square, 65 mm deep junction box for connection of lighting

circuits to switches

.2 a 200 mm square, 65 mm deep junction box for connection of cash receptacles

.3 Boxes in rigid conduit and EMT inside the building are to be stamped galvanized or prime coated steel.

.4 Boxes in exterior rigid conduit are to be "Condulet" cast gasketed boxes unless otherwise noted.

.5 Boxes in plastic conduit are to be rigid PVC plastic boxes.

.6 All pullboxes and junction boxes must be accessible after the work is completed.

.7 Accurately locate and identify all concealed pullboxes and junction boxes on "as-built" record drawings.

.8 Clearly identify main pull or junction boxes (excluding obvious outlet boxes) by spray painting the outside of the covers. Paint colours are to be as directed by the Consultant or LCBO Design Coordinator.

.9 Provide 16x16x8 junction box for BAS transducer.

3.09 INSTALLATION OF CONDUCTORS

.1 Provide all required conductors.

.2 Conductors, unless otherwise noted, are to be as follows:

.1 for isolated power system load side wiring – "RE90"

.2 for all wiring except as noted above or except as specified elsewhere – "T90 Nylon

.3 Splicing of conductors #8 AWG and larger is to be done with solderless pressure type splicing connectors of the split bolt or compression sleeve type. Splices are to be insulated with filler putty and minimum of two half-lapped layers of vinyl plastic tape. Compression joints are to be made using approved hydraulic tools to assure a permanent mechanically secure high conductivity joint.

.4 Conductors up to and including #10 AWG are to be joined with hand twist plastic insulated pressure connectors having expandable tapered spring and extended skirt. Hand twist joints will not be permitted with conductors larger than #10 AWG and the number of size of conductors within each connector is to be in accordance with the manufacturer's recommendations. Set screw connectors will not be allowed for this type of joint.

.5 Generally, conductor sizes are indicated on the drawings. Such sizes are minimum requirements and must be increased, where required, to suit the length of run and voltage drop.

.6 Colour code conductors throughout to identify phases, neutrals and ground by means of self-laminating coloured tape, coloured conductor insulation, or properly secured coloured plastic discs. Colours, unless otherwise noted, are to be as follows:

.1 phase A – red

.2 phase B – black

.3 phase C – blue

.4 ground – green

.5 neutral – white
.6 control – orange

.7 Colours for isolated power system "load" side power wiring are to be as follows:
.1 live No. 1 – ivory
.2 live No. 2 – orange
.3 ground – green

.8 When pulling wires into conduit, use lubricant and ensure that wires are kept straight and are not twisted or abraised.

.9 Use "French Chalk" or "Talcum Powder" only for pulling in isolated power system "load" side wiring.

3.10 INSTALLATION OF LOW VOLTAGE CONDUCTORS

.1 Provide all required low voltage conductors.

.2 Low voltage conductors are to be No. 18 AWG "TEW" except for use in fire alarm system applications and unless otherwise noted. Provide specified fire alarm cables for fire alarm system applications or security system applications as approved by Code and local governing authorities.

.3 Install all low voltage conductors in conduit unless otherwise noted. All conductors not installed in conduit must be FT fire rated in accordance with governing Code flame spread and smoke developed requirements.

.4 Colour code conductors for communications systems in accordance with the system component manufacturer's recommendations.

3.11 INSTALLATION OF LOCAL LIGHTING SWITCHES

.1 Provide identified sensor switch in the office

.2 Locate switches for security shutters and window shades in the Office.

.3 Unless otherwise specified, switches are to be decorator type, white on horizontal surfaces, cream colour on vertical surfaces, and complete with matching faceplates.

.4 Unless otherwise noted, switches and control devices mounting heights shall be not less than 900 mm and not more than 1200 mm above floor.

.5 Ensure that switches located adjacent to doors are located at the strike side of the door. Confirm door swing requirements on the architectural drawings, not on the electrical drawings.

3.12 NOT USED

3.13 NOT USED

3.14 INSTALLATON OF RECEPTACLES

.1 Provide all required receptacles.

.2 Unless otherwise specified or shown, receptacles are to be white on horizontal surfaces, cream colour on vertical surfaces, and equipped with matching faceplates.

.3 Floor, ceiling and isolated ground receptacles are to be standard shape. All other

receptacles are to be decorator type.

.4 For the Office layout, include receptacles as follows:
- .1 isolated ground duplex receptacles for a CPU, printer, and a computer
- .2 receptacles for stereo equipment
- .3 a receptacle for a Demo Kitchen grease interceptor control panel.
- .4 receptacles for general use

.5 Provide GFI duplex receptacle at Bell telephone backboard.

.6 Provide a separate insulated ground wire for each isolated ground receptacle.

.7 Where dishwashers and other appliances are required, provide appropriate receptacles.

.8 Provide GFCI duplex receptacles where receptacles are located within 1m of any water source.

3.15 SUPPLY OF ACCESS DOORS

.1 Supply access doors to give access to all junction boxes, pullboxes, conductor joints, transformers and other similar electrical work which may need maintenance or repair but which is concealed in inaccessible construction. Not all access doors are shown on drawings. It is the responsibility of the electrical contractor to include price of all required access doors in their price. No extra will be allowed for failure to do so.

.2 Access doors will be installed by the trade responsible for the particular type of construction in which the doors are required. Supply the access doors to the trade installing same at the proper time.

3.16 INSTALLATION OF FASTENING AND SECURING HARDWARE

.1 Provide all fasteners and similar hardware required for conduit, conductors, etc., and for equipment hanger and/or support material unless otherwise noted.

.2 Explosive powder actuated fasteners will not be permitted unless specific written approval for their use and type has been obtained from the Consultant.

.3 Under no circumstances use ceiling suspension hangers or grids for the suspension or support of conduit and conductors.

3.17 INSTALLATION OF IDENTIFICATION NAMEPLATES

.1 For each piece of electrical distribution equipment from the electrical source of supply up to and including panelboards, for special control panels and cabinets, and for each other piece of electrical equipment, provide engraved Lamacoid identification nameplates secured to apparatus with stainless steel screws. Nameplates are to indicate the equipment designation and the source of electrical supply.

.2 Panelboard nameplates are to identify the panelboard number as designated on the drawings, unless otherwise instructed. Nameplates for disconnect switches, control panels, and cabinets are to outline their service and source of supply.

.3 Provide self-adhesive identification labels on the inside and outside of each device outlet faceplate, identifying the location from which each device is fed.

3.18 GENERAL ELECTRICAL WORK TESTING

.1 In addition to the tests required by the governing authorities, Codes and Regulations, perform the following:

.1 after all luminaries, switches, receptacles, motors, signals, etc., are installed, whether same are installed as part of this Section of the work or by other Sections (telephone systems excepted), test all work to ensure that there are no grounds or crosses

.2 establish and ensure proper motor rotation – measure full load running currents and check overload elements – report to the Consultant any discrepancies which are found.

.3 Document all tests on associated forms and submit to the Consultant and Commissioning Agent for review and approval.

.4 Verify the electrical voltage, prior to beginning of fit up construction and at the end of construction/project completion.

3.19 BRANCH CIRCUIT BALANCING

.1 Connect all branch lighting and power circuits to panelboards so as to balance the actual (wattage) within 5%. If required, transpose branch circuits when the work is complete to meet this requirement.

.2 At the request of the Consultant, perform all necessary tests to show the above requirement has been fulfilled. Make such tests after the building is occupied.

.3 Record all measurements on the associated forms and submit to the Consultant and Commissioning Agent for review and approval

3.20 CONCRETE WORK FOR ELECTRICAL SERVICES

.1 Provide all concrete work, including reinforcing and formwork required for electrical work.

.2 All concrete work is to be in accordance with requirements of Division 03 unless otherwise specified.

3.21 CUTTING AND PATCHING FOR ELECTRICAL WORK

.1 All cutting and patching of building surfaces required for electrical work, including core drilling walls, and slabs for conduit will be done as part of another Division of the work, however, the cost for such cutting and patching is to be included in the cost for the electrical work.

3.22 INSTALLATION OF FIRESTOPPING AND SMOKE SEAL MATERIALS

.1 Where electrical work penetrates or punctures new and or existing fire rated construction, provide ULC certified, listed and labelled packing material to seal holes and voids in the walls or slabs and within the raceway to ensure that the continuity and integrity o the fire separation is maintained. If required by

Consultant, submit certificates of compliance from an independent testing agency, attesting that the firestopping and smoke seal materials meet ULC requirements.

.2 Install fire stopping and smoke seal materials in accordance with ULC certification and the manufacturer's instructions. Comply with OBC requirements and obtain approvals from local Building Inspection Department. Ensure that openings through fire separations do not exceed the maximum size wall opening, and maximum and minimum dimensions, indicated in ULC Guide No. 40 U19 for Service Penetration Assemblies and fire stopping materials.

.3 Install fire stopping and smoke seal materials in accordance with ULC certification and the manufacturers instructions. Ensure that the continuity and integrity of the fire separation is maintained and conforms to the requirements of the latest edition of ULC publication "List of Equipment and Materials", Volume II, Building Construction.

.4 Work is to be executed by a qualified applicator approved by the material manufacturer.

3.23 QUALITY CONTROL AND COMMISSIONING

.1 The Quality Control and Commissioning section 00 45 00 shall apply to this section.

.2 The electrical systems to be commissioned shall include:

- .1 Testing of the power distribution
- .2 Testing of the lighting system
- .3 Functional testing demonstration
- .4 Seasonal commissioning

END OF SECTION

Note, the following is for reference, final locations and quantities to be confirmed with LCBO Design Coordinator

LCBO STORE CABLING (updated 14/11/2006) **SECTION 26 05 00.03**

▲ = voice Δ = data

Cash lane	▲Δ	**Each**	
Customer service desk	▲Δ	**On side closest to cash lane**	
	▲ΔΔ	**On other side of customer service desk**	
Office	▲Δ	**Every seat in office including printer**	
	▲	**CA38a jack above DVR**	**locate in ceiling space above door - homerun back to demark**
	▲	**Power fail jack**	**locate above desk**
	Δ	**DVR drop**	**locate in security cabinetry on wall**
	Δ	**Line cut drop**	**locate in ceiling space above door**
		Coax from 0-1 terminated on back wall at cabinet.	**Hi-speed for Rogers**
Vintages	▲Δ	**Where required**	
Licensee desk	▲ΔΔΔ	**Where required**	
Access point (1)	Δ	**Retail area**	**locate centrally towards back of store**
(2)	Δ	**Warehouse area**	**locate 10' up on wall inside warehouse door**
Lunchroom	▲	**Inside or outside lunchroom**	**Locate 54" up wall**
25 pair backbone		**0-1 to GREEN patch panel in office cab**	
Dist Mgr's Office	▲ΔΔ	**Where required**	
Dist Mgrs Admin Asst	▲ΔΔ	**Where required**	
BAS System	Δ	**Where required**	**Beside BAS Panel**

CABINET

Full Service store	**RFM3022**	
New Image store	**RFM3022**	
Rural Community store	**AX100282**	**Mount on wall next to server**

PART 1: GENERAL

1.01 REFERENCES

.1 CSA C9, Dry Type Transformers.
.2 CSA C802.2, Minimum Efficiency Values for Dry-Type Transformers.
.3 ASA No. 61, Grey Colour.
.4 CSA C22.2 No. 29, Panelboards and Enclosed Panelboards.
.5 CSA C22.2 No. 5, Moulded Case Circuit Breakers.
.6 Refer to Section 26 05 00.

1.02 SHOP DRAWINGS

.1 Submit shop drawings for all products specified in Part 2 of this Section.
.2 For distribution transformers submit a detailed and dimensioned shop drawing for the suspended mounting platform assembly with vibration isolation. The shop drawing is to be prepared by and stamped by a professional structural engineer registered in the Province of Ontario.

PART 2: PRODUCTS

2.01 **NOT USED**

2.02 NOT USED

2.03 NOT USED

2.04 NOT USED

2.05 DISTRIBUTION CONDUCTORS

.1 Distribution conductors are to be as specified in Section 26 05 00, and CSA type "RA90" (X-LINK) Alcatel Canada Wire Inc., "CORFLEX II" cable suitable for 1,000 volt service and consisting of cross-linked polyethylene insulated single copper conductors, 90 degrees C. rated, enclosed by a continuous extruded corrugated aluminium sheath with an overall PVC jacket.
.2 Acceptable manufacturers are:
  .1 Alcatel Canada Wire Inc.
  .2 Phillips Cables Ltd.
  .3 ITT Royal Electric Division
  .4 Or approved alternate

2.06 NOT USED

2.07 CONTACTORS

.1 Cutler-Hammer Canada CSA approved, magnetically latched, full voltage contactors, Series A201 non-reversing type for heating and motor loads, and Series A202 for lighting loads. Each contactor is to be suitable in all respects for the application and complete with an EEMAC 2 sprinkler-proof enclosure with the

necessary accessories. The ampere rating, number of poles, etc., for contactors is to be as noted on the drawings. Standard warranty period of 1 year from the date of purchase.

.2 Acceptable manufacturers are:
- .1 Cutler-Hammer Canada
- .2 Schneider Canada
- .3 Siemens Electric Ltd.
- .4 Or approved alternate

2.08 NOT USED

2.09 DISCONNECT SWITCHES

.1 Cutler-Hammer Canada heavy duty, sprinkler-proof, CSA approved, front operated with a handle suitable for padlocking in the "OFF" position and arranged so that the enclosure cover cannot be opened while the handle is in the "ON" position. Operating mechanisms are to be quick-break, positive acting with visible blades and a line terminal shield. Fusible units are to be complete with fuse clips suitable for HRC fuses, unless otherwise noted. The ampere rating, number of poles and fuse requirements are to be as indicted on the drawings. Standard warranty period of 1 year from the date of purchase.

.2 Acceptable manufacturers are:
- .1 Cutler-Hammer Canada
- .2 Schneider Canada
- .3 Siemens Electric Ltd.
- .4 Or approved alternate

2.10 FUSES

.1 Unless otherwise indicated, fuses are to be equal to English Electric Ltd., Form I, Class "J" HRC fuses for constantly running equipment, and Form II, Class "C" fuses for motor equipment that cycles "ON" and "OFF".

2.11 NOT USED

2.12 NOT USED

2.13 DOUBLE VOLTAGE RELAYS

.1 Double voltage relays are to be complete with an EEMAC 2 enclosure except where shown otherwise. Relays are to be heavy-duty, long life type with silver to silver contacts, and contact arrangements, time delay and current ratings to suit control requirements.

2.14 NOT USED

2.15 LIGHTING CONTROL SYSTEM FOR NON-BAS STORES

.1 Basic Timer/Contactor System. Refer to Detail 26 24 13.25:
- .1 Provide 4-Channel Timer, 2hr Time-delay Override Switches and a multi-pole Contactor.
- .2 Provide 2hr time-delay override switch for lighting contactors.
- .3 Not Used
- .4 Not Used
- .5 Not Used
- .6 Provide occupancy sensors for Washroom, Janitor Room and Staff Room/Kitchen lighting control.
- .7 Acceptable manufacturers are:
  - .1 Timer: Tork #DLC400BP Timeclock T-1, 4-Channel.
  - .2 Timer Override Switches: Tork #SSA200 Timed Override Switch.
  - .3 Contactor: Siemens LE Lighting Contactors, 60A, minimum 8 Pole. Siemens Cat. #LEN01D006_B c/w equivalent coil.

2.16 NOT USED

2.17 SHOCK AND ARC FLASH PROTECTION

.1 General:
- .1 Provide for electric shock and arc flash protection as required by local governing electrical code and authorities.
- .2 Determine severity of potential exposure, planning safe work practices and selecting personal protective equipment under general guidelines of governing edition of CSA Z462.
- .3 Design safety signs and labels for applications to equipment under general guidelines of ANSI Z535.4.
- .4 Determine arc flash hazard distance and incident energy that workers may be exposed to from electrical equipment under general guidelines of IEEE 1584.
- .5 Incorporate documentation with distribution system testing and coordination report.
- .6 Acceptable companies to provide this work are same as those listed for distribution system testing and coordination study work.

.2 Arc Flash Hazard Analysis:
- .1 Perform Arc Flash Hazard analysis according to IEEE 1584equations that are presented in NFPA70E, Annex D.
- .2 Retrieve short circuit calculations and clearing times of phase overcurrent devices from short circuit and coordination study specified previously.
- .3 Calculate flash protection boundary and incident energy at significant locations in electrical distribution system (switchboards, switchgear, motor-control centres, panelboards, busway and splitters) where work could be performed on energized parts.
- .4 Arc-Flash Hazard Analysis to include significant locations in 240 V and 208 V systems fed from transformers equal to or greater than 125 kVA.

.5 Specify safe working distances for calculated fault locations based upon calculated arc flash boundary considering incident energy of 1.2 cal/cm2.

.6 Include Arc Flash Hazard analysis calculations for maximum and minimum contributions of fault current magnitude. Minimum calculation to assume that utility contribution is at a minimum and a minimum motor load. Conversely, maximum calculation to assume a maximum contribution from utility and motors to be operating under full-load conditions. Other switching scenarios are to be included as necessitated by power system design and layout.

.7 Arc Flash computation to include both line and load side of main breaker calculations, where necessary.

.8 Base Arc Flash calculations to be based on actual overcurrent protective device clearing time. Cap maximum clearing time at 2 seconds based on IEEE 1584 section B.1.2.

.3 Arc Flash Warning Labels:

.1 Provide minimum 90 mm x 127 mm (3.5" x 5") thermal transfer type label of high adhesion polyester for each work location analysed.

.2 Label to have an orange header with wording, "WARNING, ARC FLASH HAZARD", and include following information:

.1 location designation;

.2 nominal voltage;

.3 flash protection boundary;

.4 hazard risk category;

.5 incident energy;

.6 working distance;

.7 engineering report number, revision number and issue date;

.8 Machine print labels with no field markings;

.4 Provide Arc Flash labels as applicable to project and required by local codes and standards, and to requirements of local governing authorities and as reviewed with Consultant. Provide labels for following equipment (and base labels on recommended overcurrent device settings:

.1 panelboards;

.2 distribution transformers;

.3 switchboards;

.4 high voltage equipment;

.5 other equipment as required by local governing authorities;

2.18 NOT USED

PART 3: EXECUTION

3.01 NOT USED

3.02 NOT USED

3.03 NOT USED

3.04 NOT USED

3.05 INSTALLATION OF DISTRIBUTION CONDUCTORS

.1 Provide all required distribution wire and cable. The conductors, unless otherwise noted, are to be installed in conduit as specified in Section 26 05 00.

.2 Provide a Unistrut Corporation channel support system for overhead suspended "CORFLEX II" cable. The support system is to consist of channels on 1 m centres, supported by suitable threaded steel rods secured to the structure., Secure the cable on the channel at one diameter spacing with suitable aluminium clips.

.3 Support surface mounted and vertical "CORFLEX II" cables at one diameter spacing at 1 m centres by means of proper insulated two hole clips secured to the building construction in an approved manner.

.4 Provide all required cable support system accessories which are not specified herein or shown on the drawings but are required for proper installation.

.5 Ground and bond single conductor "CORFLEX II" cables at both ends where the sheath currents do not affect the cable ampacity. For certain areas, where sheath currents will reduce the cable ampacity, ground and bond the cable at the supply end and isolate the cable at the load end as recommended by the cable manufacturer, and provide a No. 3/0 green TW ground conductors for each cable run. Refer to Section No. 10 of the Ontario Electrical Safety Code.

.6 Do not install "CORFLEX II" cable in poured concrete work.

3.06 NOT USED

3.07 INSTALLATION OF CONTACTOR

.1 Provide a contactor in an enclosure. Identify each contactor enclosure. Wall mount the enclosure independent of the panelboard to which the loads are connected.

3.08 NOT USED

3.09 INSTALLATION OF DISCONNECT SWITCHES

.1 Provide safety switches (disconnects) as follows:

.1 wherever shown on the drawings and/or specified herein

.2 for motorized equipment which cannot be seen from the motor starter

location or that is more than 9 m from the starter location

2. Ensure that enclosures for safety switches located outside the building are EEMAC3.
3. Ensure that enclosures for safety switches located inside the building are EEMAC 2.
4. Ensure that power feeders for disconnect switches servicing exhaust fans are installed/equipped with adequate slack to compensate for exhaust fan hinged access service plate

3.10 INSTALLATION OF FUSES

.1 Provide a complete set of fuses for each fusible disconnect provided as part of the electrical work.

.2 Supply three spare fuses of each size and type used on the project, mount the fuses on a painted and identified plywood rack, and secure the rack in a location where later directed.

3.11 NOT USED

3.12 NOT USED

3.13 INSTALLATION OF LIGHTING CONTROL SYSTEM: NON-BAS STORES

.1 Basic Timer/Contactor System. Refer to Detail 26 24 13.25:

.1 Install Timer and Contactor in the designated electrical equipment area.

.2 Program timer Channel 1 to suit LCBO store schedule for indoor lighting. Provide 2hr time-delay override switch in Manager's Office.

.3 Program timer Channel 2 to suit applicable local Codes and guidelines for Awnings/Vestibule lighting. Provide 2hr time-delay override switch for maintenance testing in the designated electrical equipment area.

.4 Program timer Channel 3 to suit applicable local Codes and guidelines for Exterior Signs. Provide 2hr time-delay override switch for maintenance testing in the designated electrical equipment area.

.5 Provide 2hr time-delay override switch for security lighting and maintenance testing in the designated electrical equipment area.

.6 Coordinate with LCBO Coordinator for final locations of all switches. Provide lamacoid labels for each switch denoting purpose and circuit number.

.7 Coordinate with security contractor for interlock with security to override timer Channel 1 to turn on all store interior lights upon activation of the security alarm.

.8 Contractor is to acquire the lighting schedule from LCBO. The following information will be needed:

1. Weekly business hours to set exterior lights and signage control.
2. Weekly operating hours to set retail/warehouse light control. This includes time required for opening/closing operations.

3.14 GROUNDING

.1 Do all required grounding work in accordance with the drawings and in accordance with requirements of governing authorities, including the Ontario Hydro Electrical

Safety Code. Provide Utility's grounding requirements and confirm with the Utility.

.2 Provide required grounding, regardless of whether it has been shown on the drawings or called for in these Specifications.

.3 Grounds are to be so arranged that under normal operating conditions no injurious amount of current will flow in any grounding conductor.

.4 Throughout the building, solidly ground the system and make all required grounding connections to all new electrical devices and apparatus. Ground conductors are to be insulated 2/0 copper wire connected with approved fittings in accordance with the Ontario Electrical Safety Code.

.5 Extend isolated grounding conductors of computer receptacles to isolated ground bus of the computer panelboard serving the area. From the ground bus extend ground conductors to the building grounding station. Provide separate insulated ground wire for each isolated ground circuit.

.6 Provide separate communications ground bus in manager's office. Connect to main system ground.

3.15 INSTALLATION OF EXTERIOR SIGNS

.1 Installation of exterior signs is per Section 10 14 00.

.2 Provide sleeve(s) through exterior wall for power and/or communications, as required. Coordinate exact location and requirements with shop drawings prior to rough-in. Provide fire stopping as required.

.3 Provide final connection.

3.16 ELECTRICAL CONNECTIONS FOR MECHANICAL, REFRIGERATION, ETC., EQUIPMENT

.1 Provide all required electrical connections to equipment/systems provided and/or supplied as part of the mechanical work and as part of the work of other Divisions. Connection work is to include:

- .1 "line" and "load" side power wiring connections to all mechanical equipment, including trap seal primers
- .2 mounting of loose motor starters and disconnect switches supplied with mechanical equipment, and provision of motor starter panels(s) with splitter trough as required
- .3 "line" and "load" side power wiring connections to condensing units and evaporators associated with coolers and refrigerated display cases specified in Sections 11 40 00 and 11 41 20, and all required control wiring for such equipment, including, for the cooler:
  - .1 Two relays, one to control the fan coil for the cooler box, and one to control the temperature for the condensing unit
- .4 "line" side power wiring connection to the Warehouse overhead door controllers, and to the loading dock leveller system
- .5 A receptacle for the gas island cook top range specified in Section 11 40 00, with dedicated panelboard circuit
- .6 A 20 ampere, 208/240 volt, 4 wire receptacle for the under-counter oven

specified in Section 11 40 00

.7 receptacles for dishwashers specified in Section 11 40 00

.8 power connectors to motorized shade/sign as per LCBO standard

.9 double isolated ground duplex receptacles for LCBO communication

.10 Include for installation of the relay modules supplied by the LCBO security system installer. The relay modules are Altronix Model RB5

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 CSA, Canadian Standards Association.
.2 ULC, Underwriters Laboratories of Canada.
.3 ANSI C62.41, Guide For Surge Voltages In Low Voltage AC Power Circuits.
.4 ANSI C82.11, Electronic Ballast Performance.
.5 EMI/RFI, Electromagnetic Interference/Radio Frequency Interference.
.6 CSA C22.2 No., 141, Unit Equipment For Emergency Lighting.
.7 ANSI C62.45, Recommended Practice on Surge Testing For Equipment Connected To Low-Voltage AC Power Circuits.
.8 Refer to Section 26 05 00.

1.02 SHOP DRAWINGS

.1 Submit shop drawings for all products specified in this Section. Include photometric data for all fixtures.

PART 2: PRODUCTS

2.01 GENERAL RE: LIGHTING FIXTURES

.1 Lighting fixtures are to be in accordance with the Lighting Legend/Lamp Schedule and the specification and are to be CSA approved or have special ESA approval.
.2 Confirm exact colours and finishes of fixtures with the LCBO Project Coordinator and/or the Consultant after award of contract but prior to ordering. Obtain information in time to meet the installation schedule.
.3 Unless otherwise noted, luminaries with ballasts are each to be provided with its own ballast and ballasts are not to be shared.

2.02 GENERAL RE: LAMPS

.1 Lamps are to be in accordance with the Lighting Legend/Lamp Schedule, and the specification.
.2 Fluorescent Lamps: Unless otherwise specified, T8 fluorescent lamps are to be equal to Philips Lighting “Plus 800” Series, energy saving, low mercury, high efficiency, rapid start, T-8 lamps with colour temperature of 3000K, colour rendering index (CRI) of at least 85, rated average life of a minimum 36,000 hours, and initial lumens of at least 2950. T5HO lamps shall be equal to Philips Lighting “Silhouette T5HO” Series, 3000K CRI of at least 85, 25,000 hours life and initial lumens of 5000. Confirm colour temperatures with Lighting Legend prior to ordering.

.3 Compact Fluorescent Lamps: Compact fluorescent lamps are to have a rated average life of a minimum 10,000 hours, colour temperature of 3000K, minimum colour rendering index of 80, and complete with energy saving electronic ballasts as recommended by the lamp manufacturer. Confirm colour temperature with Lighting Legend prior to ordering.

2.03 FLUORESCENT FIXTURE BALLASTS

.1 T8 Fluorescent fixture ballasts are to be electronic type, equal to Advance Transformer Co., rapid start, electronic energy saving T-8 ballasts as follows:

.1 CSA approved and ULC listed and labelled comply with FCC Rules and Regulations, and ANSI Spec C62.41/C62.45
.2 rapid start in accordance with ANSI Spec. C82.11
.3 Free of PCBs
.4 Class A sound rating
.5 capable of starting lamps down to 10 degrees C
.6 total harmonic distortion not greater than 10%
.7 minimum power factor of 0.97 and ballast factor of at least 0.88
.8 lamp current crest factor not greater than 1.7
.9 frequency of operation between 20 kHz minimum to 60 kHz maximum without visible flicker
.10 EMI/RFI filtering
.11 five year full replacement parts and labour included warranty
.12 a nameplate indicating the ballast manufacturer, ballast model number, type, voltage and frequency, sound rating, CSA approval, the number and type of lamps the ballast will operate, power factor value, and a wiring diagram

.2 T5HO Ballasts shall be the same as above, except program start (to ANSI requirements), ballast factor of 1.00.

.3 Ballasts for fluorescent fixtures to be dimmed are to be as above but purposely made for dimming applications.

2.04 NOT USED

2.05 LIGHTING FIXTURES AND LAMPS

.1 Base lighting, unless otherwise specified, is to be manufactured by Canlyte-Lightolier. Alternatives will be not accepted.

.2 Sales/Retail Area Exit Lights: Lumacell LAE Series CAT. # LAE-1/L/R/2/A-OW-ACD, extruded aluminium edge-lit pictogram illuminated exit lights No substitution will be permitted unless otherwise stated by the LCBO Project Coordinator during the design period. Refer to attached Cut Sheet.

.3 Emergency Lighting: Battery Unit – 24 volt, 30 minutes operation, operation on 120 volt single phase, plug-in type, 6 terminal block, light activated test switch, fully adjustable lighting heads c/w 6 Watt LED, 591 lumens, MR16, sealed lead battery, (10 years), solid state charger, temperature compensation, sealed transfer switch, low voltage disconnect, brown out protection, built-in time delay battery lockout circuit, dual diagnostic indicator light, white polyester paint
CAT.# RG24S-720-2-LD14-TD-TMBD- -LTS
Recessed Remote Head: New 24V, 6 W LED, 591 lumens round MR16, frame-in kit c/w integral cable clamps and mounting bars. Lumacell CAT.# RSTH-19-WH-MR16-LD14

Surface Mounted Double Head: 24V, 6 W LED, 591 lumens, surface adjustable, double head Lumacell CAT.# M-QM-2-LD14
Surface Mounted Single Head: 24 V, 6 W LED, 591 lumens surface adjustable, single head Lumacell CAT.# M-QM-LD14
Light heads/trim located in drywall/T-bar ceilings shall match the colour of the finished ceiling they are installed within. Where located in Vintage baffle ceilings or Urban Design concept open Retail space, heads/trim shall be black.
No substitution will be permitted unless otherwise stated by the LCBO Project Coordinator during the design period. Refer to attached Cut Sheet.

.4 Warehouse Lighting: Lithonia LED Lighting-IBL Series #12L-WD-SD125-LP735 DLC wide distribution c/w lens, frame and door, LED-12000 Lumens, LED down, 100 Watts, 3500K, unless otherwise reviewed and discussed with the LCBO Project Coordinator during the design period.

.5 Janitor Room Lighting: 4' Phillips FluxStream LED Linear fixture with wire guard, fixture to be mounted to wall surface at high level, mounting height to be confirmed with LCBO Project Coordinator.

.6 Washroom/Staff Room/Office Lighting, Washrooms and Office: 2x2 Recessed LED Fixture by Lithonia Lighting ACLED Series Cat. #2ACL2-40L-D38-LP830

.7 Entrance Canopy Lights: 4" Dia. Exterior recessed LED downlight, 23W. Cat.# L4-17LM-30K-120-G-80CRI-HW-CS-PF.

.8 Loading Dock Security Lights: SLIM57N RCL, 57W LED, 4000K. Suitable for wet locations.

.9 All Other Fixtures and Lamps: Lighting fixtures and lamps not specified above are to be in accordance with the interior design schedule which must be adhered to unless, due to physical changes to be building structure alternative fixtures have to be proposed, in which case the alternative proposal will be reviewed by the LCBO Project Coordinator.

2.06 EXTERIOR LIGHTING/SIGNAGE CONTROL TIME SWITCH

.1 Tork (NSI Industries) Model DWZ100A, ULC listed and CSA certified, multi-purpose, 120 volt, single channel, 7-day, 24 hour digital time switch in a NEMA 3R surface wall mounting enclosure and complete with:

- .1 99 on-off set points per week with minimum 1 minute settings
- .2 1 to 24 holiday settings
- .3 automatic daylight saving setting
- .4 automatic leap year setting
- .5 AM/PM clock format
- .6 LCD display
- .7 manual override, with contacts to connect a remote override switch
- .8 lithium battery capable of maintaining real time for 30 days, and retaining the timer schedule for 40 years without power

.2 Acceptable manufacturers are:

- .1 Tork (Nsi Industries)

.2 Borg General Controls
.3 The Watt Stopper Inc.
.4 Or approved alternates

2.07 EXTERIOR LIGHTING/SIGNAGE CONTROL PHOTOCELL

.1 Tork (Nsi Industries) Model 2001, ULC listed and CSA certified, 25 mm dia. conduit mounting, 180 degree swivel, 120 volt cadmium sulphide epoxy coated photocell housed in a UV stabilized "Lexan" dome and complete with:
.1 an adjustable delay of up to 2 minutes to prevent false switching
.2 adjustable turn on/turn off light level selector
.3 contacts which remain closed between dusk and dawn, and fail "ON"
.4 a # 73866 wall mounting bracket

.2 Acceptable manufacturers are:
.1 Tork (Nsi Industries)
.2 Borg General Controls
.3 The Watt Stopper Inc.
.4 Or approved alternates

2.08 TIME SWITCH REMOTE MANUAL OVERRIDE SWITCH

.1 Specification Grade, premium quality, 15 ampere, 120 volt with toggle switch. Engrave faceplate with black letters to read "OUTDOOR LIGHTING OVERRIDE".

2.09 INTERIOR LIGHTING CONTROL LIGHT SENSOR

.1 The Watt Stopper Inc. Model LS-101 "LightSaver" ceiling mount, electronic, 24 volt, microprocessor based daylight sensor, ULC listed, complete with a multi-band digital photosensor, a removable white colour cover, and the following:
.1 100 degree light measuring angle
.2 adjustable deadband with 25%, 50%, 75% or 100% in relation to set points to prevent lighting from cycling on-off due to minor daylight changes due to clouds
.3 adjustable time delay ranges of 3, 10, 15 or 30 minutes to prevent lighting from cycling on-off on partly cloudy days
.4 lighting level set points of from 1 to 850 fc
.5 LCD display with menu button and select button
.6 LED status indicators
.7 a #TRP-1 transformer relay power pack

.2 Acceptable manufacturers are:
.1 The Watt Stopper Inc.
.2 Tork (Nsi Industries)
.3 Borg General Controls
.4 Or approved alternate

PART 3: EXECUTION

3.01 INSTALLATION OF LIGHTING FIXTURES AND LAMPS

.1 Provide all required lighting fixtures and lamps.

.2 Thoroughly review ceiling types, finishes and construction details before placing fixture orders, and ensure that required mounting assemblies, frames, rings and similar features are included.

.3 Carefully coordinate the fixture installation with the work of other trades to ensure that the necessary recessing depths and mounting spaces are provided.

.4 Install fixtures in accordance with applicable electrical and architectural drawing reflected ceiling plans and/or wall elevations and/or field instruction. Confirm locations prior to roughing-in. In equipment rooms and similar secondary areas, install fixtures after the mechanical and other major work is roughed in and adjust locations as required.

.5 Align and position all adjustable luminaires, and ensure that luminaires with adjustable lamp holders are properly positioned to correspond to the lamps specified.

.6 Comply with the requirements of OESC regarding support of luminaires in suspended ceilings.

.7 All lamps are to be new and intact when the project is complete and ready for acceptance.

.8 Install Warehouse LED. lighting such that lenses are below the blades of ceiling fans and at least 25 mm below the bottom of steel joists.

.10 Lighting fixtures are to be installed accurately in line and level. Any fixtures that are not, in the opinion of the Architect, installed properly, are to be taken down and reinstalled to his satisfaction, without cost to the Owner. Fixtures are to be left clean, free from dirt, grease, fingerprints, etc.

.11 Co-ordinate with the architectural drawings for installation of plaster frames and rings in the appropriate ceilings to accommodate installation of recessed lighting fixtures.

.12 Surface mounted luminaries, which are to be installed on ceilings, are to be securely bolted to Unistrut or equal channels, which are secured to the structure. Align fixtures to correct light distribution.

.13 Support recess mounted luminaires from the building structure and independent of the ceiling system and roof deck.

.14 Where 1.2 m long fluorescent luminaries are mounted in continuous rows, 2.4 m long luminaries may be used, but are to be installed using 1.2 m long lamps in tandem, and with hangers spaces at maximum 1.2 m centers.

.15 Include a full lamp listing in the Operating and Maintenance Instruction Manuals.

.16 Upon Substantial Completion of the work supply a minimum of 10% spare lamps for each type of lamp used. Handover the spare lamps to the Store Manager, in identified packaging.

.17 Warehouse lighting at pallet racking to be mounted at not lower than bottom of joist. All other areas to be at 14'. Confirm with LCBO Project Coordinator and architectural reflected ceiling plan

.18 Provide Emergency Lighting/Exit sign verification report to Consultant and commissioning agent.

.19 For renovation projects, existing emergency battery units and lighting shall be replaced where they are not compatible with the addition of a new remote push-button for emergency light testing.

3.02 INSTALLATION OF EXTERIOR LIGHTING/SIGNAGE CONTROL

.1 Provide a time switch to turn exterior lighting and signage off at the end of the working day, a photocell to turn the lighting on in the evening, and an override switch to permit manual override of the control sequence.

.2 Wall mount the time switch adjacent to the lighting contactor panel. Identify the time switch with an engraved nameplate as per Section 26 05 00.

.3 Install the photocell, complete with mounting bracket, at roof level in an appropriate location in accordance with the manufacturer's instructions. Ensure that the photocell is located on as-built record drawings.

.4 Flush wall mount the override switch in the Manager's Office where shown, but confirm exact location prior to roughing-in.

.5 Connect the lighting control components in accordance with the drawing schematic control diagram. When installation is complete:

.1 set and program the time switch in accordance with the Owner's schedule, daylight savings dates, etc.

.2 adjust the photocell sensitivity to suit requirements

.3 test overall operation of the system and make any required adjustments

3.03 **NOT USED**

3.04 COMMISSIONING OF LIGHTING CONTROL

.1 Verify the proper operation of the lighting control system and demonstrate to the Consultant and the Commissioning Agent that the system functions as intended.

END OF SECTION

PART 1: GENERAL

1.01 REFERENCES

.1 Refer to Section 26 05 00.

1.02 SHOP DRAWINGS

.1 Submit shop drawings for the following:
- .1 pushbuttons, bells/buzzers
- .2 special boxes

PART 2: PRODUCTS

2.01 NOT USED

2.02 NOT USED

2.03 PUSHBUTTONS AND SIGNALS

.1 **NOT USED**

.2 **Check-Out Counter Pushbutton and Signal:** GE/Edwards #693-12, lock-nut mounting, 24 volt, 16 mm dia. recessed white pushbutton. Supply and install Edwards #5560M-AQ & signals sound file is 06_Beep-cvt.wav. Install in warehouse, retail, cold room and office. Sound value setting shall be 81 dBA @ 10 feet.

.3 **NOT USED**

PART 3: EXECUTION

3.01 EMPTY CONDUIT/RACEWAY SYSTEMS FOR COMMUNICATIONS & SECURITY SYSTEMS

.1 Provide complete systems of empty conduit and raceway for security, telephone and data system wiring as shown on the drawings and on LCBO SKE sketch sheets found at the end of this Section.

.2 Provide fish wires in all ducts and raceways.

.3 Refer to PART 3 of Section 26 05 00 for conduit/raceway/box/faceplate installation requirements.

.4 Terminate empty conduit with bushed ends.

.5 Wherever it is necessary to change the directions of conduit runs, use a standard conduit bend. No “T” or “L” type fittings will be permitted.

3.02 NOT USED

3.03 INSTALLATION OF PUSHBUTTONS AND SIGNALS

.1 Provide an exterior pushbutton at the Warehouse overhead door, connected to a buzzer inside the Warehouse, a buzzer in the Office ceiling space and a buzzer in the cold room ceiling space.

.2 Provide pushbuttons at check-out desks connected to a chime in the Office ceiling space, a chime in the cold room and a chime in the Warehouse area. Adjust the location of the chime in the Office ceiling space so that the dB level in the Office does not exceed 75 Db.

.3 Provide 15A-1P circuits, low voltage transformers, any required accessories, and all required line voltage and low voltage wiring in conduit.

.4 Confirm exact locations of components with the LCBO Design Coordinator prior to roughing-in.

3.04 SECURITY SYSTEM FACILITIES

.1 Provide all required facilities for installation of security system equipment and wiring.

.2 Provide a duplex receptacle adjacent to each security CCTV camera location, including wiring from the receptacle to the panelboard.

.3 At cash counters provide ceiling security system as shown.

.4 Provide junction boxes above cash desks connected to 20 mm dia. conduit with fishwire and terminate conduit above t-bar ceiling within the designated office area.
Refer to attached sketches SK01 - 26 05 00 and SK02 - 26 05 00 2.

.5 Within office ceiling space and near the security conduits install two 15A 125 volt duplex receptacles.

.6 Provide a wood shelf on heavy-duty enamelled steel wall brackets capable of supporting a 100 lb. load with adjacent duplex receptacle for the remote VCR unit. Refer to architectural drawings.

.7 Emergency Exit Doors in retail space not regularly used for entrance/exit shall have a signalling device mounted above the door and shall be wired to annunciate an open door.

3.05 OFFICE ELECTRICAL SYSTEMS

.1 Refer to LCBO electrical sketch sheets found at the end of this Section.

.2 Office electrical system components are to include, but are not to be limited to, the following:

.1 150 mm x 150 mm x 100 mm pullbox at 150 mm a.f.f. to connect data and telephone conduits from Cash System underfloor duct system. Include conduits to above finished ceiling and conduits stubbed out to ceiling space. Conduits are to include three 50 mm dia. and one 25 mm dia. E.C. with fishwire.

.2 loop wire panel (computer and cash registers)

.3 telephone with empty conduit to ceiling space

.4 voice 1104 box (computer modem)

.5 data 1104 box (credit/debit)

.6 voice 1104 boxes (telephone)

.7 voice 1104 box (facsimile line)

.8 three data 1104 boxes near CPU

.9 debit/credit bridge

.10 DVAC monitoring panel

3.06 NOT USED

END OF SECTION