Part 1 General

1.1 REFERENCES

.1 City of Winnipeg Bid Opportunity, General and Supplementary Conditions.

.2 In case of conflicting requirements with the Specifications, the City of Winnipeg Bid Opportunity will govern.

1.2 APPLICATIONS FOR PROGRESS PAYMENT

.1 Progress Payments to be processed in accordance with City of Winnipeg Bid Opportunity, General and Supplementary Conditions.

1.3 SCHEDULE OF VALUES

.1 Provide schedule of values supported by evidence as Contract Administrator may reasonably direct and when accepted by Contract Administrator, be used as basis for applications for payment. Include statement based on schedule of values with each application for payment.

.2 Support claims for products delivered to Place of Work but not yet incorporated into Work by such evidence as Contract Administrator may reasonably require to establish value and delivery of products.

1.4 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF WORK

.1 Holdback to be processed in accordance with City of Winnipeg Bid Opportunity, General and Supplementary Conditions.

1.5 FINAL PAYMENT

.1 Final Payment to be processed in accordance with City of Winnipeg Bid Opportunity, General and Supplementary Conditions.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 APPOINTMENT AND PAYMENT

.1 Contract Administrator will appoint and pay for services of testing laboratory except follows:

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

.2 Inspection and testing performed exclusively for Contractor's convenience.

.3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.

.4 Mill tests and certificates of compliance.

.5 Tests specified to be carried out by Contractor under supervision of Contract Administrator.

.6 Additional tests where specified.

.2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Contract Administrator to verify acceptability of corrected work.

1.2 CONTRACTOR'S RESPONSIBILITIES

.1 Provide labour, equipment and facilities to:

.1 Provide access to Work for inspection and testing.

.2 Facilitate inspections and tests.

.3 Make good Work disturbed by inspection and test.

.4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.

.2 Notify Contract Administrator 48 hours minimum sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

.3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Contract Administrator.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of Contract Administrator.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting four days in advance of meeting date to Contract Administrator and The City of Winnipeg.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants, including the Contract Administrator and The City of Winnipeg, and, affected parties not in attendance.

.8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

.1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Senior representatives of Contract Administrator, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.5 Agenda to include:

.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

.3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

.4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.

.5 Delivery schedule of equipment.

.6 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

.7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.8 The City of Winnipeg provided products.

.9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.

.10 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.

.11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.

.12 Monthly progress claims, administrative procedures, photographs, hold backs.

.13 Appointment of inspection and testing agencies or firms.

.14 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

.1 During course of Work, schedule progress meetings monthly or bi-weekly, as determined by the Contract Administrator given the stage and complexity of the Work.

.2 Contractor, major Subcontractors involved in Work, Contract Administrator and The City of Winnipeg are to be in attendance.

.3 Notify parties minimum 7 days prior to meetings.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.

.5 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Review of off-site fabrication delivery schedules.

.6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

.11 Review proposed changes for affect on construction schedule and on completion date.

.12 Other business.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or work weeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System: overall system operated by Contract Administrator to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

.4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit a Master Plan to the Contract Administrator within 3 working days of Award of Contract.

.1 Contract Administrator will review and return revised schedules within 5 working days.

.2 Revise and resubmit within 1 working days.

.3 Accepted revised schedule will become Master Plan and be used as baseline for updates.

.3 Submit GANTT Project Schedule to Contract Administrator within 5 working days of receipt of acceptance of Master Plan.

.1 Develop detailed Project Schedule derived from Master Plan.

1.4 GANTT FORMAT

.1 Microsoft Project Format.

.2 Provide separate lines for each major item.

.3 Indicate projected and actual performance.

.4 Provide vertical lines indicating the first day of each week.

.5 Provide listings in chronological format.

1.5 PROJECT SCHEDULE

.1 Ensure detailed Project Schedule includes as minimum milestone and activity types including the following as a minimum:

.1 Award.

.2 Shop Drawings, Samples.

.3 Permits.

.4 Mobilization.

.5 Excavation.

.6 Foundations.

.7 Superstructure.

.8 Exterior Envelope.

.9 Interior walls.

.10 Plumbing.

.11 Lighting.

.12 Electrical.

.13 Piping.

.14 Controls.

.15 Heating, Ventilating, and Air Conditioning.

.16 Millwork.

.17 Fire Systems.

.18 Site work.

.19 Landscaping.

.20 Testing and Commissioning.

.21 Supplied equipment long delivery items.

.22 Engineer supplied equipment required dates.

1.6 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule for each project meeting, reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.7 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Submit to Contract Administrator submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Contract Administrator. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Contract Administrator, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are co-ordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator review.

.10 Keep one reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.

.3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow 10 business days for Contract Administrator's review of each submission.

.5 Adjustments made on shop drawings by Contract Administrator are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Contract Administrator prior to proceeding with Work.

.6 Make changes in shop drawings as Contract Administrator may require, consistent with Contract Documents. When resubmitting, notify Contract Administrator in writing of revisions other than those requested.

.7 Accompany submissions with transmittal letter, containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.8 Submissions include:

- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.

.9 After Contract Administrator's review, distribute copies.

.10 Submit an electronic copy of shop drawings for each requirement requested in specification Sections and as Contract Administrator may reasonably request.

.11 Submit an electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Contract Administrator where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit an electronic copy of test reports for requirements requested in specification Sections and as requested by Contract Administrator.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within 3 years of date of contract award for project.

.13 Submit an electronic copy of certificates for requirements requested in specification Sections and as requested by Contract Administrator.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit an electronic copy of manufacturers instructions for requirements requested in specification Sections and as requested by Contract Administrator.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit an electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Contract Administrator.

.16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.17 Submit an electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Contract Administrator.

.18 Delete information not applicable to project.

.19 Supplement standard information to provide details applicable to project.

.20 If upon review by Contract Administrator, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.3 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Contract Administrator's business address.

.3 Notify Contract Administrator in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples by Contract Administrator are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Contract Administrator prior to proceeding with Work.

.6 Make changes in samples which Contract Administrator may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 MOCK-UPS

.1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

1.5 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic copy of colour digital photography in jpg format, fine resolution, monthly with progress statement.

.1 Project identification: name and number of project and date of exposure indicated.

.2 Number of viewpoints: 4 locations. Viewpoints and their location to best demonstrate progress of work for payment certification, or as determined by Contract Administrator.

.2 Frequency of photographic documentation: as directed by Contract Administrator.

.1 Upon completion of: excavation, foundation, framing and services before concealment of Work, and as directed by Contract Administrator.

1.6 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

.2 Submit transcription of insurance immediately after award of Contract.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with all applicable Laws and Regulations, as stipulated in the City of Winnipeg Bid Opportunity, General Conditions.

.2 Meet or exceed requirements of:

.1 The National Building Code of Canada (NBC), including amendments up to bid closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Contract documents.

.3 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health.

.1 Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Contract Administrator.

.2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work.

.1 Notify Contract Administrator.

.3 Mould: stop work immediately when material resembling mould is encountered during demolition work.

.1 Notify Contract Administrator.

1.3 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions and municipal by-laws.

.2 No smoking is permitted in the building.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 City of Winnipeg Bid Opportunity

.1 General and Supplemental Conditions.

1.2 INSPECTION

.1 Allow Contract Administrator access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Contract Administrator, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Contract Administrator will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Contract Administrator for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Contract Administrator.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Contract Administrator at no cost to Contract Administrator. Pay costs for retesting and re-inspection.

1.4 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.5 PROCEDURES

.1 Notify appropriate agency and Contract Administrator in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.6 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Contract Administrator as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Contract Administrator it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the City of Winnipeg will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Contract Administrator.

1.7 REPORTS

.1 Submit electronic copies of inspection and test reports to Contract Administrator.

.2 Provide copies to subcontractor of work being inspected or tested and manufacturer or fabricator of material being inspected or tested.

1.8 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

.2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Contract Administrator and may be authorized as recoverable.

1.9 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.

.2 Construct in locations acceptable to Contract Administrator and as specified in specific Section.

.3 Prepare mock-ups for Contract Administrator's review with reasonable promptness and in orderly sequence, to not cause delays in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 Mock-ups may remain as part of Work if authorized by Contract Administrator.

1.10 MILL TESTS

.1 Submit mill test certificates as requested and as required in specification Sections.

1.11 EQUIPMENT AND SYSTEMS

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

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.3 DEWATERING

.1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.4 WATER SUPPLY

.1 Potable Water: Arrange and pay for potable water supply at current utility rates.

1.5 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

.2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:

- .1 Facilitate progress of Work.
- .2 Protect Work and products against dampness and cold.
- .3 Prevent moisture condensation on surfaces.
- .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
- .5 Provide adequate ventilation to meet health regulations for safe working environment.

.4 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.

.5 Ventilating:

- .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
- .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.

.3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.

.4 Ventilate storage spaces containing hazardous or volatile materials.

.5 Ventilate temporary sanitary facilities.

.6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.6 Permanent heating system of building, not to be used when available unless authorized in writing by Contract Administrator.

.1 Be responsible for damage to heating system if use is permitted.

.2 Use temporary filters of type and efficiency approved by Contract Administrator, and replace with new filters on completion of work.

.3 Clean all equipment and provide manufacturer statement indicating that bearings and all equipment component are in good condition and full working order.

.7 Ensure Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Contract Administrator.

.8 Pay costs for maintaining temporary heat, when using permanent heating system

.9 Maintain strict supervision of operation of temporary heating and ventilating equipment to:

.1 Conform with applicable codes and standards.

.2 Enforce safe practices.

.3 Prevent abuse of services.

.4 Prevent damage to finishes.

.5 Vent direct-fired combustion units to outside.

.10 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.6 TEMPORARY POWER AND LIGHT

.1 Temporary Power: Provide and pay for temporary power at current utility rates.

.2 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx.

.3 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Contract Administrator provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for more than 3 months.

1.7 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for temporary telephone / data, and other equipment necessary for own use.

1.8 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.

.2 Burning rubbish and construction waste materials is not permitted on site.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 City of Winnipeg Bid Opportunity

.1 General and Supplemental Conditions

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.

.2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.3 Canadian Standards Association (CSA International)

.1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA-0121-M1978(R2003), Douglas Fir Plywood.

.3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.

.4 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.

.4 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.

.5 U.S. Environmental Protection Agency (EPA) / Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.3 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

.4 Provide construction facilities in order to execute work expeditiously.

.5 Remove from site all such work after use.

1.4 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-S269.2.

.2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, temporary stairs and all other access methods required for completion of work.

1.5 HOISTING

.1 Provide, operate and maintain hoists and cranes if required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.

.2 All hoisting equipment to be operated by qualified operator.

1.6 ELEVATORS

.1 Elevators not to be used by construction personnel and for transporting of materials.

.2 Provide protective coverings for finish surfaces of cars and entrances.

1.7 SITE STORAGE/LOADING

.1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

.2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.8 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work.

.2 Provide and maintain adequate access to project site.

.3 Clean driveways and loading areas where used by Contractor's equipment.

1.9 SECURITY

.1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

.2 Ensure existing building remains secure at all times.

1.10 OFFICES

.1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.

.2 Provide marked and fully stocked first-aid case in a readily available location.

.3 Subcontractors to provide their own offices if and as necessary. Direct location of these offices.

1.11 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.12 SANITARY FACILITIES

.1 Sanitary Facilities: Make arrangement with Contract Administrator for access to existing arena washrooms. Washrooms are to be kept clean and sanitary to the Contract Administrator's approval.

.2 The Contract Administrator may rescind access to the existing washrooms, in which case the Contractor will be responsible to provide temporary washroom facilities. Situations leading to this determination includes:

.1 Where the Contractor's use of the washrooms is generating conflict with the public's ongoing use of the existing building.

.2 Where the Contractor's forces are not leaving the washrooms in a clean and sanitary condition.

.3 Post notices and take precautions as required by local health authorities. Keep areas and premises in sanitary condition at all times.

1.13 CONSTRUCTION SIGNAGE

.1 Provide and erect project sign, within three weeks of signing Contract, in a location designated by Contract Administrator.

.1 Construct Project signboard of 1200mm x 2400mm wood frame and pressure treated plywood construction.

.1 Painted with exhibit lettering produced by a professional sign painter.

.2 Akyd Enamel paint over exterior alkyd primer.

.3 Fasteners: hot-dip galvanized steel nails and carriage bolts.

.4 Indicate on sign, name of Owner (City of Winnipeg), Contract Administrator (Harold Funk Architect Inc.), Project supporters / funders, and Contractor, and name of Project.

.5 Coordinate design and approval with Contract Administrator prior to fabrication.

.6 Coordinate installation and location with Contract Administrator prior to installation.

.2 Contractor may erect a maximum of one Contractor sign on each fronting street.

.3 Install and maintain, for duration of contract, Contract Administrator sign and The City of Winnipeg sign adjacent to main Project Signboard.

.1 Remove and return to Contract Administrator and The City of Winnipeg upon completion of project.

.2 No other signs or advertisements, other than warning signs, are permitted on site.

.3 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Contract Administrator.

1.14 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access and temporary relocated roads as necessary to maintain traffic.

.2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Contract Administrator.

.3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs

.4 Protect travelling public from damage to person and property.

.5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.7 Construct access and haul roads necessary.

.8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.

.9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.10 Dust control: adequate to ensure safe operation at all times.

.11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Contract Administrator.

.12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.

.13 Provide snow removal during period of Work.

.14 Remove, upon completion of work, haul roads designated by Contract Administrator.

1.15 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.

.2 Canadian Standards Association (CSA International)

.1 CSA-O121-M1978(R2003), 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.

1.2 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.3 HOARDING AND FENCING

.1 Install temporary hoarding and fencing to prevent unauthorized access to the construction area and building, and for protection of the public and building occupants.

.1 Prevent all unauthorized access to scaffolding, elevators, and other areas of work.

.2 Provide site signage alerting the public and building occupants of the extent of construction activities and to prevent unauthorized or accidental access to areas of work.

.2 Provide construction site fencing around area of work.

.1 Erect temporary site enclosure using pre-manufactured 3000mm width x 2400mm height (10’x8’) steel chain link fencing modules, adequately braced and interconnected to resist collapse.

.2 Provide lockable entrance gates located to conform to applicable traffic restrictions on adjacent streets and without disruption to site circulation routes. Equip gates with locks and keys.

.3 As required by law, and where construction occurs above areas not within the enclosed construction fencing, or within the vicinity of public circulation areas, erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting.

.1 Erect temporary site enclosures adjacent to public pedestrian areas using 38 x 89 mm construction grade lumber framing at 600 mm centres and 1200 x 2400 x 13 mm exterior grade fir plywood to CSA O121. Apply plywood panels vertically, flush and butt jointed.

.2 Paint public side of site enclosure in selected colours with one coat primer to CAN/CGSB 1.189 and one coat exterior paint to CGSB 1.59. Maintain public side of enclosure in clean condition.

.4 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.4 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guardrails and barricades around deep excavations, open shafts, open stairwells, open edges of floors and roofs.

.2 Provide as required by governing authorities.

1.5 WEATHER ENCLOSURES

.1 Provide weather-tight closures to unfinished door and window openings, tops of shafts 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.

.3 Design enclosures to withstand wind pressure and snow loading.

1.6 DUST TIGHT SCREENS

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

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

1.7 ACCESS TO SITE

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

1.8 PUBLIC TRAFFIC FLOW

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

1.9 FIRE ROUTES

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

1.10 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.

1.11 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Contract Administrator locations and installation schedule 3 days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

1.12 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 City of Winnipeg Bid Opportunity

.1 General and Supplementary Conditions.

.2 Within text of each specifications section, reference may be made to reference standards.

.3 Conform to these reference standards, in whole or in part as specifically requested in specifications.

.4 If there is question as to whether products or systems are in conformance with applicable standards, Contract Administrator reserves right to have such products or systems tested to prove or disprove conformance.

.5 Cost for such testing will be born by Contract Administrator in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.2 QUALITY

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.

.3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.4 Should disputes arise as to quality or fitness of products, decision rests strictly with Contract Administrator based upon requirements of Contract Documents.

.5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.3 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify

Contract Administrator of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Contract Administrator at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Contract Administrator reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials, lumber and on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Contract Administrator.

.9 Touch-up damaged factory finished surfaces to Contract Administrator's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

.2 Transportation cost of products supplied by The City of Winnipeg will be paid for by Contract Administrator. Unload, handle and store such products.

1.6 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Contract Administrator in writing, of conflicts between specifications and manufacturer's instructions, so that Contract Administrator will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Contract Administrator to require removal and re-installation at no increase in Contract Price or Contract Time.

1.7 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Contract Administrator if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in the required duties. Contract Administrator reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Contract Administrator, whose decision is final.

1.8 CO-ORDINATION

.1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.9 CONCEALMENT

.1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation inform Contract Administrator if there is interference. Install as directed by Contract Administrator.

1.10 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 LOCATION OF FIXTURES

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Contract Administrator of conflicting installation. Install as directed.

1.12 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.14 PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Contract Administrator.

1.15 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 City of Winnipeg Bid Opportunity

.1 General and Supplemental Conditions

.2 The City of Winnipeg's identification of existing survey control points and property limits.

1.2 QUALIFICATIONS OF SURVEYOR

.1 Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to Contract Administrator.

1.3 SURVEY REFERENCE POINTS

.1 Existing base horizontal and vertical control points are designated on drawings.

.1 Existing main and basement floor heights are to be used as vertical datum.

.2 Existing basement concrete walls to be used as horizontal datum.

.3 Site confirm grade elevations at area of work.

.4 Confirm design to site grade elevation conditions and raise and resolve discrepancies with Contract Administrator prior to commencement of construction activities.

.2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.3 Make no changes or relocations without prior written notice to Contract Administrator.

.4 Report to Contract Administrator when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

.5 Require surveyor to replace control points in accordance with original survey control.

1.4 SURVEY REQUIREMENTS

.1 Establish two permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.

.2 Establish lines and levels, locate and lay out, by instrumentation.

.3 Stake for grading, fill and topsoil placement and landscaping features.

.4 Stake slopes and berms.

.5 Establish pipe invert elevations.

.6 Stake batter boards for foundations.

.7 Establish foundation column locations and floor elevations.

.8 Establish lines and levels for mechanical and electrical work.

1.5 EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Contract Administrator of findings.

.2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by Contract Administrator.

1.6 LOCATION OF EQUIPMENT AND FIXTURES

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

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

.3 Inform Contract Administrator of impending installation and obtain approval for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by Contract Administrator.

1.7 RECORDS

.1 Maintain a complete, accurate log of control and survey work as it progresses.

.2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.

.3 Record locations of maintained, re-routed and abandoned service lines.

1.8 SUBMITTALS

.1 Submit name and address of Surveyor to Contract Administrator.

.2 On request of Contract Administrator, submit documentation to verify accuracy of field engineering work.

.3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract Documents.

1.9 SUBSURFACE CONDITIONS

.1 Promptly notify Contract Administrator in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

.2 After prompt investigation, should Contract Administrator determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit written request in advance of cutting or alteration which affects:

- .1 Structural integrity of elements of project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of operational elements.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of The City of Winnipeg or separate contractor.

.3 Include in request:

- .1 Identification of project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of The City of Winnipeg or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be executed.

1.2 MATERIALS

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.3 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

.1 Execute cutting, fitting, and patching, including excavation and fill, to complete Work.

.2 Fit several parts together, to integrate with other Work.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Remove samples of installed Work for testing.

.6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

.7 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.8 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

.10 Restore work with new products in accordance with requirements of Contract Documents.

.11 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.12 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material in accordance with Section 07 84 00 - Firestopping, full thickness of the construction element.

.13 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

.14 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 City of Winnipeg Bid Opportunity.

.1 General and Supplemental Conditions.

1.2 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by The City of Winnipeg or other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Contract Administrator. Do not burn waste materials on site, unless approved by Contract Administrator.

.3 Clear snow and ice from access to building, bank/pile snow in designated areas only remove from site.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

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

.6 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.7 Dispose of waste materials and debris off site.

.8 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.

.9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.3 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris including that caused by The City of Winnipeg or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Contract Administrator. Do not burn waste materials on site, unless approved by Contract Administrator.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors and as otherwise required.

.9 Clean lighting reflectors, lenses, and other lighting surfaces.

.10 Vacuum clean and dust building interiors, behind grilles, louvres and screens.

.11 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.

.12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.13 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.14 Remove dirt and other disfiguration from exterior surfaces.

.15 Clean and sweep roofs, gutters, areaways, and sunken wells.

.16 Sweep and wash clean paved areas.

.17 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.

.18 Clean roofs, downspouts, and drainage systems.

.19 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.20 Remove snow and ice from access to building.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 WASTE MANAGEMENT GOALS

.1 Accomplish maximum control of solid construction waste.

.2 Preserve environment and prevent pollution and environment damage.

1.2 DEFINITIONS

.1 Class III: non-hazardous waste - construction renovation and demolition waste.

.2 Inert Fill: inert waste - exclusively asphalt and concrete.

.3 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

.4 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.

.5 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.6 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.7 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

.2 Returning reusable items including pallets or unused products to vendors.

.8 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.9 Separate Condition: refers to waste sorted into individual types.

.10 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

.11 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

1.3 DOCUMENTS

.1 Maintain at job site, one copy of following documents:

.1 Material Source Separation Plan.

1.4 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Prepare and submit following prior to project start-up:

.1 Submit 2 copies of Materials Source Separation Program (MSSP) description.

.3 Submit before final payment summary of waste materials salvaged for reuse, recycling or disposal by project using deconstruction/disassembly material audit form.

.1 Failure to submit could result in hold back of final payment.

.2 Provide receipts, scale tickets, waybills, and show quantities and types of materials reused, recycled, co-mingled and separated off-site or disposed of.

.3 For each material reused, sold or recycled from project, include amount in tonnes or quantities by number, type and size of items and the destination.

.4 For each material land filled or incinerated from project, include amount in tonnes of material and identity of landfill, incinerator or transfer station.

1.5 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)

.1 Prepare MSSP and have ready for use prior to project start-up.

.2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Contract Administrator.

.3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.

.4 Provide containers to deposit reusable and recyclable materials.

.5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.

.6 Locate separated materials in areas which minimize material damage.

.7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.

.1 Transport to approved and authorized recycling facility to users of material for recycling.

.8 Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition.

.1 Ship materials to site operating under Certificate of Approval.

.2 Materials must be immediately separated into required categories for reuse or recycling.

1.6 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to be reused, recycled and salvaged in locations as directed by Contract Administrator.

.2 Unless specified otherwise, materials for removal become Contractor's property.

.3 Protect, stockpile, store and catalogue salvaged items.

.4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

.5 Protect structural components not removed for demolition from movement or damage.

.6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Contract Administrator.

.7 Protect surface drainage, mechanical and electrical from damage and blockage.

.8 Separate and store materials produced during dismantling of structures in designated areas.

.9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.

.1 On-site source separation is recommended.

.2 Remove co-mingled materials to off-site processing facility for separation.

.3 Provide waybills for separated materials.

1.7 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste, volatile materials, mineral spirits, oil, paint thinner, or other environmentally damaging materials into waterways, storm, or sanitary sewers.

.3 Keep records of construction waste including:

.1 Number and size of bins.

.2 Waste type of each bin.

.3 Total tonnage generated.

.4 Tonnage reused or recycled.

.5 Reused or recycled waste destination.

.4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

.5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.8 SCHEDULING

.1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 APPLICATION

.1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

.1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS

.1 Separate salvageable, recyclable, and reusable materials from general waste stream and stockpile in separate piles or containers, suitable for processing to recycling and waste management facilities, and consistent with applicable fire regulations.

.1 Mark containers or stockpile areas.

.2 Provide instruction on disposal practices.

.2 On-site sale of salvaged, recovered, reusable, recyclable, materials is permitted when approved by the Contract Administrator in writing.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 City of Winnipeg Bid Opportunity.

.1 General and Supplemental Conditions.

.2 Canadian Environmental Protection Act (CEPA)

.1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.1 In event of discrepancy between the Specifications and the City of Winnipeg Bid Opportunity, the Bid Opportunity and associated General and Supplemental conditions shall govern.

.2 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Contract Administrator in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.

.2 Request Contract Administrator's inspection.

.3 Contract Administrator's Inspection:

.1 Contract Administrator and Contractor to inspect Work and identify defects and deficiencies.

.2 Contractor to correct Work as directed.

.4 Completion Tasks: submit written certificates in English that tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Equipment and systems: tested, adjusted and balanced and fully operational.

.4 Certificates required by Boiler Inspection Branch, Fire Commissioner Utility companies: submitted.

.5 Operation of systems: demonstrated to The City of Winnipeg's personnel.

.6 Commissioning of mechanical systems: completed in accordance with 01 91 13 - General Commissioning (Cx) Requirements and and copies of final Commissioning Report submitted to Contract Administrator.

.7 Work: complete and ready for final inspection.

.5 Final Inspection:

.1 When completion tasks are done, request final inspection of Work by Contract Administrator.

.2 When Work incomplete according to The City of Winnipeg and Contract Administrator, complete outstanding items and request re-inspection.

.6 Declaration of Substantial Performance: In accordance with City of Winnipeg Bid Opportunity, General and Supplemental Conditions.

.7 Commencement of Lien and Warranty Periods: In accordance with City of Winnipeg Bid Opportunity, General and Supplemental Conditions.

.8 Final Payment: In accordance with City of Winnipeg Bid Opportunity, General and Supplemental Conditions.

.9 Payment of Holdback: In accordance with City of Winnipeg Bid Opportunity, General and Supplemental Conditions.

1.3 FINAL CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:

.1 Convene meeting one week prior to contract completion with contractor's representative and Contract Administrator, in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify Project requirements.

.2 Review manufacturer's installation instructions and warranty requirements.

.2 Contract Administrator to establish communication procedures for:

.1 Notifying construction warranty defects.

.2 Determine priorities for type of defects.

.3 Determine reasonable response time.

.3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Two weeks prior to Substantial Performance of the Work, submit to the Contract Administrator, three final copies of operating and maintenance manuals in English.

.3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.

.4 Provide evidence, if requested, for type, source and quality of products supplied.

1.3 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings.

.1 Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by systems, under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab.

.1 Bind in with text; fold larger drawings to size of text pages.

1.4 CONTENTS - PROJECT RECORD DOCUMENTS

.1 Table of Contents for Each Volume: provide title of project;

.1 Date of submission; names.

.2 Addresses, and telephone numbers of Contract Administrator and Contractor with name of responsible parties.

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data.

.1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

.6 Training: refer to Section 01 79 00 - Demonstration and Training .

1.5 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions, at site for Contract Administrator and The City of Winnipeg, one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction.

.1 Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.

.1 Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition.

.1 Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Contract Administrator .

1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on set of black line opaque drawings.

.2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress.

.1 Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:

.1 Measured depths of elements of foundation in relation to finish first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

.5 Specifications: mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

.7 Provide digital photos, if requested, for site records.

1.7 FINAL SURVEY

.1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.8 EQUIPMENT AND SYSTEMS

.1 For each item of equipment and each system include description of unit or system, and component parts.

.1 Give function, normal operation characteristics and limiting conditions.

.2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.

.1 Include regulation, control, stopping, shut-down, and emergency instructions.

.2 Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's Design-Builder's co-ordination drawings, with installed colour coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control and 01 91 13 - General Commissioning (Cx) Requirements.

.15 Additional requirements: as specified in individual specification sections.

1.9 MATERIALS AND FINISHES

.1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

.1 Provide information for re-ordering custom manufactured products .

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional requirements: as specified in individual specifications sections.

1.10 MAINTENANCE MATERIALS

.1 Spare Parts:

.1 Provide spare parts, in quantities specified in individual specification sections.
.2 Provide items of same manufacture and quality as items in Work.
.3 Deliver to site; place and store.
.4 Receive and catalogue items.
.1 Submit inventory listing to Contract Administrator.
.2 Include approved listings in Maintenance Manual.
.5 Obtain receipt for delivered products and submit prior to final payment.

.2 Extra Stock Materials:

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
.2 Provide items of same manufacture and quality as items in Work.
.3 Deliver to site; place and store.
.4 Receive and catalogue items.
.1 Submit inventory listing to Contract Administrator.
.2 Include approved listings in Maintenance Manual.
.5 Obtain receipt for delivered products and submit prior to final payment.

.3 Special Tools:

.1 Provide special tools, in quantities specified in individual specification section.
.2 Provide items with tags identifying their associated function and equipment.
.3 Deliver to site; place and store.
.4 Receive and catalogue items.
.1 Submit inventory listing to Contract Administrator.
.2 Include approved listings in Maintenance Manual.

1.11 DELIVERY, STORAGE AND HANDLING

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and for review by Contract Administrator.

1.12 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Contract Administrator approval.

.3 Warranty management plan to include required actions and documents to assure that Contract Administrator receives warranties to which it is entitled.

.4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.5 Submit, warranty information made available during construction phase, to Contract Administrator for approval prior to each monthly pay estimate.

.6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:

- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
- .4 Verify that documents are in proper form, contain full information, and are notarized.
- .5 Co-execute submittals when required.
- .6 Retain warranties and bonds until time specified for submittal.

.7 Except for items put into use with The City of Winnipeg's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.8 Conduct joint 4 month and 9 month warranty inspection, measured from time of acceptance, by Contract Administrator.

.9 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and commissioned systems such as fire protection, alarm systems, sprinkler systems, lightning protection systems.

.3 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

.5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

.9 Summary of maintenance procedures required to continue warranty in force.

.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names and phone numbers of persons to call for warranty service.

.12 Typical response time and repair time expected for various warranted equipment.

.4 Contractor's plans for attendance at 4 and 9 month post-construction warranty inspections.

.5 Procedure and status of tagging of equipment covered by extended warranties.

.6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.10 Respond in timely manner to oral or written notification of required construction warranty repair work.

.11 Written verification to follow oral instructions.

.1 Failure to respond will be cause for the Contract Administrator to proceed with action against Contractor.

1.13 WARRANTY TAGS

.1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Contract Administrator.

.2 Attach tags with copper wire and spray with waterproof silicone coating.

.3 Leave date of acceptance until project is accepted for occupancy.

.4 Indicate following information on tag:

.1 Type of product/material.
.2 Model number.
.3 Serial number.
.4 Contract number.
.5 Warranty period.
.6 Inspector's signature.
.7 Construction Contractor.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Demonstrate scheduled operation and maintenance of equipment and systems to The City of Winnipeg's personnel two weeks prior to date of substantial performance.

.2 The City of Winnipeg: provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.

.3 Preparation:

- .1 Verify conditions for demonstration and instructions comply with requirements.
- .2 Verify designated personnel are present.
- .3 Ensure equipment has been inspected and put into operation in accordance with Section .
- .4 Ensure testing, adjusting, and balancing has been performed in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements and equipment and systems are fully operational.

.4 Demonstration and Instructions:

- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, , servicing, and maintenance of each item of equipment at agreed upon times, at the designated location.
- .2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
- .3 Review contents of manual in detail to explain aspects of operation and maintenance.
- .4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.

.5 Time Allocated for Instructions: ensure amount of time required for instruction of each item of equipment or system as follows:

- .1 Section – Mechanical Systems: 2 hours of instruction.
- .2 Section - Control Systems: 2 hours of instruction.
- .3 Section - Electrical System: 2 hours of instruction.
- .4 Section - Elevators: 2 hours of instruction.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures .

.2 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Contract Administrator's approval.

.3 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.

.4 Give time and date of each demonstration, with list of persons present.

.5 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.3 QUALITY ASSURANCE

.1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:

.1 Instruct The City of Winnipeg's personnel.

.2 Provide written report that demonstration and instructions have been completed.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Acronyms:

.1 AFD - Alternate Forms of Delivery, service provider.

.2 BMM - Building Management Manual.

.3 Cx - Commissioning.

.4 EMCS - Energy Monitoring and Control Systems.

.5 O&M - Operation and Maintenance.

.6 PI - Product Information.

.7 PV - Performance Verification.

.8 TAB - Testing, Adjusting and Balancing.

1.2 GENERAL

.1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:

.1 Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.

.2 Ensure appropriate documentation is compiled into the BMM.

.3 Effectively train O&M staff.

.2 Contractor assists in Cx process, operating equipment and systems, troubleshooting and making adjustments as required.

.1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be tested interactively with each other as intended in accordance with Contract Documents and design criteria.

.2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.

.3 Design Criteria: as per client's requirements or determined by designer. To meet Project functional and operational requirements.

1.3 COMMISSIONING OVERVIEW

.1 Cx to be a line item of Contractor's cost breakdown.

.2 Cx activities supplement field quality and testing procedures described in relevant technical sections.

.3 Departmental Representative will issue Interim Acceptance Certificate when

.1 Completed Cx documentation has been received, reviewed for suitability and approved by Departmental Representative.

.2 Equipment, components and systems have been commissioned.

.3 O&M training has been completed.

1.4 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

.1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the unfunctional system, including related systems as deemed required by Departmental Representative to ensure effective performance.

.2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

1.5 PRE-CX REVIEW

.1 Before Construction:

.1 Review contract documents, confirm by writing to Departmental Representative.

.1 Adequacy of provisions for Cx.

.2 Aspects of design and installation pertinent to success of Cx.

.2 During Construction: Co-ordinate provision, location and installation of provisions for Cx.

.3 Before start of Cx:

.1 Have completed Cx Plan up-to-date.

.2 Ensure installation of related components, equipment, sub-systems, systems is complete.

.3 Fully understand Cx requirements and procedures.

.4 Have Cx documentation shelf-ready.

.5 Understand completely design criteria and intent and special features.

.6 Submit complete start-up documentation to Departmental Representative.

.7 Have Cx schedules up-to-date.

.8 Ensure systems have been cleaned thoroughly.

.9 Complete TAB procedures on systems, submit TAB reports to Departmental Representative for review and approval.

.10 Ensure "As-Built" system schematics are available.

.4 Inform Departmental Representative in writing of discrepancies and deficiencies on finished works.

1.6 CONFLICTS

.1 Report conflicts between requirements of this section and other sections to Departmental Representative before start-up and obtain clarification.

.2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.7 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit no later than 4 weeks after award of Contract: Preliminary Cx schedule.

.2 Provide additional documentation relating to Cx process required by Departmental Representative.

1.8 COMMISSIONING SCHEDULE

.1 Provide detailed Cx schedule as part of construction schedule.

.2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:

.1 Approval of Cx reports.

.2 Verification of reported results.

.3 Repairs, retesting, re-commissioning, re-verification.

.4 Training.

1.9 STARTING AND TESTING

.1 Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

1.10 WITNESSING OF STARTING AND TESTING

.1 Provide 14 days notice prior to commencement.

.2 Contractor's Cx Agent to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

1.11 MANUFACTURER'S INVOLVEMENT

.1 Factory testing: manufacturer to:

.1 Coordinate time and location of testing.

.2 Provide testing documentation for approval by Departmental Representative.

.3 Arrange for Departmental Representative to witness tests.

.4 Obtain written approval of test results and documentation from Departmental Representative before delivery to site.

.2 Obtain manufacturers installation, start-up and operations instructions prior to start-up of components, equipment and systems and review with Departmental Representative.

.1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.

.2 Modify procedures detrimental to equipment performance and review same with manufacturer before start-up.

.3 Integrity of warranties:

.1 Use manufacturer's trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty.

.2 Verify with manufacturer that testing as specified will not void warranties.

.4 Qualifications of manufacturer's personnel:

.1 Experienced in design, installation and operation of equipment and systems.

.2 Ability to interpret test results accurately.

.3 To report results in clear, concise, logical manner.

1.12 PROCEDURES

.1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.

.2 Conduct start-up and testing in following distinct phases:

.1 Included in delivery and installation:

.1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.

.2 Visual inspection of quality of installation.

.2 Start-up: follow accepted start-up procedures.

.3 Operational testing: document equipment performance.

.4 System PV: include repetition of tests after correcting deficiencies.

.5 Post-substantial performance verification: to include fine-tuning.

.3 Correct deficiencies and obtain approval from Departmental Representative after distinct phases have been completed and before commencing next phase.

.4 Document required tests on approved PV forms.

.5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Departmental Representative. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:

.1 Minor equipment/systems: implement corrective measures approved by Departmental Representative.

.2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Departmental Representative.

.3 If evaluation report concludes that major damage has occurred, Departmental Representative shall reject equipment.

.1 Rejected equipment to be remove from site and replace with new.

.2 Subject new equipment/systems to specified start-up procedures.

1.13 START-UP DOCUMENTATION

.1 Assemble start-up documentation and submit to Departmental Representative for approval before commencement of commissioning.

.2 Start-up documentation to include:

.1 Factory and on-site test certificates for specified equipment.

.2 Pre-start-up inspection reports.

.3 Signed installation/start-up check lists.

.4 Start-up reports,

.5 Step-by-step description of complete start-up procedures, to permit Departmental Representative to repeat start-up at any time.

1.14 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS

.1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.

.2 With assistance of manufacturer develop written maintenance program and submit Departmental Representative for approval before implementation.

.3 Operate and maintain systems for length of time required for commissioning to be completed.

.4 After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.

1.15 TEST RESULTS

.1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.

.2 Provide manpower and materials, assume costs for re-commissioning.

1.16 COMMISSIONING PERFORMANCE VERIFICATION

.1 Carry out Cx:

.1 Under actual or accepted simulated operating conditions, over entire operating range, in all modes.

.2 On independent systems and interacting systems.

.2 Cx procedures to be repeatable and reported results are to be verifiable.

.3 Follow equipment manufacturer's operating instructions.

.4 EMCS trending to be available as supporting documentation for performance verification.

1.17 AUTHORITIES HAVING JURISDICTION

.1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.

.2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.

.3 Provide copies to Departmental Representative days of test and with Cx report.

1.18 EXTENT OF VERIFICATION

.1 Elsewhere: Provide manpower and instrumentation to verify up to 30 % of reported results, unless specified otherwise in other sections.

.2 Number and location to be at discretion of Departmental Representative.

.3 Conduct tests repeated during verification under same conditions as original tests, using same test equipment, instrumentation.

.4 Review and repeat commissioning of systems if inconsistencies found in more than 20% of reported results.

.5 Perform additional commissioning until results are acceptable to Departmental Representative.

1.19 REPEAT VERIFICATIONS

.1 Assume costs incurred by Departmental Representative for third and subsequent verifications where:

.1 Verification of reported results fail to receive Departmental Representative's approval.

.2 Repetition of second verification again fails to receive approval.

.3 Departmental Representative deems Contractor's request for second verification was premature.

1.20 SUNDRY CHECKS AND ADJUSTMENTS

.1 Make adjustments and changes which become apparent as Cx proceeds.

.2 Perform static and operational checks as applicable and as required.

1.21 DEFICIENCIES, FAULTS, DEFECTS

.1 Correct deficiencies found during start-up and Cx to satisfaction of Departmental Representative.

.2 Report problems, faults or defects affecting Cx to Departmental Representative in writing. Stop Cx until problems are rectified. Proceed with written approval from Departmental Representative.

1.22 COMPLETION OF COMMISSIONING

.1 Upon completion of Cx leave systems in normal operating mode.

.2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.

.3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Departmental Representative.

1.23 ACTIVITIES UPON COMPLETION OF COMMISSIONING

.1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

1.24 TRAINING

.1 In accordance with Section 01 79 00 – Demonstration and Training.

1.25 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

.1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

1.26 OCCUPANCY

.1 Cooperate fully with Departmental Representative during stages of acceptance and occupancy.

1.27 PERFORMANCE VERIFICATION TOLERANCES

.1 Application tolerances:

.1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Except for special areas, to be within +/- 10% of specified values.

.2 Instrument accuracy tolerances:

.1 To be of higher order of magnitude than equipment or system being tested.

.3 Measurement tolerances during verification:

.1 Unless otherwise specified actual values to be within +/- 2 % of recorded values.

1.28 THE CITY OF WINNIPEG'S PERFORMANCE TESTING

.1 Performance testing of equipment or system by Departmental Representative will not relieve Contractor from compliance with specified start-up and testing procedures.

Part 2 **Part 2: Not Used**

Part 3 **Part 3**

3.1 **SCHEDULE**

.1 Cx Architectural Systems:

- .1 Elevator.
- .2 Door operation and door Hardware.
- .3 Air-barrier systems: Provide inspection reports.
  - .1 Two air-barrier inspections.
  - .2 One blower-door test.
- .4 Roofing:
  - .1 Provide two inspection reports.

.2 Commission mechanical systems and associated equipment:

- .1 Plumbing systems:
  - .1 Sump pump (ESP-1) and related draining system.
- .2 HVAC and exhaust systems:
  - .1 Fan 1 and associated ventilation system complete with balancing report.
- .3 Fire and life safety systems:
  - .1 Fire Dampers.
  - .2 Fire Extinguishers.

.3 Commission electrical systems and equipment:

- .1 Lighting systems:
  - .1 Lighting equipment.
  - .2 Emergency and exit lighting systems.
- .2 Fire alarm systems, equipment:
  - .1 Fire Alarm system verification for all new or relocated devices.
  - .2 Communications panels.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes.

.1 Methods and procedures for demolishing, salvaging, recycling and removing sitework items designated to be removed in whole or in part, and for backfilling resulting trenches and excavations.

1.2 REFERENCES

.1 Department of Justice Canada (Jus).

.1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.

.2 Canadian Environmental Protection Act, 1999 (CEPA), c. 33.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.3 Transport Canada (TC).

.1 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.

1.3 DEFINITIONS

.1 Demolition: rapid destruction of building following removal of hazardous materials.

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

.3 Waste Management Coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

1.4 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.3 Shop drawings.

.1 Submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning, where required by authorities having jurisdiction.

.2 Submit drawings stamped and signed by qualified professional engineer registered or licensed in Province of Manitoba, Canada.

.4 Hazardous Materials: provide description of Hazardous Materials and Notification of Filing with proper authorities prior to beginning of Work as required.

.5 Certificates: submit copies of certified weigh bills from authorized disposal sites and reuse and recycling facilities for material removed from site on monthly basis or upon request of Contract Administrator.

1.5 QUALITY ASSURANCE

.1 Regulatory Requirements: ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable Provincial/Territorial regulations.

.2 Site Meetings.

.1 Convene pre-commencement meeting one week prior to beginning work of this Section, to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

.2 Arrange for site visit with Contract Administrator to examine existing site conditions adjacent to demolition work, prior to start of Work.

.3 Hold project meetings bi-weekly or as determined by Contract Administrator.

.4 Ensure key personnel, site supervisor, project manager, subcontractor representatives, and WMC attend.

.5 Reporting Requirements: WMC to complete.

.6 WMC must provide verbal report on status of waste diversion activity at each meeting.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Storage and Protection.

.1 Protect in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Contract Administrator at no cost to The City of Winnipeg.

.3 Remove and store materials to be salvaged, in manner to prevent damage.

.4 Store and protect in accordance with requirements for maximum preservation of material.

.5 Handle salvaged materials as new materials.

.2 Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling in accordance with Section01 74 21 - Construction/Demolition Waste Management And Disposal.

.2 Divert excess materials from landfill to site approved by Contract Administrator.

.3 Separate for reuse and recycling and place in designated containers Steel, Metal, Plastic and other recyclable waste in accordance with Waste Management Plan.

.4 Place materials defined as hazardous or toxic in designated containers.

.5 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal, regulations.

.6 Label location of salvaged material's storage areas and provide barriers and security devices.

.7 Ensure emptied containers are sealed and stored safely.

.8 Remove materials that cannot be salvaged for reuse or recycling and dispose of in accordance with applicable codes at licensed facilities.

1.7 SITE CONDITIONS

.1 Site Environmental Requirements.

.1 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.2 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.

.1 Ensure proper disposal procedures are maintained throughout the project.

.3 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.

.4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.

.5 Protect trees, plants and foliage on site and adjacent properties where indicated.

Part 2 Products

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

Part 3 Execution

3.1 PREPARATION

.1 Inspect site with Contract Administrator and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

.4 Do not disrupt active or energized utilities designated to remain undisturbed.

3.2 REMOVAL OF HAZARDOUS WASTES

.1 Remove contaminated or dangerous materials defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

3.3 REMOVAL OPERATIONS

.1 Remove items as indicated.

.2 Do not disturb items designated to remain in place.

.3 Removal of Pavements, Curbs and Gutters:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Contract Administrator.

.2 Protect adjacent joints and load transfer devices.

.3 Protect underlying and adjacent granular materials.

.4 Prevent contamination with base course aggregates, when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving,

.5 Excavate at least 300 mm below pipe invert, when removing pipes under existing or future pavement area.

.6 Remove designated trees during demolition.

.1 Obtain written approval of Contract Administrator prior to removal of trees not designated.

.7 Stockpile topsoil for final grading and landscaping.

.1 Provide erosion control and seeding if not immediately used.

.8 Salvage.

.1 Dismantle items containing materials for salvage and stockpile salvaged materials at locations approved by The City of Winnipeg and Contract Administrator.

.9 Disposal of Material.

.1 Dispose of materials not designated for salvage or reuse on site at authorized facilities.

.2 Trim disposal areas to approval of Contract Administrator.

.10 Backfill.

.1 Backfill in areas as indicated and in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.4 STOCKPILING

.1 Label stockpiles, indicating material type and quantity.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

.3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.

.4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.5 REMOVAL FROM SITE

.1 Remove stockpiled material as directed by Contract Administrator, when it interferes with operations of project.

.2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.

.3 Transport material designated for alternate disposal using approved facilities and in accordance with applicable regulations.

.4 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

3.6 RESTORATION

.1 Restore areas and existing works outside areas of demolition to conditions that existed prior to beginning of Work and match condition of adjacent, undisturbed areas.

.2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.7 CLEANING

.1 Remove debris, trim surfaces and leave work site clean, upon completion of Work

.2 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Definitions:

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

.2 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as co-ordinating related, required submittal and reporting requirements.

.2 Reference Standards:

.1 Canadian Environmental Protection Act (CEPA)

.1 CCME PN 1326-2008, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems for Petroleum Products and Allied Petroleum Products.

.2 CSA International

.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

.3 Department of Justice Canada (Jus)

.1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.

.2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

.1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.

.2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.

.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.4 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S660-08, Standard for Nonmetallic Underground Piping for Flammable and Combustible Liquids.

.2 ULC/ORD-C58.15-1992, Overfill Protection Devices for Flammable Liquid Storage Tanks.

.3 ULC/ORD-C58.19-1992, Spill Containment Devices for Underground Flammable Liquid Storage Tanks.

.5 U.S. Environmental Protection Agency (EPA)

.1 EPA CFR 86.098-10, Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles.

.2 EPA CFR 86.098-11, Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles.

.3 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Convene pre-installation meeting 1 week prior to beginning work of this Section, with Contractor's Representative and Contract Administrator in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify project requirements.

.2 Verify existing site conditions adjacent to demolition work.

.3 Co-ordination with other construction subtrades.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 WMC is responsible for fulfilment of reporting requirements.

.3 Shop Drawings:

.1 Submit for review and approval demolition drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning.

.2 Submit demolition drawings stamped and signed by professional engineer registered or licensed in the Province of Manitoba, Canada.

1.4 QUALITY ASSURANCE

.1 Regulatory Requirements: Ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable Provincial/Territorial and Municipal regulations.

1.5 SITE CONDITIONS

.1 Environmental protection:

.1 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.2 Fires and burning of waste or materials is not permitted on site.

.3 Do not bury rubbish waste materials.

.4 Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.

.1 Ensure proper disposal procedures are maintained throughout project.

.5 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.

.6 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction and as directed by Contract Administrator.

.7 Protect trees, plants and foliage on site and adjacent properties where indicated.

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

.9 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

1.6 EXISTING CONDITIONS

.1 If material resembling spray or trowel applied asbestos or other designated substance listed as hazardous be encountered in course of demolition, stop work, take preventative measures, and notify Contract Administrator immediately. Proceed only after receipt of written instructions have been received from Contract Administrator.

.2 Structures to be demolished are based on their condition, at time of examination prior to bidding.

.3 Remove, protect and store salvaged items for re-use or storage, as directed by Contract Administrator.

Part 2 Products

2.1 EQUIPMENT

.1 Equipment and heavy machinery:

.1 On-road vehicles to:CEPA-SOR/2003-2, On-Road Vehicle and Engine Emission Regulations and CEPA-SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.

.2 Off-road vehicles to: 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

3.1 PREPARATION

.1 Protection of in-place conditions:

.1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades,, properties and parts of existing building to remain.

.1 Provide bracing, shoring and underpinning as required.

.2 Repair damage caused by demolition as directed by Contract Administrator.

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

.3 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.

.2 Surface Preparation:

.1 Disconnect and re-route electrical and telephone service lines where and if affected.

.2 Disconnect and cap mechanical systems and utilities where and if affected.

.3 Do not disrupt active or energized utilities designated to remain undisturbed.

3.2 DEMOLITION

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

.2 Blasting operations not permitted during demolition.

.3 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

.4 Demolish parts of structure where indicated. To permit construction of addition and as indicated in the drawings.

.5 Demolish foundation walls and footings, and concrete floors below or on grade to extent required for new construction.

.6 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.

.7 At end of each day's work, leave Work in safe and stable condition.

.1 Protect interiors of parts not to be demolished from exterior elements at all times.

.8 Demolish to minimize dusting.

.9 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.

.10 Remove following materials and equipment, store, protect, and leave ready for modification and installation by other sections of Work:

.1 Existing ticket-booth enclosure.

.11 Use natural lighting to do Work where possible.

.1 Shut off lighting except those required for security purposes at end of each day.

3.3 CLEANING

.1 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

.2 Designate appropriate security resources / measures to prevent vandalism, damage and theft.

.3 Locate stockpiled materials convenient for use in new construction. Eliminate double handling where possible.

.4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

.1 Label stockpiles, indicating material type and quantity.

.5 Separate from general waste stream each of following materials for recycle and reuse to the extent practicable. Stockpile materials in neat and orderly fashion in location and as directed by Contract Administrator for alternate disposal. Stockpile materials in accordance with applicable fire and safety regulations.

.1 Concrete and Concrete Block.

.2 Miscellaneous metals.

.6 Supply separate, clearly marked disposal bins for categories of waste material.

.7 Remove stockpiled material as directed by Contract Administrator, when it interferes with operations of project construction.

.8 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.

.9 Transport material designated for alternate disposal using approved receiving organizations and in accordance with applicable regulations.

.10 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Definitions:

.1 Dangerous Goods: product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.

.2 Hazardous Material: product, substance, or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.

.3 Hazardous Waste: hazardous material no longer used for its original purpose and that is intended for recycling, treatment or disposal.

.2 Reference Standards:

.1 Canadian Environmental Protection Act,1999 (CEPA 1999)

.1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).

.2 Department of Justice Canada (Jus)

.1 Transportation of Dangerous Goods Act, 1992 (TDG Act) 1992, (c. 34).

.2 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).

.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 National Research Council Canada Institute for Research in Construction (NRC-IRC)

.1 National Fire Code of Canada-2005.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for hazardous materials and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS to Contract Administrator for each hazardous material required prior to bringing hazardous material on site.

.3 Submit hazardous materials management plan to Contract Administrator that identifies hazardous materials, usage, location, personal protective equipment requirements, and disposal arrangements.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.

.1 When exporting hazardous waste to another country, ensure compliance with Export and Import of Hazardous Waste and Hazardous Recyclable Materials Regulations.

.4 Storage and Handling Requirements:

.1 Co-ordinate storage of hazardous materials Contract Administrator and abide by internal requirements for labelling and storage of materials and wastes.

.2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.

.3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada requirements.

.4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.

.1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.

.2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Contract Administrator.

.5 Transfer of flammable and combustible liquids is prohibited within buildings.

.6 Transfer flammable and combustible liquids away from open flames or heat-producing devices.

.7 Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.

.8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.

.9 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.

.10 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:

.1 Store hazardous materials and wastes in closed and sealed containers.

.2 Label containers of hazardous materials and wastes in accordance with WHMIS.

.3 Store hazardous materials and wastes in containers compatible with that material or waste.

.4 Segregate incompatible materials and wastes.

.5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.

.6 Store hazardous materials and wastes in secure storage area with controlled access.

.7 Maintain clear egress from storage area.

.8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.

.9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.

.10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

.11 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.

.12 Report spills or accidents immediately to Contract Administrator. Submit a written spill report to Contract Administrator within 24 hours of incident.

Part 2 Products

2.1 MATERIALS

.1 Description:

.1 Bring on site only quantities hazardous material required to perform Work.

.2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

Part 3 Execution

3.1 CLEANING

.1 Progress Cleaning: clean in accordance with Section01 74 11 - Cleaning. Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.

.2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.

.3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.

.4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.

.5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.

.6 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.

.7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

.8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:

.1 Hazardous wastes recycled in manner constituting disposal.

.2 Hazardous waste burned for energy recovery.

.3 Lead-acid battery recycling.

.4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

- .1 CSA-A23.1-04/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CSA-O86S1-05, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
- .3 CSA O121-M1978(R2003), Douglas Fir Plywood.
- .4 CSA O151-04, Canadian Softwood Plywood.
- .5 CSA O153-M1980(R2003), Poplar Plywood.
- .6 CAN/CSA-O325.0-92(R2003), Construction Sheathing.
- .7 CSA O437 Series-93(R2006), Standards for OSB and Waferboard.CSA S269.1-1975(R2003), Falsework for Construction Purposes.
- .8 CAN/CSA-S269.3-M92(R2003), Concrete Formwork, National Standard of Canada

.2 Underwriters' Laboratories of Canada (ULC)

- .1 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit shop drawings for formwork and falsework.

- .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Manitoba, Canada.

.3 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.4 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings. Comply with CAN/CSA-S269.3 for formwork drawings.

.5 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.

.6 Indicate sequence of erection and removal of formwork/falsework as directed by Contract Administrator.

.7 When slip forming and flying forms are used, submit details of equipment and procedures for review by Contract Administrator.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 47 21 - Construction/Demolition Waste Management and Disposal.

.2 Place materials defined as hazardous or toxic in designated containers.

.3 Divert wood materials from landfill to a reuse facility.

.4 Divert plastic materials from landfill to a recycling facility.

.5 Divert unused form release material from landfill to an official hazardous material collections site.

1.4 STRUCTURAL DRAWINGS

.1 See the Structural Drawings for further information.

.2 In any situation where the specifications do not agree with the Structural Drawings:

.1 The more stringent requirements shall govern.

.2 Confirm requirements with Contract Administrator prior to proceeding.

Part 2 Products

2.1 MATERIALS

.1 Formwork materials:

.1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121, CAN/CSA-O86, CSA O437 Series, CSA-O153.

.2 For concrete with special architectural features, use formwork materials to CSA-A23.1/A23.2.

.3 Rigid insulation board: to CAN/ULC-S701.

.2 Pan forms: material as indicated.

.3 Form ties:

.1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.

.2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.

.4 Form liner:

.1 Plywood: Douglas Fir to CSA O121, Canadian Softwood Plywood to CSA O151, Poplar to CSA O153, edge and thickness as required.

.2 For Exposed Concrete above finished floor: Use high density overlay.

.3 Waferboard: to CAN/CSA-O325.0, edge and thickness as required.

.5 Form release agent: non-toxic, biodegradable, low VOC,.

.6 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene, with viscosity between 70 and 110s Saybolt Universal, 15 to 24 mm5/s at 40 degrees C, flashpoint minimum 150 degrees C, open cup.

.7 Falsework materials: to CSA-S269.1.

.8 Sealant: to Section 07 92 00 - Joint Sealants.

Part 3 Execution

3.1 FABRICATION AND ERECTION

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

.2 Obtain Contract Administrator's approval for use of earth forms framing openings not indicated on drawings.

.3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.

.4 Fabricate and erect falsework in accordance with CSA S269.1.

.5 Refer to architectural drawings for concrete members requiring architectural exposed finishes.

.6 Do not place shores and mud sills on frozen ground.

.7 Provide site drainage to prevent washout of soil supporting mud sills and shores.

.8 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.

.9 Align form joints and make watertight.

.1 Keep form joints to minimum.

.10 Locate horizontal form joints for exposed columns 2400 mm above finished floor elevation.

.11 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.

.12 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

.13 Construct forms for architectural concrete, and place ties as indicated and as directed.

.1 Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.

.14 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.

.1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.

.15 Line forms for following surfaces:

.1 Outer face of outside grade beams where above grade level.

.2 Exposed face of interior grade beams where above finished floor level.

.3 Secure lining taut to formwork to prevent folds.

.4 Pull down lining over edges of formwork panels.

.5 Ensure lining is new and not reused material.

.6 Ensure lining is dry and free of oil when concrete is poured.

.7 Application of form release agents on formwork surface is prohibited where drainage lining is used.

.8 If concrete surfaces require cleaning after form removal, use only pressurized water stream so as not to alter concrete's smooth finish.

.9 Cost of textile lining is included in price of concrete for corresponding portion of Work.

.16 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

.17 When slip forming and flying forms are used, submit details as indicated in PART 1 - SUBMITTALS.

3.2 REMOVAL AND RESHORING

.1 Leave formwork in place for minimum periods of time indicated on Structural Drawings, after placing concrete.

.2 Remove formwork when concrete has reached specified percentage of design strength or minimum period noted on Structural Drawings, whichever comes later, and replace immediately with adequate reshoring.

.3 Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.

.4 Space reshoring in each principal direction at not more than 3000 mm apart.

.5 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 SP-66-04, ACI Detailing Manual 2004.

.2 ASTM International

.1 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

.2 ASTM A143/A143M-07, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.

.3 ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

.4 ASTM A775/A775M-07b, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.

.3 CSA International

.1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.

.3 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.

.4 CSA-G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.5 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.6 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.

.4 Reinforcing Steel Institute of Canada (RSIC)

.1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice and SP-66.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.

.1 Indicate placing of reinforcement and:

.1 Bar bending details.

.2 Lists.

.3 Quantities of reinforcement.

.4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Contract Administrator, with identifying code marks to permit correct placement without reference to structural drawings.

.5 Indicate sizes, spacings and locations of chairs, spacers and hangers.

.2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.

.4 When Chromate solution is used as replacement for galvanizing non-prestressed reinforcement, provide product description for review by Contract Administrator prior to its use.

1.3 QUALITY ASSURANCE

.1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.

.1 Mill Test Report: provide Contract Administrator with certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.

.2 Submit in writing to Contract Administrator proposed source of reinforcement material to be supplied.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and according to manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

1.5 STRUCTURAL DRAWINGS

.1 See the Structural Drawings for further information.

.2 In any situation where the specifications do not agree with the Structural Drawings:

.1 The more stringent requirements shall govern.

.2 Confirm requirements with Contract Administrator prior to proceeding.

Part 2 Products

2.1 MATERIALS

.1 Substitute different size bars only if permitted in writing by Contract Administrator.

.2 Reinforcing steel: billet steel, grade as indicated on structural drawings, deformed bars to CSA-G30.18, unless indicated otherwise.

.3 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.

.4 Deformed steel wire for concrete reinforcement: to ASTM A82/A82M.

.5 Welded steel wire fabric: to ASTM A185/A185M.

.6 Welded deformed steel wire fabric: to ASTM A82/A82M.

.7 Epoxy Coating of non-prestressed reinforcement: to ASTM A775/A775M.

.8 Galvanizing of non-prestressed reinforcement: to CAN/CSA-G164, minimum zinc coating 610 g/m^2.

.1 Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.

.2 If chromate treatment is carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.

.1 Temperature of solution equal to or greater than 32 degrees and galvanized steels immersed for minimum 20 seconds.

.3 If galvanized steels are at ambient temperature, add sulphuric acid as bonding agent at concentration of 0.5% to 1%.

.1 In this case, no restriction applies to temperature of solution.

.4 Chromate solution sold for this purpose may replace solution described above, provided it is of equivalent effectiveness.

.1 Provide product description as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

.9 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.

.10 Mechanical splices: subject to approval of Contract Administrator.

.11 Plain round bars: to CSA-G40.20/G40.21.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2, SP-66 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

.1 SP-66 unless indicated otherwise.

.2 Obtain Contract Administrator's written approval for locations of reinforcement splices other than those shown on placing drawings.

.3 Upon approval of Contract Administrator, weld reinforcement in accordance with CSA W186.

.4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

.1 Ship epoxy coated bars in accordance with ASTM A775A/A775M.

2.3 SOURCE QUALITY CONTROL

.1 Provide Contract Administrator with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.

.2 Inform Contract Administrator of proposed source of material to be supplied.

Part 3 Execution

3.1 PREPARATION

.1 Galvanizing to include chromate treatment.

.1 Duration of treatment to be 1 hour per 25 mm of bar diameter.

.2 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.

3.2 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized by Contract Administrator.

.2 When field bending is authorized, bend without heat, applying slow and steady pressure.

.3 Replace bars, which develop cracks or splits.

3.3 PLACING REINFORCEMENT

.1 Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2.

.2 Use plain round bars as slip dowels in concrete.

.1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.

.2 When paint is dry, apply thick even film of mineral lubricating grease.

.3 Prior to placing concrete, obtain Contract Administrator's approval of reinforcing material and placement.

.4 Ensure cover to reinforcement is maintained during concrete pour.

.5 Protect epoxy and paint coated portions of bars with covering during transportation and handling.

3.4 FIELD TOUCH-UP

.1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

3.5 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Abbreviations and Acronyms:

.1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement.

.1 Type GU, GUb and GUL - General use cement.

.2 Type MS and MSb - Moderate sulphate-resistant cement.

.3 Type MH, MHb and MHL - Moderate heat of hydration cement.

.4 Type HE, HEb and HEL - High early-strength cement.

.5 Type LH, LHb and LHL - Low heat of hydration cement.

.6 Type HS and HSb - High sulphate-resistant cement.

.2 Fly ash:

.1 Type F - with CaO content less than 15%.Type CI - with CaO content ranging from 15 to 20%.

.2 Type CH - with CaO greater than 20%.

.3 GGBFS - Ground, granulated blast-furnace slag.

.2 Reference Standards:

.1 ASTM International

.1 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.

.2 ASTM C309-07, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.3 ASTM C494/C494M-10a, Standard Specification for Chemical Admixtures for Concrete.

.4 ASTM C1017/C1017M-07, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.

.5 ASTM D412-06ae2, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.

.6 ASTM D624-00(2007), Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.

.7 ASTM D1751-04(2008), Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.8 ASTM D1752-04a(2008), Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

.2 Canadian General Standards Board (CGSB)CAN/CGSB-37.2-[M88], Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.

.1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.3 CSA International

.1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA A283-06, Qualification Code for Concrete Testing Laboratories.

.3 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation Meetings: convene pre-installation meeting one week prior to beginning concrete works.

.1 Ensure key personnel, site supervisor, speciality contractor - finishing, forming are in attendance.

.1 Verify project requirements.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Provide testing results and reports for review by Contract Administrator and do not proceed without written approval when deviations from mix design or parameters are found.

.3 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.

.4 Concrete hauling time: provide for review by Contract Administrator deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.

.5 Provide two copies of WHMIS MSDS.

1.4 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.2 Provide Contract Administrator, minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.

.1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.

.3 Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review by Contract Administrator on following items:

.1 Falsework erection.

.2 Hot weather concrete.

.3 Cold weather concrete.

.4 Curing.

.5 Finishes.

.6 Formwork removal.

.7 Joints.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.

.1 Do not modify maximum time limit without receipt of prior written agreement from Contract Administrator, laboratory representative and concrete producer as described in CSA A23.1/A23.2.

.2 Deviations to be submitted for review by Contract Administrator.

.2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

.2 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.6 STRUCTURAL DRAWINGS

.1 See the Structural Drawings for further information.

.2 In any situation where the specifications do not agree with the Structural Drawings:

.1 The more stringent requirements shall govern.

.2 Confirm requirements with the Contract Administrator prior to proceeding.

Part 2 Products

2.1 DESIGN CRITERIA

.1 To CSA A23.1/A23.2.

2.2 PERFORMANCE CRITERIA

.1 Portland Cement: to CSA A3001, Type as indicated on Structural Drawings.

.2 Portland-limestone cement: Type as indicated on Structural Drawings, to CSA A23.1.

.3 Water: to CSA A23.1.

.4 Aggregates: to CSA A23.1/A23.2.

.5 Admixtures:

.1 Air entraining admixture: to ASTM C260.

.2 Chemical admixture: to ASTM C494, ASTM C1017. Contract Administrator to approve accelerating or set retarding admixtures during cold and hot weather placing.

.6 Shrinkage compensating grout, non premixed dry pack grout, curing compound: As indicated on structural drawings and / or to Contract Administrator's approval.

.7 Waterstops, premoulded joint fillers, weep hole tubes, dovetail anchor slots: As indicated on structural drawings and / or to Contract Administrator's approval.

.8 Dampproof membrane and Dampproofing: See Section 07 11 13 – Bituminous Damproofing and Waterproofing.

.9 Polyethylene film: 0.254 mm (10mil) thickness to CAN/CGSB-51.34.

2.3 MIXES

.1 Concrete mix as indicated on Structural Drawings and to CSA A23.1.

.1 Ensure materials used in concrete mix have been submitted for testing and meet requirements of CSA A23.1.

.2 Co-ordinate construction methods to suit Contract Administrator approved concrete mix proportions and parameters.

.3 Identify and report immediately to Contract Administrator when concrete mix design and parameters pose anticipated problems or deficiencies related to construction.

Part 3 Execution

3.1 PREPARATION

.1 Obtain Contract Administrator's written approval before placing concrete. Provide 72 hours minimum notice prior to placing of concrete.

.2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.

.3 During concreting operations:

.1 Development of cold joints not allowed.

.2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.

.4 Pumping of concrete only permitted with prior approval of Contract Administrator.

.5 Ensure reinforcement and inserts are not disturbed during concrete placement.

.6 Prior to placing of concrete obtain Contract Administrator's approval of proposed method for protection of concrete during placing and curing in adverse weather.

.7 Protect previous Work from staining.

.8 Clean and remove stains prior to application for concrete finishes.

.9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

.10 In locations where new concrete is dowelled to existing work, drill holes in existing concrete.

.1 Place steel dowels of deformed steel reinforcing bars and pack solidly with shrinkage compensating grout epoxy grout to anchor and hold dowels in positions as indicated.

.11 Do not place load upon new concrete until authorized by Contract Administrator.

3.2 INSTALLATION/APPLICATION

.1 Do cast-in-place concrete work to CSA A23.1/A23.2.

.2 Sleeves and inserts:

.1 Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through joists, beams, column capitals or columns, except where indicated or approved by Contract Administrator.

.2 Where approved by Contract Administrator, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.

.3 Sleeves and openings greater than 100 x 100 mm not indicated, must be reviewed by Contract Administrator.

.4 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Contract Administrator before placing of concrete.

.5 Confirm locations and sizes of sleeves and openings shown on drawings.

.6 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.

.3 Anchor bolts:

.1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.

.2 Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from Contract Administrator.

.4 Formed holes: 100 mm minimum diameter.

.1 Drilled holes: 25 mm minimum diameter larger than bolts used to manufacturers' recommendations.

.2 Protect anchor bolt holes from water accumulations, snow and ice build-ups.

.3 Set bolts and fill holes with shrinkage compensating grout epoxy grout.

.4 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.

.5 Drainage holes and weep holes:

.1 Form weep holes and drainage holes in accordance with Section 03 10 00 - Concrete Forming and Accessories. If wood forms are used, remove them after concrete has set.

.2 Install weep hole tubes and drains as indicated.

.6 Dovetail anchor slots: in accordance with Section 04 05 00 - Common Work Results for Masonry.

.1 Install continuous vertical anchor slot to forms where masonry abuts concrete wall or columns.

.2 Install continuous vertical anchor slots at 800 mm on centre where concrete walls are masonry faced.

.7 Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.

.8 Finishing and curing:

.1 Finish concrete to CSA A23.1/A23.2.

.1 Schedule: Provide architectural smooth finish for all interior grade beams or concrete walls exposed above adjacent finished floor height.

.2 Use procedures as reviewed by Contract Administrator and those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.

.3 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.

.4 Finish concrete floor to CSA A23.1/A23.2.

.5 Provide [swirl-trowelled] finish unless otherwise indicated].

.6 Rub exposed sharp edges of concrete with carborundum to produce 3 mm minimum radius edges unless otherwise indicated.

.9 Waterstops:

.1 Install waterstops to provide continuous water seal.

.2 Do not distort or pierce waterstop in way as to hamper performance.

.3 Do not displace reinforcement when installing waterstops.

.4 Use equipment to manufacturer's requirements to field splice waterstops.

.5 Tie waterstops rigidly in place.

.6 Use only straight heat-sealed butt joints in field.

.7 Use factory welded corners and intersections unless otherwise approved by Contract Administrator.

.10 Joint fillers:

.1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Contract Administrator.

.2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.

.3 Locate and form construction / expansion joints as indicated. Install joint filler.

.4 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

.11 Dampproof membrane:

.1 Install dampproof membrane under concrete slabs-on-grade inside building.

.2 Lap dampproof membrane minimum 150 mm at joints and seal.

.3 Seal punctures in dampproof membrane before placing concrete.

.4 Use patching material at least 150 mm larger than puncture and seal.

3.3 SURFACE TOLERANCE

.1 Concrete tolerance to CSA A23.1

3.4 FIELD QUALITY CONTROL

.1 Site tests: conduct tests as follows [in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

.1 Concrete pours.

.2 Slump.

.3 Air content.

.4 Compressive strength at [7 and 28] days.

.5 Air and concrete temperature.

.2 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Contract Administrator for review to CSA A23.1/A23.2.

.1 Ensure testing laboratory is certified to CSA A283.

.3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and Contract Administrator.

.4 Contract Administrator will pay for costs of tests as specified in Section 01 29 83 - Payment Procedures for Testing Laboratory Services.

.5 Concrete tester to take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete, which they represent.

.6 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.

.7 Inspection or testing by Contract Administrator will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.

3.5 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal

.1 Divert unused concrete materials from landfill to local facility after receipt of written approval from Contract Administrator.

.2 Provide appropriate area on job site where concrete trucks and be safely washed.

.3 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by Contract Administrator.

.4 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

.5 Prevent admixtures and additive materials from entering drinking water supplies or streams.

.6 Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal. Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-25.20-95, Surface Sealer for Floors.

.2 CSA International

.1 CAN/CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction//Methods of Test for Concrete.

.3 ACI 308: Standard Specification for Curing Concrete.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Provide manufacturer's printed product literature and data sheets for concrete finishes and include product characteristics, performance criteria, physical size, finish and limitations.

.1 Provide two copies of WHMIS MSDS. WHMIS MSDS acceptable to Labour Canada and Health and Welfare Canada for concrete floor treatment materials. Indicate VOC content in g/L.

.2 Include application instructions for concrete floor treatments.

1.3 ENVIRONMENTAL REQUIREMENTS

.1 Temporary lighting:

.1 Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40 sq m of floor being treated.

.2 Electrical power:

.1 Provide sufficient electrical power to operate equipment normally used during construction.

.3 Work area:

.1 Make work area water tight protected against rain and detrimental weather conditions.

.4 Temperature:

.1 Maintain ambient temperature of not less than 10 degrees C from 7 days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40% during same period.

.5 Moisture:

.1 Ensure concrete substrate is within moisture limits prescribed by flooring manufacturer.

.6 Safety:

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

.7 Ventilation:

.1 Ventilate area of work as directed by by use of approved portable supply and exhaust fans.

.2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

.3 Provide continuous ventilation during and after coating application.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements:

.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

Part 2 Products

2.1 PERFORMANCE REQUIREMENTS

.1 Product quality and quality of work in accordance with Section 01 61 00 - Common Product Requirements.

.1 Submit written declaration that components used are compatible and will not adversely affect finished flooring products and their installation adhesives.

2.2 CHEMICAL HARDENERS

.1 **Water soluble sealer/densifier:** Acceptable Product: Kure N Harden ® by BASF Building Systems or approved equivalent in accordance with B6 Substitutes.

.2 **Magnesium- flurosilicate concrete hardener and dustproofer:** Acceptable Product: Lapidolith by BASF Building Systems or approved equivalent in accordance with B6 Substitutes.

.3 Water: potable.

Part 3 Execution

3.1 EXAMINATION

.1 Verify that slab surfaces are ready to receive work and elevations are as recommended by manufacturer's written instructions.

3.2 PREPARATION OF EXISTING SLAB

.1 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radiused edges unless otherwise indicated.

.2 Where required by structural drawings: Saw cut control joints to CAN/CSA-A23.1, 24 hours maximum after placing of concrete.

3.3 APPLICATION

.1 Apply concrete finishing floor hardener in accordance with manufacturer's written instructions.

.2 After floor treatment is dry, seal control joints and joints at junction with vertical surfaces with sealant.

.1 Sealants in accordance with Section 07 92 00 – Joint Sealants.

.3 Apply floor treatment in accordance with Sealer manufacturer's written instructions.

.4 Clean over spray. Clean sealant from adjacent surfaces.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.5 PROTECTION

.1 Protect finished installation in accordance with manufacturer's instructions.

3.6 SCHEDULE

.1 Floor Hardener: Intended for foot-traffic areas. Reference room finish schedule.

.1 BASF Kure-N-Harden (or approved equivalent in accordance with B6 Substitutes) applied to newly installed concrete.

.2 BASF Lapidolith (or approved equivalent in accordance with B6 Substitutes) applied after completion of construction but prior to occupant move-in. Apply after cleaning floor and allow sufficient time for curing prior to occupant move-in.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM C109/C109M-08, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 in. or 50 mm Cube Specimens).

.2 ASTM C260-06, Standard Specification for Air-Entraining Admixtures for Concrete.

.3 ASTM C330-09, Standard Specification for Lightweight Aggregates for Structural Concrete.

.4 ASTM C494/C494M-10a, Standard Specification for Chemical Admixtures for Concrete.

.5 ASTM C827-10, Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.

.6 ASTM C939-10, Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).

.2 CSA International

.1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CSA A23.4-09, Precast Concrete-Materials and Construction.

.3 CSA A3000-08, Cementitious Materials Compendium.

.4 CSA G30.18-09, Carbon and Steel Bars for Concrete Reinforcement.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for precast concrete products and include product characteristics, performance criteria, physical size, mix design, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect concrete curbs from damage.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan.

Part 2 Products

2.1 SPLASHPADS.

.1 Barkman Concrete PreCast Splashpads or approved equivalent in accordance with B6 Substitutes.

.1 51” Splashpad: 51” long by 14 ½” wide by 5” high.

.2 Location and quantity as indicated in drawings.

.1 Installation at sod locations: Provide splashpads with 4” galvanized angle iron by Barkman Concrete. Angle iron to have two holes to accept splashpad mounting pins (by splashpad manufacturer). Angle iron to be mounted flush to grade beam finish. Attach angle iron to recessed galvanized HSS spacers (supplied by miscellaneous metals) as per drawings.

.2 Installation at concrete pad locations: Drill two holes in concrete pad to accept two anchor pins underneath Barkman Concrete splashpad. (Anchor pins by splashpad manufacturer.)

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for precast concrete installation in accordance with manufacturer's written instructions.

3.2 INSTALLATION

.1 Install in accordance with manufacturer’s recommended installation methods.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

.2 Remove damaged and excess concrete for clean fill.

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by precast concrete specialties installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

- .1 CSA-A165 Series-04, Standards on Concrete Masonry Units.
- .2 CSA A179-04, Mortar and Grout for Unit Masonry.
- .3 CSA-A371-04, Masonry Construction for Buildings.

.2 International Masonry Industry All-Weather Council (IMIAC)

- .1 Recommended Practices and Guide Specification for Hot and Cold Weather Masonry Construction.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation meetings: comply with Section 01 31 19 - Project Meetings. Conduct pre-installation meeting one week prior to commencing work of this Section and on-site installations to:

- .1 Verify project requirements, including mock-up requirements.
- .2 Verify substrate conditions.
- .3 Co-ordinate products, installation methods and techniques.
- .4 Sequence work of related sections.
- .5 Co-ordinate with other building subtrades.
- .6 Review manufacturer's installation instructions.
- .7 Review masonry cutting operations, methods and tools and determine worker safety and protection from dust during cutting operations.
- .8 Review warranty requirements.

.2 Sequencing: sequence with other work in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart. Comply with manufacturer's written recommendations for sequencing construction operations.

.3 Scheduling: schedule with other work in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

1.3 ACTION SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

- .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, limitations and colours.
- .2 Provide two copies of Workplace Hazardous Materials Information System (WHMIS) - Material Safety Data Sheets (MSDS).

.3 Samples:

.1 Provide samples as follows:

.1 Six of each type of unit specified, including special shapes.

.2 Two cured, and coloured samples of mortar and grout illustrating mortar colour and colour range.

.3 Two of each type of masonry accessory and flashing specified.

.4 Two of each type of masonry anchorage, reinforcement and connector proposed for use.

.5 Samples: used for testing and when accepted become standard for material used.

.4 Shop Drawings:

.1 Provide drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.

.2 Provide shop drawings detailing temporary bracing required, designed to resist wind pressure and lateral forces during installation.

1.4 INFORMATION SUBMITTALS

.1 Certificates: provide manufacturer's product certificates certifying materials comply with specified requirements.

.2 Test and Evaluation Reports:

.1 Provide certified test reports in accordance with Section 01 29 83 - Payment Procedures for Testing Laboratory Services.

.2 Test reports to certify compliance of masonry units and mortar ingredients with specified performance characteristics and physical properties.

.3 Provide data for masonry units, in addition to requirements set out in referenced CSA and ASTM Standards, indicating initial rates of absorption.

.3 Installer Instructions: provide manufacturer's installation instructions, including storage, handling, safety and cleaning.

.4 Manufacturer's Reports: provide written reports prepared by manufacturer's on-site personnel to include:

.1 Verification of compliance of work with Contract.

.2 Site visit reports providing detailed review of installation of work, and installed work.

1.5 CLOSEOUT SUBMITTALS

.1 Provide manufacturer's instructions for care, cleaning and maintenance of prefaced masonry units for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

.1 Provide manufacturer's instructions in accordance with Section 01 78 00 - Closeout Submittals covering maintenance requirements and parts catalogue, with cuts and identifying numbers.

1.7 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturer: capable of providing field service representation during construction and approving application method.

.2 Installer: experienced in performing work of this section who has specialized in installation of work similar to that required for this project.

.3 Masons: company or person specializing in masonry installations with 5 years documented experience with masonry work similar to this project.

.1 Masons employed on this project must demonstrate ability to reproduce mock-up standards.

.2 Mock-ups:

.1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up panel of masonry wall construction 1200 x 1800 mm showing masonry colours and textures, use of reinforcement, ties, through-wall flashing, weep holes, jointing, coursing, mortar and workmanship.

.3 Mock-up used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.4 Allow 24 hours for inspection of mock-up by Contract Administrator before proceeding with work.

.5 When accepted by Contract Administrator, mock-up will demonstrate minimum standard for this work. Mock-up may not remain as part of finished work.

.6 Start work only upon receipt of written acceptance of mock-up by Contract Administrator.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Deliver materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.3 Storage and Handling Protection:

.1 Keep materials dry until use except where wetting of bricks is specified.

.2 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

.3 Packaging Waste Management:

.1 Remove for reuse and return of pallets, crates, paddling, and packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

1.9 SITE CONDITIONS

.1 Ambient Conditions: assemble and erect components when temperatures are above 4 degrees C.

.2 Weather Requirements: to CSA-A371 to IMIAC - Recommended Practices and Guide Specifications for Hot and Cold Weather Masonry Construction.

.3 Cold weather requirements:

.1 To CSA-A371 with following requirements.

.1 Maintain temperature of mortar between 5 degrees C and 50 degrees C until batch is used or becomes stable.

.2 Maintain ambient temperature of masonry work and it's constituent materials between 5 degrees C and 50 degrees C and protect site from windchill.

.3 Maintain temperature of masonry above 0 degrees C for minimum of 28 days, after mortar is installed.

.4 Preheat unheated wall sections in enclosure for minimum 72 hours above 10 degrees C, before applying mortar.

.2 Hot weather requirements:

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

.2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.

.3 Spray mortar surface at intervals and keep moist for maximum of three days after installation.

1.10 WARRANTY

.1 For Work in this Section 04 05 00 - Common Work Results for Masonry, 12 months warranty period is extended to 24 months.

1.11 STRUCTURAL DRAWINGS

.1 See the Structural Drawings for further information.

.2 In any situation where the specifications do not agree with the Structural Drawings:

.1 The more stringent requirements shall govern.

.2 Confirm requirements with the Contract Administrator prior to proceeding.

Part 2 Products

2.1 MANUFACTURERS

.1 Ensure manufacturer has minimum 5 years experience in manufacturing components similar to or exceeding requirements of project.

Part 3 Execution

3.1 INSTALLERS

.1 Experienced and qualified masons to carry out erection, assembly and installation of masonry work.

3.2 MANUFACTURER'S INSTRUCTIONS

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

3.3 EXAMINATION

.1 Examine conditions, substrates and work to receive work of this Section.

.1 Co-ordinate with Section 01 71 00 - Examination and Preparation.

.2 Examine openings to receive masonry units. Verify opening size, location, and that opening is square and plumb, and ready to receive work of this Section.

.1 Inform Contract Administrator of unacceptable conditions immediately upon discovery.

.2 Proceed with installation after unacceptable conditions have been remedied and after receipt of written approval from Contract Administrator.

.3 Verification of Conditions:

.1 Verify that:

.1 Substrate conditions which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of brick / concrete block / glass block.

.2 Field conditions are acceptable and are ready to receive work.

.3 Built-in items are in proper location, and ready for roughing into masonry work.

.2 Commencing installation means acceptance of existing substrates.

3.4 PREPARATION

.1 Surface Preparation: prepare surface in accordance with manufacturer's written recommendations and co-ordinate with Section 01 71 00 - Examination and Preparation.

.2 Establish and protect lines, levels, and coursing.

.3 Protect adjacent materials from damage and disfiguration.

3.5 INSTALLATION

.1 Do masonry work in accordance with CSA-A371 except where specified otherwise.

.2 Build masonry plumb, level, and true to line, with vertical joints in alignment, respecting construction tolerances permitted by CSA-A371.

.3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3.6 CONSTRUCTION

.1 Exposed masonry:

.1 Remove chipped, cracked, and otherwise damaged units, in accordance with CSA A-165 in exposed masonry and replace with undamaged units.

.2 Jointing:

.1 Concave: Allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, joints true to line, compressed, uniformly concave joints where concave joints are indicated.

.2 Flush: Strike flush joints concealed in walls and joints in walls to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating.

.3 Cutting:

.1 Cut out for electrical switches, outlet boxes, and other recessed or built-in objects.

.2 Make cuts straight, clean, and free from uneven edges.

.4 Building-In:

.1 Build in items required to be built into masonry.

.2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.

.3 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.

.5 Wetting of bricks:

.1 Except in cold weather, wet bricks having initial rate of absorption exceeding 1 g/minute/1000 mm^2: wet to uniform degree of saturation, 3 to 24 hours before laying, and do not lay until surface dry.

.2 Wet tops of walls built of bricks qualifying for wetting, when recommencing work on such walls.

.6 Support of loads:

.1 Use concrete to Section 03 30 00 - Cast-in-Place Concrete where concrete fill is used in lieu of solid units.

.2 Use grout to CSA A179 where grout is used in lieu of solid units.

.3 Install building paper below voids to be filled with concrete grout; keep paper 25 mm back from faces of units.

.7 Provision for movement:

.1 Leave 3 mm space below shelf angles.

.2 Leave 6 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.

.3 Built masonry to tie in with stabilizers, with provision for vertical movement.

.8 Loose steel lintels:

.1 Install loose steel lintels. Centre over opening width.

.9 Control joints:

.1 Construct continuous control joints at evenly distributed locations and near corners and adjacent to openings to meet all necessary requirements.

.2 Locations must be discussed and agreed upon on site with the Contract Administrator prior to proceeding.

.10 Movement joints:

.1 Build-in continuous movement joints at evenly distributed locations and near corners and adjacent to openings to meet all necessary requirements.

.2 Locations must be discussed and agreed upon on site with the Contract Administrator prior to proceeding.

.11 Interface with other work:

.1 Cut openings in existing work as indicated.

.2 Openings in walls: approved Contract Administrator.

.3 Make good existing work. Use materials to match existing.

3.7 SITE TOLERANCES

.1 Tolerances in notes to CSA-A371 apply.

3.8 FIELD QUALITY CONTROL

.1 Site Tests, Inspection:

.1 Perform field inspection and testing in accordance with Section 01 45 00 - Quality Control.

.2 Notify inspection agency minimum of 24 hours in advance of requirement for tests.

.2 Manufacturer's Services:

.1 Have manufacturer of products supplied under this Section review work involved in handling, installation/application, and protection of its products, and submit written reports in acceptable format to verify compliance of work with Contract.

.2 Manufacturer's field services: provide manufacturer's field services, consisting of product use recommendations and periodic site visits for inspection of product installation, in accordance with manufacturer's instructions.

.3 Schedule site visits to review work as installation is about to begin.

.4 Schedule site visits to review work at stages listed:

.1 After delivery and storage of products, and when preparatory work on which work of this Section depends is complete, but before installation begins.

.2 Twice during progress of work at 25% and 60% complete.

.3 Upon completion of work, after cleaning is carried out.

.5 Obtain reports within three days of review and submit immediately to Contract Administrator.

3.9 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.2 Progress Cleaning: in accordance with related masonry sections.

.3 Final Cleaning:

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

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

.4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Divert unused or damaged masonry units and glass block from landfill.

3.10 PROTECTION

.1 Temporary Bracing:

.1 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

.2 Bracing approved by Contract Administrator.

.3 Brace masonry walls as necessary to resist wind pressure and lateral forces during construction.

.2 Moisture Protection:

.1 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until completed and protected by flashing or other permanent construction.

.2 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.

.3 Air Temperature Protection: protect completed masonry as recommended in 1.9 SITE CONDITIONS.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C73-10, Standard Specification for Calcium Silicate Brick (Sand-Lime Brick).

.2 ASTM A116-11, Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric.

.3 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.4 ASTM C140-11a, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.

.5 ASTM A153/A153M-09, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.6 ASTM C207-06(2011), Standard Specification for Hydrated Lime for Masonry Purposes.

.7 ASTM C216-11, Standard Specification for Facing Brick (Solid Masonry Units Made of Clay or Shale).

.8 ASTM A307-10, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.

.9 ASTM C549-06 Standard Specification for Perlite Loose Fill Insulation.

.10 ASTM A641/A641M-09a, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

.11 ASTM A653/A653M-10, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.12 ASTM A1011/A1011M-10, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

.2 Brick Industry Association (BIA)

.1 Technical Note No. 20-2006, Cleaning Brick Work.

.3 Canadian Standards Association (CSA International)

.1 CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete, Includes Update No.1 (2011).

.2 CSA A82-06, Fired Masonry Brick Made From Clay or Shale, Includes Update No. 1.

.3 CAN/CSA A82.1-M87 (R2003), Burned Clay Brick (Solid Masonry Units Made From Clay or Shale).

.4 CAN3-A82.8-M78(R2003), Hollow Clay Brick.

.5 CAN/CSA-A165 Series-04 (R2009), CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2, and A165.3).

.6 CSA A179-04 (2009), Mortar and Grout for Unit Masonry.

.7 CSA S304.1-04, Design of Masonry Structures.

.8 CSA A370-04 (2009), Connectors for Masonry.

.9 CAN/CSA A371-04 (R2009), Masonry Construction for Buildings.

.10 CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005), Includes Update No. 1 (2009), Update No. 2 (2010), Update No. 3 (2011).

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Coordinate lines, levels and coursing with work of other Sections.

.2 Obtain built-in items prior to start of this work.

.2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with Contractor's representative, trade contractor, material supplier and Contract Administrator in accordance with Section 01 31 19 – Project Meetings to:

.1 Verify project requirements including specification and details for project.

.2 Confirm required mortar, grout and concrete testing; review batch control and grouting procedures.

.3 Co-ordination with related Work including, but not limited to, air/vapour membranes and insulation.

.4 Review cavity drainage requirements and methods for keeping mortar out of cavity spaces.

.5 Coordinate crack control measures.

.6 Review requirements for reinforcement at corners and wall intersections.

.7 Review membranes and membrane flashing materials and details used for construction.

.8 Confirm trowelled or tooled joints to concealed and exposed masonry faces.

.9 Review methods for controlling efflorescence during construction.

.10 Review hot and cold weather requirements.

1.3 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 – Submittal Procedures.

.1 Provide manufacturer's printed product literature, specifications and data sheet. Indicate masonry types, shapes, sizes, and textures.

.2 Cementitious Materials:

.1 Include brand, type, and name of manufacturer for site mixed mortar materials.

.2 Submit proposed mix proportions and sand analysis reports and compressive strength reports on the proposed mortar mix(es).

.2 Submit samples in accordance with Section 01 33 00 – Submittals Procedures.

.1 Provide 3 concrete masonry units (face only) to show texture and colour variance of exterior finish only.

.2 Provide sample of masonry connector, joint reinforcement, flashings, weeps and vent.

.3 Obtain review comments from Contract Administrator prior to ordering.

1.4 QUALITY ASSURANCE

.1 Conform to CAN/CSA A371, except as modified by this specification.

.2 The masonry contractor shall be a member in good standing with the Manitoba Masonry Contractors Association.

.3 The masonry contractor shall have a minimum of five (5) years of experience on projects of similar size and magnitude and shall provide continuous active supervision by a journeyman mason while masonry work is in progress.

.4 Masonry work shall be performed by experienced, qualified journeyman masons under the direct and continual full-time supervision of certified masons.

.5 Before starting masonry work establish mix proportions based on the limitations set out in Table 2 of CSA A179.

.6 Test laboratory prepared samples of the proposed mortar(s) for compressive strength in accordance with CSA A179, by a laboratory approved by the City of Winnipeg. The City of Winnipeg will pay for the initial cost of mortar testing. Any re-testing required as a result of the original test failing will be borne by the Contractor.

.7 Connectors and joint reinforcement shall conform to CSA A370.

.8 Miscellaneous masonry accessories, and their use where not otherwise specified but shown or required for proper completion of the Work, shall conform to CSA A371.

.9 Regulatory Requirements: Provide fire resistance rated materials and construction identical to those of assemblies with fire resistance ratings determined by ULC Listings.

1.5 MOCK-UPS

.1 Construct mock-up in accordance with Section 01 45 00 – Quality Control.

.2 Construct a portion of a free standing mock-up to establish a standard of construction, workmanship, and appearance. Show reinforcement, masonry connectors, flashing, jointing, coursing, mortar, and masonry pattern, unit face alignment, texture, and colour.

.3 Do not continue with work of this Section until Contract Administrator has reviewed mock-up.

.4 Mockup, if accepted, may remain as portion of finished work.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver masonry units on pallets, suitably protected from road grime and moisture absorption due to exposure to rain or melting snow.

.2 Unload and store on dry, level areas.

.3 Remove plastic wrappings from concrete masonry units and cover with waterproof coverings which will provide protection from the elements but allow for air circulation.

.4 Deliver cement, lime, and mortar in dry condition with manufacturer's label intact and store under waterproof cover and protected from elements.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Waste Management and Disposal.

1.8 SITE CONDITIONS

.1 Ambient Conditions: maintain materials and surrounding air temperature to:

.1 Minimum 5 degrees C prior to, during, and 48 hours after completion of masonry work.

.2 Maximum 32 degrees C prior to, during, and 48 hours after completion of masonry work.

.2 Provide adequate bracing for masonry during construction and until permanent lateral supports are in place.

1.9 STRUCTURAL DRAWINGS

.1 See the Structural Drawings for further information.

.2 In any situation where the specifications do not agree with the Structural Drawings:

.1 The more stringent requirements shall govern.

.2 Confirm requirements with Contract Administrator prior to proceeding.

Part 2 Products

2.1 GENERAL

.1 Reference Structural drawings for structural specifications.

.2 If in any case the structural drawings contradict the specifications, the Contract Administrator must be notified immediately who will confirm requirements. Follow the more strict requirements unless instructed otherwise by the Contract Administrator.

2.2 CONCRETE MASONRY UNITS

.1 Standard Concrete Masonry Units: to CAN/CSA A 165.1 and as follows:

.1 Classification:

.1 H/15/A/M (standard) or as indicated on Structural Drawings.

.2 1hr Fire Rated construction for elevator shaft.

.3 Size (Nominal): As indicated on Drawings.

.4 Special shapes: Lintels and bond beams are constructed using knock-out lintel units. Provide additional special shapes if and as indicated on the drawings.

.5 Acceptable Manufacturer:

.1 CCI/Expocrete Concrete Products Ltd or approved equivalent in accordance with B6 Substitutes.

2.3 MORTAR AND GROUT MATERIALS

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

.2 Cement:

.1 Portland Cement: to CAN/CSA-A3000, Type GU - General use hydraulic cement (Type 10) gray colour.

.3 Aggregate: supplied by one supplier.

.1 Fine Aggregate: to CAN/CSA A179.

.2 Course Aggregate: to CAN/CSA A179.

.4 Water: clean and potable.

.5 Lime:

.1 Quick Lime: to CAN/CSA A179.

.2 Hydrated Lime: to CAN/CSA A179, Type S, SA.

.6 Mortar Mixes

.1 Mortar for exterior masonry above grade:

.1 Loadbearing: type S based on proportion specifications.

.2 Non-Loadbearing: S based on proportion specifications.

.2 Mortar for interior masonry:

.1 Loadbearing: type S based on proportion specifications.

.2 Non-Loadbearing: S based on proportion specifications.

.3 Mortar for Parapet walls, chimneys, unprotected walls: type S based on proportion specifications, to CAN/CSA A179.

.4 Pointing Mortar: CAN/CSA A179, Type S using property specification with maximum 2 percent ammonium stearate or calcium stearate per cement weight.

.5 Following applies regardless of mortar types and uses specified above:

.1 Mortar for grouted reinforced masonry: Type S based on proportion specifications.

.7 Mortar Mixing:

.1 Mix mortar ingredients in accordance with CAN/CSA A179 in quantities needed for immediate use.

.2 Maintain sand uniformly damp immediately before mixing process.

.3 Add mortar colour and admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and colouration.

.4 Do not use admixtures, including pigments, air entraining agents, accelerators, retarders, water repellent agents, or other admixtures; unless approved in writing by the Contract Administrator.

.5 Do not use anti-freeze compounds including calcium chloride or chloride based compounds.

.6 Use a batch type mixer in accordance with CAN/CSA A179.

.7 Pointing mortar: prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour no more than 2 hours then remix with sufficient water to produce mortar of proper consistency for pointing.

.8 Re-temper mortar only within two hours of mixing, when water is lost by evaporation.

.9 Use mortar within 2 hours after mixing at temperatures of 32 degrees C, or 2-1/2 hours at temperatures under 10 degrees C.

.8 Grout Mixes:

.1 Bond Beams / Lintels / Grout: grout mix and strength as indicated on structural drawings and / or as approved by Contract Administrator.

.9 Grout Mixing:

.1 Mix batched and delivered grout in accordance with CAN/CSA-A23.1 transit mixed.

.2 Mix grout ingredients in quantities needed for immediate use in accordance with CAN/CSA A179.

.3 Add admixtures in accordance with manufacturer's instructions; mix uniformly.

.4 Do not use calcium chloride or chloride based admixtures.

.10 Mix Tests:

.1 Testing Mortar Mix:

.1 Test mortar to requirements of Section 01 45 00 - Quality Control, and in accordance with CAN/CSA A179, for proportion specification. Test prior to construction and during construction for:

.1 Compressive strength.

.2 Consistency.

.3 Mortar aggregate ratio.

.4 Sand/cement ratio.

.5 Water content and water/cement ratio.

.6 Air content.

.7 Splitting tensile strength

.2 Testing Grout Mix:

.1 Test grout to requirements of Section 01 45 00 - Quality Control, and in accordance with CAN/CSA A179, for proportion specification. Test prior to construction and during construction for:

.1 Compressive strength.

.2 Sand/cement ratio.

.3 Water content and water/cement ratio.

.4 Slump.

2.4 GALVANZING

.1 The following galvanizing requirements apply to steel anchors, ties, reinforcing and accessories where requirements are not otherwise specifically listed:

.1 Ties and Reinforcing:

.1 Mill Galvanized (Interior Use): In accordance with ASTM A116, Class 3.

.2 Hot Dip Galvanized (Exterior, including inner wythe of exterior wall construction and High Humidity Use): In accordance with ASTM A153, Class B-2.

.2 Hot Dip Hardware and Bolts: In accordance with ASTM A153, Class B-2 regardless of location.

.3 Hot Dip Sheet Steel: In accordance with ASTM A653, Coating Designation Z600, regardless of location.

.4 Structural Shapes and Pipes: In accordance with ASTM A123, Grade 85, regardless of location.

2.5 REINFORCEMENT

.1 Bar reinforcement: Steel to CAN/CSA A371 and CAN/CSA G30.18, and as indicated on structural drawings.

.2 Masonry Joint Reinforcement: In accordance with to CSA A371 and ASTM A496, with corrosion protection in accordance with CSA S304 and CSA A370, and as follows:

.1 Interior Walls: Hot dip galvanized, carbon steel.

.2 Exterior Walls: Stainless steel.

.3 Wire Size for Side and Cross Rods: As indicated on structural drawings.

.4 Spacing of Cross Rods, Tabs, and Cross Ties: At a maximum of 400 mm O/C.

.5 Lengths: A minimum of 3000 mm , with prefabricated corner and tee units.

.3 Connectors: In accordance with to CSA A370 and CSA S304 with [hot dip] galvanized finish.

.4 Single Wythe Masonry Joint Reinforcement: Ladder type with single pair of side rods.

.5 Multi-Wythe Masonry Joint Reinforcement: Ladder type with 1 side rod at each face shell of hollow masonry units more than 100 mm in width, plus 2 side rods at each wythe of masonry 100 mm or less in width.

2.6 TIES AND ANCHORS

.1 Ties and anchors specified in this section shall be designed in accordance with CSA A370 for non-conventional masonry connectors as follows:

.1 Deflection: Maximum 2 mm, including free play, when acted upon by a lateral load of 0.45 kN, in all possible positions of adjustment.

.2 Positive restraint at position of maximum adjustment.

.3 Free play of multi-component ties maximum 1.2 mm when assembled in all possible configurations.

.4 Anchors shall allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall.

2.7 ACCESSORIES

.1 Firestopping: As specified under Section 07 84 00 – Fire Stopping.

.2 Joint Filler: Control Joint Fillers: Preformed rubber, neoprene or polyvinylchloride, size and profile to suit intended application and as indicated on drawings.

.3 Bond Breaker Strips: #15 asphalt saturated, organic roofing felt in accordance with CSA A123.3.

.4 Cavity wall insulation in accordance with Section 07 21 13 – Board Insulation.

.5 Air and vapour barrier membrane in accordance with Section 07 27 00.01 - Air Barriers – Descriptive or Proprietary.

2.8 CLEANING COMPOUNDS

.1 Compatible with substrate and acceptable to concrete masonry manufacturer for use on products.

.2 Cleaning compounds compatible with clay brick masonry units and in accordance with manufacturer's written recommendations and instructions.

Part 3 Execution

3.1 EXAMINATION

.1 Verify surfaces and conditions are ready to accept work of this Section.

.2 Examine work of other Sections upon which work of this section is dependent. Should discrepancies be found which affect the proper performance of the work of this section, do not commence work until such discrepancies have been resolved.

3.2 PREPARATION

.1 Protect adjacent finished materials from damage due to masonry work.

3.3 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.4 INSTALLATION: GENERAL

.1 Construction to conform to CAN/CSA A371 and CAN/CSA S304.1. Masonry work shall comply with S304-94 masonry design for buildings (limit states design) including design testing and workmanship. Refer to S304.1 for material specifications.

.2 Where mortar has started to harden at units requiring repositioning, remove and replace with fresh mortar.

.3 Masonry horizontal and vertical joints to be 10 mm thick except where adjustments are necessary to maintain the bond pattern or to adjust coursing.

3.5 INSTALLATION: CONCRETE MASONRY UNITS

.1 Standard concrete block units:

.1 Bond: running.

.2 Coursing height: 200 mm for one block and one joint.

.3 Jointing: flush where exposed or where paint or other finish coating is specified.

.2 Special Shapes:

.1 Install special units to form corners, returns, offsets, reveals and indents without cut ends being exposed and without losing bond or module.

.2 Install reinforced concrete block lintels over openings in masonry where steel or reinforced concrete lintels are not indicated.

.3 End bearing: not less than 200 mm or as indicated on drawings.

.4 Install special site cut shaped units.

.3 Cull out masonry units, in accordance with CAN/CSA A165 and approved range of colour samples, with chips, cracks, broken corners, excessive colour and texture variation.

.4 Build in miscellaneous items such as bearing plates, steel angles, bolts, anchors, inserts, sleeves and conduits.

.5 Construct masonry walls using running bond unless otherwise noted.

.6 Build around frames previously set and braced. Fill behind hollow frames within masonry walls with mortar or grout and embed anchors.

.7 Fit masonry closely against electrical and plumbing outlets so collars, plates and covers overlap and conceal cuts.

.8 Install movement joints and keep free of mortar where indicated.

.9 Hollow Units: spread mortar setting bed from outside edge of face shells. Gauge amount of mortar on top and end of unit to create full joints, equivalent to shell thickness. Avoid excess mortar.

.10 Solid Units: apply mortar over entire vertical and horizontal surfaces. Avoid bridging of airspace between brick veneer and backup wall with mortar.

.11 Ensure compacted head joints. Use full or face-shell joint as indicated.

.12 Tamp units firmly into place.

.13 Do not adjust masonry units after mortar has set. Where resetting of masonry is required, remove, clean and reset units in new mortar.

.14 Tool exposed joints concave; strike concealed joints flush.

.15 After mortar has achieved initial set up, tool joints.

.16 Do not interrupt bond below or above openings.

3.6 TOLERANCES

.1 Tolerances for standard concrete unit masonry tolerances in accordance with CAN/CSA A165.1, supplemented as follows:

.1 Maximum variation between units within specific job lot not to exceed 2 mm.

.2 No parallel edge length, width or height dimension for individual unit to differ by more than 2 mm.

.3 Out of square tolerance not to exceed 2 mm.

3.7 INSTALLATION: CONNECTORS AND REINFORCEMENT

.1 Supply and install masonry connectors and reinforcement in accordance with CAN/CSA A370, CAN/CSA A371, CAN/CSA-A23.1 and CSA-S304.1 unless indicated otherwise.

.2 Prior to placing concrete / mortar/ grout, obtain Contract Administrator's approval of placement of reinforcement and connectors.

.3 Supply and install additional reinforcement to masonry as indicated.

3.8 BONDING AND TYING

.1 Install unit, adjustable, single wythe and multiple wythe joint reinforcement where indicated and in accordance with CAN/CSA A370, CAN/CSA A371, and manufacturer's instructions.

.1 Bond walls of two or more wythes using metal connectors in accordance with CAN/CSA A371 and as indicated.

.2 Install horizontal joint reinforcement 400 mm on centre.

.3 Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 400 mm each side of opening.

.4 Place joint reinforcement continuous in first and second joint below top of walls.

.5 Lap joint reinforcement ends minimum 150 mm.

.6 Connect stack bonded unit joint corners and intersections with strap anchors 400 mm on centre.

3.9 REINFORCED LINTELS AND BOND BEAMS

.1 Reinforce masonry beams, masonry lintels and bond beams as indicated.

.2 Place and grout reinforcement in accordance with CSA-S304.1, CAN/CSA A371, and CAN/CSA A179.

.3 Support and position reinforcing bars in accordance with CAN/CSA A371.

3.10 GROUTING

.1 Grout masonry in accordance with CSA-S304.1, CAN/CSA A371 and CAN/CSA A179 and as indicated.

3.11 ANCHORS

.1 Supply and install metal anchors in accordance with CAN/CSA A370 and CAN/CSA A371.

3.12 LATERAL SUPPORT AND ANCHORAGE

.1 Supply and install lateral support and anchorage in accordance with CSA-S304.1 and as indicated.

3.13 CONTROL AND EXPANSION JOINTS

.1 Install control and expansion joint materials in unit masonry as masonry progresses; do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

.2 Form control joints in concrete masonry consisting of a complete vertical break free from mortar using one of the following methods:

.1 Break joint reinforcement at control joints, but extend bond beam reinforcing 400 mm into wall across control joint and wrap with 0.15 mm polyethylene bond breaker.

.2 Fit bond breaker strips into hollow contour in ends of concrete masonry units on one side of control joint; fill resultant core with grout and rake out joints in exposed faces for application of sealant.

.3 Install preformed control joint gaskets designed to fit standard sash block.

.4 Install interlocking units designed for control joints; install bond breaker strips at joint; keep head joints free and clear of mortar or rake out joint for application of sealant.

.5 Install temporary foam plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

.6 Locate joints at 8000mm o/c maximum. Confirm location of control joints with Contract Administrator before installation.

.3 Form expansion joints in brick masonry consisting of a complete vertical break free from mortar using one of the following methods:

.1 Build flanges of metal expansion strips into masonry; lap each joint 100 mm in direction of water flow; seal joints below grade and at junctures with horizontal expansion joints if any.

.2 Build flanges of factory fabricated, expansion joint units into masonry.

.3 Build in compressible joint filler.

.4 Form open joint full depth of brick wythe a minimum of 10 mm for installation of sealant and backer rod specified in accordance with Section 07 92 00 – Joint Sealants.

.5 Locate joints at 6000 mm O/C maximum and at a minimum of 3600 mm from any corners, any other indication notwithstanding. Confirm location of expansion joints with Contract Administrator on site prior to installation.

.4 Install a minimum 10 mm high horizontal, pressure relieving joints by either leaving an air space or inserting a compressible filler, sealant and backer rod specified in Section 07 92 00 – Joint Sealants; locate horizontal, pressure relieving joints beneath shelf angles supporting masonry.

3.14 FIELD BENDING

.1 Do not field bend reinforcement and connectors except where indicated or authorized by Contract Administrator.

.2 When field bending is authorized, bend without heat, applying a slow and steady pressure.

.3 Replace bars and connectors which develop cracks or splits.

3.15 REPAIR/RESTORATION

.1 Upon completion of masonry, fill holes and cracks, remove loose mortar and repair defective work.

3.16 FIELD QUALITY CONTROL

.1 Site Tests, Inspection: in accordance with Section 04 05 00 - Common Work Results for Masonry.

.2 Manufacturer's Field Services: in accordance with Section 04 05 00 - Common Work Results for Masonry.

3.17 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.2 Concrete Unit Masonry:

.1 Progress Cleaning:

.1 Standard Concrete Unit Masonry:

.1 Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block. Clean wall surface with suitable brush or burlap.

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

.4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International Inc.

- .1 ASTM A36/A36M-08, Standard Specification for Carbon Structural Steel.
- .2 ASTM A193/A193M-08, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature or High-Pressure Service and Other Special Purpose Applications.
- .3 ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .4 ASTM A325-07a, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- .5 ASTM A325M-08, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile StrengthMetric.
- .6 ASTM A490M-04ae, Standard Specification for High-Strength Steel Structural Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints Metric.

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-85.10-99, Protective Coatings for Metals.

.3 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturers Association (CPMA).

- .1 Handbook of the Canadian Institute of Steel Construction.
- .2 CISC/CPMA Standard 2-75, Quick-Drying Primer for use on Structural Steel.

.4 Canadian Standards Association (CSA International)

- .1 CSA G40.20/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CAN/CSA-S16-01(R2007), Limit States Design of Steel Structures.
- .4 CAN/CSA-S136-07, North American Specifications for the Design of Cold Formed Steel Structural Members.
- .5 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel.
- .6 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.
- .7 CSA W55.3-1965(R2003), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .8 CSA W59-03, Welded Steel Construction (Metal Arc Welding).

.5 Master Painters Institute

- .1 MPI-INT 5.1-08, Structural Steel and Metal Fabrications.
- .2 MPI-EXT 5.1-08, Structural Steel and Metal Fabrications.

.6 The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineers (NACE) International

- .1 NACE No. 3/SSPC SP-6-06, Commercial Blast Cleaning.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings:

.1 Provide drawings stamped and signed by professional engineer registered or licensed in the Province of Manitoba, Canada.

.3 Erection drawings:

.1 Submit erection drawings indicating details and information necessary for assembly and erection purposes including:

.1 Description of methods.

.2 Sequence of erection.

.3 Type of equipment used in erection.

.4 Temporary bracings.

.4 Fabrication drawings:

.1 Submit fabrication drawings showing designed assemblies, components and connections are stamped and signed by qualified professional engineer licensed in the Province of Manitoba, Canada.

.5 Samples :

.6 Source Quality Control Submittals:

.1 Submit 2 copies of mill test reports 4 weeks prior to fabrication of structural steel.

.1 Mill test reports to show chemical and physical properties and other details of steel to be incorporated in project.

.2 Provide mill test reports certified by metallurgists qualified to practice in the Province of Manitoba, Canada.

.7 Fabricator Reports:

.1 Provide structural steel fabricator's affidavit stating that materials and products used in fabrication conform to applicable material and products standards specified and indicated.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver materials in manufacturer's original, undamaged containers with identification labels intact.

.3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets crates paddling and packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.4 STRUCTURAL DRAWINGS

.1 See the Structural Drawings for further information.

.2 In any situation where the specifications do not agree with the Structural Drawings:

.1 The more strict requirements shall govern.

.2 The Contract Administrator must be alerted, who will then confirm requirements.

Part 2 Products

2.1 DESIGN REQUIREMENTS

.1 Design details and connections in accordance with requirements of CAN/CSA-S16 and CAN/CSA-S136 with CSA-S136.1 to resist forces, moments, shears and allow for movements indicated.

.2 Shear connections:

.1 Select framed beam shear connections from an industry accepted publication such as "Handbook of the Canadian Institute of Steel Construction" when connection for shear only (standard connection) is required.

.2 Select or design connections to support reaction from maximum uniformly distributed load that can be safely supported by beam in bending, provided no point loads act on beam, when shears are not indicated.

.3 For composite construction select or design minimum end connection to resist reaction resulting from factored movement resistance as tabulated in the "Handbook of the Canadian Institute of Steel Construction" assuming 100% shear connection with depth of steel deck and/or slab shown on drawings.

.4 Submit sketches and design calculations stamped and signed by qualified professional engineer licensed in the Province of Manitoba, Canada for non standard connections.

2.2 MATERIALS

.1 Structural steel: to CSA-G40.20/G40.21 Grade as indicated and CAN/CSA-S136.

.2 Anchor bolts: to ASTM A307.

.3 High strength anchor bolts: to ASTM A193/A193M, grade as indicated.

.4 Bolts, nuts and washers: to ASTM A307, ASTM A325, ASTM A325M, ASTM A490/A490M.

.5 Welding materials: to CSA W48 Series and CSA W59 and certified by Canadian Welding Bureau.

.6 Shop paint primer: to CISC/CPMA2-75 solvent reducible alkyd, grey.

.7 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 600 g/m^2.

.8 Shear studs: to CSA W59, Appendix H.

2.3 FABRICATION

.1 Fabricate structural steel in accordance with CAN/CSA-S16, CAN/CSA-S136 and in accordance with reviewed shop drawings.

.2 Install shear studs in accordance with CSA W59.

.3 Continuously seal members by continuous welds or as indicated. Grind smooth.

.4 Provide holes in top / bottom flanges where required.

2.4 SHOP PAINTING

.1 Clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16, CAN/CSA-S136, MPI INT 5.1, EXT 5.1 except where members to be encased in concrete.

.1 All exterior steel to be galvanized.

.2 Clean members, remove loose mill scale, rust, oil, dirt and foreign matter. Prepare surface according to NACE No.3/SSPC-SP-6.

.3 Apply one coat of primer in shop to steel surfaces except:

.1 Surfaces to be galvanized.
.2 Surfaces to be encased in concrete.
.3 Surfaces to receive field installed stud shear connections.
.4 Surfaces and edges to be field welded.
.5 Faying surfaces of slip-critical connections.
.6 Below grade surfaces in contact with soil.

.4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5 degrees C.

.5 Maintain dry condition and 5 degrees C minimum temperature until paint is thoroughly dry.

.6 Strip paint from bolts, nuts, sharp edges and corners before prime coat is dry.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 GENERAL

.1 Structural steel work: in accordance with CAN/CSA-S16 / CAN/CSA-S136.

.2 Welding: in accordance with CSA W59.

.3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.

3.3 CONNECTION TO EXISTING WORK

.1 Verify dimensions and condition of existing work, report discrepancies and potential problem areas to Contract Administrator for direction before commencing fabrication.

3.4 MARKING

.1 Mark materials in accordance with CSA G40.20/G40.21. Do not use die stamping. When steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection.

.2 Match marking: shop mark bearing assemblies and splices for fit and match.

3.5 ERECTION

.1 Erect structural steel, as indicated and in accordance with CAN/CSA-S16 / CAN/CSA-S136 and in accordance with reviewed erection drawings.

.2 Field cutting or altering structural members: to approval of Contract Administrator.

.3 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.

.4 Continuously seal members by continuous welds where indicated. Grind smooth.

3.6 FIELD QUALITY CONTROL

.1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Contract Administrator.

.2 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Contract Administrator.

.3 Submit test reports to Contract Administrator within 2 weeks of completion of inspection.

.4 City of Winnipeg will pay costs of tests as specified in Section 01 29 83 - Payment Procedures for Testing Laboratory Services .

.5 Test shear studs in accordance with CSA W59.

3.7 FIELD PAINTING

.1 Paint in accordance with Section 09 91 23 - Interior Painting.

.1 Touch up damaged surfaces and surfaces without shop coat with primer to NACE No.3/SSPC-SP-6 except as specified otherwise. Apply in accordance: MPI Architectural Painting Specification Manual.

3.8 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-85.10-99, Protective Coatings for Metals.

.2 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA)

.1 CISC/CPMA 2-75-1975, Quick-Drying, Primer for Use on Structural Steel.

.2 CISC/CPMA 1-73a-1975, Quick-Drying, One-Coat Paint for Use on Structural Steel.

.3 CSA International

.1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CSA S16-09, Design of Steel Structures.

.3 CSA S136-07, North American Specification for the Design of Cold Formed Steel Structural Members.

.4 CSA W47.1-09, Certification of Companies for Fusion Welding of Steel.

.5 CSA W55.3-08, Certificate of Companies for Resistance Welding of Steel and Aluminum.

.6 CSA W59-M03(R2008), Welded Steel Construction (Metal Arc Welding) Metric.

.4 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - current edition.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for steel joist framing and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.

.2 Indicate on erection drawings, relevant details such as joist mark, depth, spacing, bridging lines, bearing, anchorage and details.

.3 Indicate particulars, on shop drawings, relative to joist geometry, framed openings, splicing details, bearing and anchorage. Include member size, properties, specified and factored member loads, and stresses under various loadings, deflection and camber.

.4 Delegated Design Submittals:

.1 Submit electronic copies of calculations and joist design drawings for typical joists to Contract Administrator for review at least 4 weeks prior to fabrication and/or delivery.

1.3 QUALITY ASSURANCE

.1 Submit 2 copies of mill test reports at least 4 weeks prior to fabrication of steel joists and accessories. Reports to show:

.1 Chemical and physical properties.

.2 Other details of steel to be incorporated into work.

.3 Certification by qualified metallurgists confirming that tests conform to requirements of CSA G40.20/G40.21

.2 Submit affidavit prepared by fabricator of structural steel joists stating that materials and products used in fabrication conform to this specification.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan.

1.5 STRUCTURAL DRAWINGS

.1 See the Structural Drawings for further information.

.2 In any situation where the specifications do not agree with the Structural Drawings:

.1 The more stringent requirements shall govern.

.2 Confirm requirements with Contract Administrator prior to proceeding.

Part 2 Products

2.1 DESIGN CRITERIA

.1 Design steel joists and bridging to carry loads indicated in joist schedule shown on drawings to CSA S16 CSA S136.

.2 Design joists and anchorages for uplift forces as indicated.

.3 Ensure joists are manufactured to consider load effects due to fabrication, erection and handling.

.4 Limit natural frequency of joist and or floor system to maximums indicated on the Structural Drawings.

.5 Limit roof joist deflection to maximums indicated on the Structural Drawings.

.6 Limit floor joist deflection due to specified live load maximums indicated on the Structural Drawings.

2.2 MATERIALS

.1 Open web steel joists: to CSA S16 and CSA S136.

.2 Structural steel: to CSA G40.20/G40.21 and CSA S136.

.3 Welding materials: to CSA W59.

.4 Shop paint primer: to MPI - INT 5.1B, CISC/CPMA-1, CISC/CPMA-2.

.5 Shear studs: to CSA W59, Appendix H.

2.3 FABRICATION

.1 Fabricate steel joists and accessories as indicated in accordance with CSA S16 and CSA S136 and in accordance with reviewed shop drawings.

.2 Weld in accordance with CSA W59.

.3 Provide top or bottom chord extensions where indicated.

.4 Provide diagonal and horizontal bridgings and anchorages as indicated.

.5 Weld studs to top / bottom chords for attachment purposes.

.6 Install shear studs in accordance with CSA W59.

2.4 SHOP PAINTING

.1 Clean, prepare and shop prime surfaces of steel joists to CSA S16, SSPC SP6.

.1 All exterior steel to be galvanized.

.2 Clean members of loose mill scale, rust, oil, dirt and other foreign matter. Prepare surfaces to SSPC SP1 brush blast.

.3 Apply one coat of CISC/CPMA 2 primer to steel surfaces to achieve dry film thickness of .065 mm to .080 mm maximum except:

.1 Surfaces to be galvanized.
.2 Surfaces to be encased in concrete.
.3 Surfaces to receive field installed stud shear connectors and steel decks.
.4 Surfaces and edges to be field welded.
.5 Faying surfaces of friction-type connections.
.6 Below grade surfaces in contact with soil.

.4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5 degrees C.

.5 Maintain dry condition and 5 degrees C minimum temperature until paint is thoroughly dry.

.6 Strip paint bolts, nuts, sharp edges and corners before prime coat is dry.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for steel joist framing installation in accordance with manufacturer's written instructions.

.1 Inform Contract Administrator of unacceptable conditions immediately upon discovery.

.2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Contract Administrator.

3.2 INSTALLATION

.1 Do structural steel work: to CSA S16 and CSA S136.

.2 Do welding: in accordance with CSA W59.

.3 Ensure installers are certified to CSA W47.1 for fusion welding and / or CSA W55.3 for resistance welding.

.4 Submit certification that welded joints are qualified by Canadian Welding Bureau.

3.3 CONNECTION TO EXISTING WORK

.1 Verify dimensions and condition of existing work; report discrepancies and potential problem areas to Contract Administrator for direction before commencing fabrication.

3.4 FIELD QUALITY CONTROL

.1 Testing laboratory will inspect representative joists for integrity, accuracy of fabrication and soundness of welds. Testing laboratory will also monitor test loading of joists used by manufacturer to verify design and check representative field connections. Contract Administrator will determine extent of and identify all inspections.

.2 Submit test report to Contract Administrator within 3 days after completion of inspection.

.3 City of Winnipeg will pay costs of tests as specified in Section 01 29 83 - Payment Procedures: Testing Laboratory Services.

.4 Test shear studs to CSA W59.

3.5 ERECTION

.1 Erect steel joists and bridging as indicated to CSA S16 and in accordance with reviewed erection drawings.

.2 Complete installation of bridging and anchorages before placing construction loads on joists.

.3 Field cutting or altering joists or bridging that are not shown on shop drawings: to approval of Contract Administrator.

.4 Clean and touch up shop primer to bolts, welds, burned or scratched surfaces at completion of erection.

3.6 FIELD PAINTING

.1 Paint: in accordance with Section 09 91 23 - Interior Painting.

.2 Touch up all damaged surfaces and surfaces without shop coat with MPI - INT 5.1B, CISC/CPMA-1, CISC/CPMA-2 in accordance with manufacturers' recommendations.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.8 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by steel joist framing installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM A653/A653M-09a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM A792/A792M-09a, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

.3 CSA International

.1 CSA C22.2 No.79-1978(R2008), Cellular Metal and Cellular Concrete Floor Raceways and Fittings.

.2 CSA S16-09, Design of Steel Structures.

.3 CSA S136-07, North American Specification for the Design of Cold Formed Steel Structural Members.

.4 CSA W47.1-09, Certification of Companies for Fusion Welding of Steel Structures.

.5 CSA W55.3-08, Certification of Companies for Resistance Welding of Steel and Aluminum.

.6 CSA W59-03(R2008), Welded Steel Construction, (Metal Arc Welding).

.4 Canadian Sheet Steel Building Institute (CSSBI)

.1 CSSBI 10M-08, Standard for Steel Roof Deck.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for steel decking and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.

.2 Submit design calculations if requested by Contract Administrator.

.3 Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, reinforcement details and accessories.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect decking from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan.

1.4 STRUCTURAL DRAWINGS

.1 See the Structural Drawings for further information.

.2 In any situation where the specifications do not agree with the Structural Drawings:

.1 The more stringent requirements shall govern.

.2 Confirm requirements with Contract Administrator prior to proceeding.

Part 2 Products

2.1 DESIGN CRITERIA

.1 Design steel deck to CSA S136 and CSSBI 10M.

.2 Steel deck and connections to steel framing to carry dead, live and other loads including lateral loads, diaphragm action, composite deck action, and uplift as indicated.

.3 Deflection under specified live load not to exceed 1/240 of span, except that when gypsum board ceilings are hung directly from deck, live load deflection not to exceed 1/360 of span.

.4 Where vibration effects are to be controlled as indicated, dynamic characteristics of decking system to be designed to be in accordance with CSA S16.

2.2 MATERIALS

.1 Zinc-iron Alloy (ZF) coated steel sheet: to ASTM A653/A653M structural quality Grade as indicated, with ZF75 coating, for interior surfaces not exposed to weather, painted finish.

.2 Decks to be painted: zinc-iron alloy coated decks suitable for finish painting.

.3 Zinc (Z) coated steel sheet: to ASTM A653/A653M structural quality Grade as indicated, with Z275, coating for exterior surfaces exposed to weather.

.4 Acoustic insulation: fibrous glass 17.5 kg/m; density minimum profiled to suit deck flutes.

.5 Closures: as indicated in accordance with manufacturer's recommendations.

.6 Cover plates, cell closures and flashings: steel sheet with minimum base steel thickness of 0.76 mm minimum. Metallic coating same as deck material.

.7 Primer: zinc rich, ready mix to CAN/CGSB-1.181.

.8 Caulking: to Section 07 92 00 - Joint Sealants.

.9 Shear studs: to CSA W59.

2.3 TYPES OF DECKING

.1 Structural metal deck: As indicated on structural drawings.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for steel decking installation in accordance with manufacturer's written instructions.

.1 Inform Contract Administrator of unacceptable conditions immediately upon discovery.

.2 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Structural steel work: in accordance with CSA S136 and CSSBI 10M.

.2 Welding: in accordance with CSA W59, except where specified otherwise.

.3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel and/or CSA W55.3 for resistance welding.

3.3 ERECTION

.1 Erect steel deck as indicated and in accordance with CSA S136, CSSBI 10M and in accordance with reviewed erection drawings.

.2 Lap ends: to 50 mm minimum. Weld and test stud shear connectors through steel deck to steel joists/beams below in accordance with CSA W59.

.3 Immediately after deck is permanently secured in place, touch up metallic coated top surface with compatible primer where burned by welding.

.4 Prior to concrete placement, steel deck to be free of soil, debris, standing water, loose mil scale and other foreign matter.

.5 Temporary shoring, if required, to be designed to support construction loads, wet concrete and other construction equipment. Do not remove temporary shoring until concrete attains 75% of its specified 28 day compression strength.

.6 Place and support reinforcing steel as indicated.

3.4 CLOSURES

.1 Install closures in accordance with approved details.

3.5 OPENINGS AND AREAS OF CONCENTRATED LOADS

.1 No reinforcement required for openings cut in deck, which are smaller than 150 mm square.

.2 Frame deck openings with any one dimension between 150 to 300 mm as recommended by manufacturer, except as otherwise indicated.

.3 For deck openings with any one dimension greater than 300 mm and for areas of concentrated load, reinforce in accordance with structural framing details, except as otherwise indicated.

3.6 CONNECTIONS

.1 Install connections in accordance with CSSBI recommendations as indicated.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.8 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by steel decking installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM A653/A653M-09a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.3 ASTM A792/A792M-09a, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

.3 CSA International

.1 CSA W47.1-09, Certification of Companies for Fusion Welding of Steel Structures.

.2 CSA W55.3-08, Certification of Companies for Resistance Welding of Steel and Aluminum.

.3 CSA W59-M03(R2008), Welded Steel Construction (Metal Arc Welding) Metric.

.4 CAN/CSA S136-07, North American Specification for the Design of Cold Formed Steel Structural Members.

.4 Canadian Sheet Steel Building Institute (CSSBI)

.1 CSSBI 50M-06, Lightweight Steel Framing Manual.

.2 CSSBI Fact Sheet #3 June 1994, Care and Maintenance of Prefinished Sheet Steel Building Products.

.3 CSSBI Technical Bulletin Vol. 7, No. 2 February 2004, Changing Standard Thicknesses for Canadian Lightweight Steel Framing Applications.

.4 CSSBI S5-04, Guide Specification for Wind Bearing Steel Studs.

.5 Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - current edition.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for structural metal studs and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba Canada.

.2 Indicate design loads, member sizes, materials, design thickness exclusive of coatings, coating specifications, connection and bracing details, screw sizes and spacing, and anchors.

.3 Indicate locations, dimensions, openings and requirements of related work.

.4 Indicate welds by welding symbols as defined in CSA W59.

.4 Samples:

.1 Submit samples of framing components for review.

.2 Submit duplicate 300 x 300 mm samples of each type.

.5 Certificates: prior to beginning Work, submit: 2 certified copies of mill reports covering material properties.

.6 Manufacturer Reports:

.1 Submit manufacturer's written report, within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect structural metal studs from nicks, scratches, and blemishes.

.3 Protect steel studs during transportation, site storage and installation in accordance with CSSBI Sheet Steel Facts #3.

.4 Handle and protect galvanized materials from damage to zinc coating.

.5 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

.1 Steel: to CAN/CSA S136, fabricated from ASTM A653/A653M, Grades as indicated on Structural Drawings.

.2 Zinc coated steel sheet: quality to ASTM A653/A653M, with Z275 designation coating.

.3 Welding materials: to CSAW59 and certified by Canadian Welding Bureau.

.4 Screws: as indicated on Structural Drawings.

.5 Anchors: concrete expansion anchors or other suitable drilled type fasteners.

.6 Bolts, nuts, washers: hot dipped galvanized to ASTM A123/A123M, 600 g/m2 zinc coating.

.7 Touch up primer: zinc rich, to CAN/CGSB-1.181, MPI #18.

2.2 STEEL STUD DESIGNATIONS

.1 Colour code: to CSSBI Technical Bulletin Vol.7, No. 2.

2.3 METAL FRAMING

.1 Steel studs: to CAN/CSA S136, fabricated from metallic coated steel, depth as indicated.

.1 Minimum steel thickness as indicated in Structural Drawings.

.2 Stud tracks: fabricated from same material and finish as steel studs, depth to suit.

.1 Top and Bottom tracks.

.3 Bridging: fabricated from same material and finish as studs, 38 x 12 x 1.09 mm minimum thickness.

.4 Angle clips: fabricated from same material and finish as studs, 38 x 38 mm x depth of steel stud, 1.37 mm minimum thickness.

.5 Tension straps and accessories: as recommended by manufacturer.

2.4 SOURCE QUALITY CONTROL

.1 Ensure mill reports covering material properties are reviewed by Contract Administrator

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for precast concrete installation in accordance with manufacturer's written instructions.

.1 Inform Contract Administrator of unacceptable conditions immediately upon discovery.

.2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Contract Administrator.

3.2 GENERAL

.1 Weld in accordance with CSA W59.

.2 Certification of companies: to CSA W47.1 for fusion welding and CSA W55.3 for resistance welding.

.3 Do structural metal stud framing work to CSSBI S5.

3.3 ERECTION

.1 Erect components to requirements of reviewed shop drawings.

.2 Anchor tracks securely to structure at 800 mm on centre maximum, unless lesser spacing prescribed on shop drawings.

.3 Erect studs plumb, aligned and securely attached with 2 screws minimum, / welded in accordance with manufacturer's recommendations.

.4 Seat studs into bottom tracks and top tracks.

.5 Install 50 mm minimum telescoping track at top of walls where required to accommodate vertical deflection.

.1 Nest top track into deflection channel minimum of 30 mm and maximum of 40 mm.

.2 Do not fasten tracks together.

.3 Stagger joints.

.6 Install studs at not more than 50 mm from abutting walls, openings, and each side of corners and terminations with dissimilar materials.

.7 Brace steel studs with horizontal internal bridging at 1220 mm maximum.

.1 Fasten bridging to steel clips fastened to steel studs with screws or by welding.

.8 Frame openings in stud walls to adequately carry loads by use of additional framing members and bracing as detailed on shop drawings.

.9 Touch up welds with coat of zinc rich primer.

3.4 ERECTION TOLERANCES

.1 Plumb: not to exceed 1/500th of member length.

.2 Camber: not to exceed 1/1000th of member length.

.3 Spacing: not more than +/- 3 mm from design spacing.

.4 Gap between end of stud and track web: not more than 4 mm.

3.5 CUTOUTS

.1 Maximum size of cutouts for services as follows:

Member Depth	Across Member Depth	Along Member Length	Centre to Centre Spacing (mm)
92	40 max.	105 max.	600 min.
152	65 max.	115 max.	600 min.

.2 Limit distance from centerline of last unreinforced cutout to end of member to less than 300 mm.

3.6 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 Obtain written report from manufacturer's verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 – Clause 1.2 ACTION AND INFORMATIONAL SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits to review Work as follows.

.1 After delivery and storage of products, and when preparatory Work is complete but before installation begins.

.2 Twice during progress of Work at 25% and 60% complete.

.3 Upon completion of Work, after cleaning is carried out.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.8 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by structural metal stud installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM A53/A53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

.2 ASTM A269-08, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

.3 ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 CSA International

.1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CSA S16-09, Design of Steel Structures.

.4 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).

.5 CSA W59-M03(R2008), Welded Steel Construction (Metal Arc Welding) Metric.

.6 Environmental Choice Program

.1 CCD-047-98(R2005), Architectural Surface Coatings.

.2 CCD-048-98(R2006), Surface Coatings - Recycled Water-borne.

.7 Green Seal Environmental Standards (GS)

.1 GS-11-2008, 2nd Edition, Paints and Coatings.

.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - current edition.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for metal components and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS for finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Manitoba, Canada.

.2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.3 QUALITY ASSURANCE

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

.2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan.

Part 2 Products

2.1 MATERIALS

.1 Steel sections, tubing and plates: to CSA G40.20/G40.21

.2 Steel pipe: to ASTM A53/A53M.

.3 Welding materials: to CSA W59.

.4 Welding electrodes: to CSA W48 Series.

.5 Bolts and anchor bolts: to ASTM A307.

.6 High strength bolts to ASTM A325M.

.7 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 FABRICATION

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.

.3 Where possible, fit and shop assemble work, ready for erection.

.4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

.5 Fabricate stairs to NAAMM Metal Stair Manual.

.1 Weld connections where possible, otherwise bolt connections. Countersink exposed fastenings, cut off bolts flush with nuts. Make exposed connections of same material, colour and finish as base material on which they occur.

.2 Accurately form connections with exposed faces flush; mitres and joints tight. Make risers of equal height.

.3 Grind or file exposed welds and steel sections smooth.

.4 Shop fabricate stairs in sections as large and complete as practicable.

2.3 FINISHES

.1 Exterior Finishes:

.1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m^2 to CAN/CSA-G164.

.2 Prime over galvanizing in accordance with MPI (The Master Painters Institute). Review preparation of galvanized steel with galvanizer for suitability:

.1 Surface preparation and cleaning in accordance with MPI #25:

.1 Etching cleaner for galvanized metal.

.2 Priming & Painting to be in accordance MPI EXT 5.3A G5 Finish:

.1 Cementitious primer #26.

.2 Finish coats by painting contractor. See Specification Section 09 91 23.

.3 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.

.4 Field touch-up as required.

.3 Clean surfaces to be field welded; do not paint.

.1 Use touch-up primer after installation.

.2 Interior Finishes:

.1 SSPC – SP-7 surface preparation. Shop applied.

.2 Rust-inhibitive primer – shop applied by manufacturer. To be fully compatible with substrate and site applied finish coats.

.3 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.

.4 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, and grease. Do not paint when temperature is lower than 7 degrees C.

.5 Finish coats by painter. See Specification Section 09 91 23.

2.4 ISOLATION COATING

.1 Isolate aluminum from following components, by means of bituminous paint:

.1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.

.2 Concrete, mortar and masonry.

.3 Wood.

2.5 ANGLE LINTELS

.1 Steel angles: Galvanized, sizes as indicated and as required for openings.

.2 Provide 150mm minimum bearing at ends and as indicated by Structural Drawings.

.3 Weld or bolt back-to-back angles to profiles as indicated.

.4 See Structural Drawings.

2.6 STEEL PAN STAIRS

.1 Fabricate stairs with closed riser steel pan construction.

.2 Stringers: Form stair stringers from MC 310 x 15.8 unless noted on drawings.

.3 Form treads and risers from 5 mm thick steel plate. Secure treads and risers to L 35 x 35 x 5mm steel plate horizontal and vertical support angles welded to stringers.

.1 2 rods per tread.

.2 Fill treads with concrete.

.4 Form wall stringers from MC 310 x 15.8.

.5 Form landings from 3 mm thick steel plate, reinforced by L 55 x 55 x 6 mm spaced at 400 mm on centre.

.6 Provide clip angles for fastening of furring channels, where applied finish is indicated for underside of stairs and landings.

.7 Extend stringers around mid landings to form steel base.

.8 Close ends of stringers where exposed.

.9 Paint stair and rail.

2.7 GUARDRAILS & HANDRAILS

.1 Fabricate handrails as detailed in drawings.

.2 Handrails: 38mm steel tubing.

.1 Provide 76x76x3mm attachment plates where handrails are mounted to walls – mechanically fastened to wall through equally spaced predrilled countersunk holes.

.2 Coordinate blocking in stud walls at attachment locations.

.3 Cap and weld exposed ends.

.4 Grind smooth.

.5 Exterior finish: galvanized.

.6 Interior finish: Prime and paint in accordance with 09 91 23 – Interior Painting.

2.8 ELEVATOR HOIST BEAM

.1 See Structural Drawings.

.2 Coordinate to elevator manufacturer's requirements.

2.9 ELEVATOR PIT LADDER

.1 Roof access ladders to meet Workplace Safety and Health Guidelines and ANSI A14.3 "Safety Requirements for Fixed Ladders".

.2 Ladder location and height to be coordinated with elevator manufacturer.

.3 10 x 65mm vertical bar to heights indicated.

.4 19mm dia. steel rungs at 300mm o.c.

.5 10x65mm steel support brackets at max. 1200 o.c.

.1 Coordinate support blocking at bracket locations.

.2 Mechanically fasten.

2.10 ACTUATOR MOUNTING POST AND FRAME

.1 Galvanized actuator mounting post and frame:

.1 150mmx150mm Galvanized H.S.S. tube. Set in concrete located min 610mm from door in 90 degree open position

.2 38mm Diameter galvanized metal tube guard frame with horizontal guards at 150mm, 600mm and 1050mm. Vertical 38mm diameter galvanized metal post located 100mm from building anchored to concrete, and opposite side connected to 150x150mm H.S.S.

2.11 SUMP PIT COVERS

.1 Sump Cover hatch doors: Two galvanized 6 x 938 x 650mm checker plate covers and One 6 x 938 x 725mm checker plate cover complete with:

.1 Flush drop handle.

.2 Heavy Duty Hinges on exterior wall side.

.3 Cover reinforced for live load of 300 pounds/sq ft.

.4 Rubber gasket seal all around cover

.2 50 x 50 x 6 mm perimeter angles on all sides of concrete opening. Anchor angle into the concrete.

.3 38mm Galvanized grate with solid galvanized steel cover plate c/w openings for 3 hatch doors.

.4 Gasket and/or caulk all joints, edges and pipe penetrations for full gas-seal.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.

.1 Inform Contract Administrator of unacceptable conditions immediately upon discovery.

.2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Contract Administrator.

3.2 ERECTION

.1 Do welding work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Provide suitable means of anchorage acceptable to Contract Administrator such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.4 Exposed fastening devices to match finish and be compatible with material through which they pass.

.5 Supply components for work by other trades in accordance with shop drawings and schedule.

.6 Make field connections with bolts to CSA S16 or Weld field connection.

.7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.

.8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces with primer after completion of:

.9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by metal fabrications installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI/NPA A208.1-1999, Particleboard, Mat Formed Wood.

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM A653/A653M-05a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealled) by the Hot-Dip Process.

.2 ASTM C36/C36M-03, Standard Specification for Gypsum Wallboard.

.3 ASTM C578-05a, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.

.4 ASTM C1289-05a, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

.5 ASTM D1761-88(2000), Standard Test Methods for Mechanical Fasteners in Wood.

.6 ASTM D5055-05, Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.

.7 ASTM D5456-05a, Standard Specification for Evaluation of Structural Composite Lumber Products.

.3 American Wood-Preservers' Association (AWPA)

.1 AWPA M2-01, Standard for Inspection of Treated Wood Products.

.2 AWPA M4-06, Standard for the Care of Preservative-Treated Wood Products.

.4 Canada Green Building Council (CaGBC)

.1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.

.5 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-11.3-M87, Hardboard.

.2 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.

.3 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.4 CAN/CGSB-71.26-M88, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.

.6 Canadian Standards Association (CSA International)

.1 CSA O80 Series-97(R2002) - O80S2-05, Wood Preservation.

.2 CSA O80.20-1.1-M97(R2002), This Standard applies to the fire-retardant treatment of lumber by pressure processes..

.3 CSA O80.27-1.1-M97(R2002), This Standard covers the fire-retardant treatment of Douglas Fir, hardwood, softwood, and Poplar plywood by pressure processes.

.4 CSA O80.201-M89, This Standard covers hydrocarbon solvents for preparing solutions of preservatives.

.5 CSA A123.2-03, Asphalt Coated Roofing Sheets.

.6 CAN/CSA-A247-M86, Insulating Fiberboard.

.7 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.8 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.9 CSA O112 Series-M1977(R2006), CSA Standards for Wood Adhesives.

.10 CSA O121-M1978(R2003), Douglas Fir Plywood.

.11 CSA O122-06, Structural Glued-Laminated Timber.

.12 CSA O141-05, Softwood Lumber.

.13 CSA O151-04, Canadian Softwood Plywood.

.14 CSA O153-M1980(R2003), Poplar Plywood.

.15 CSA O322-02, Procedure for Certification of Pressure-Treated Wood Materials for Use in Preserved Wood Foundations.

.16 CAN/CSA-O325.0-92(R2003), Construction Sheathing.

.17 CSA O437 Series-93(R2006), Standards on OSB and Waferboard.

.7 Forest Stewardship Council (FSC)

.1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.2 FSC-STD-20-002-2004, Structure and Content of Forest Stewardship Standards V2-1

.3 FSC Accredited Certified Bodies.

.8 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber 2005.

.9 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)

.1 SCAQMD Rule 1113-04, Architectural Coatings.

.2 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

.10 Truss Design and Procedures for Light Metal Connected Wood Trusses, Truss Plate Institute of Canada.

.11 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S706-97, Mineral Fibre Thermal Insulation for Buildings.

1.2 SUBMITTALS

.1 Submit Submittal submissions: in accordance with Section 01 33 00 - Submittal Procedures.

1.3 QUALITY ASSURANCE

.1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

Part 2 Products

2.1 FRAMING AND STRUCTURAL MATERIALS

.1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% (S-dry) 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: "Standard" or better grade.

.2 Dimension sizes: "Standard" light framing or better grade.

.3 Post and timbers sizes: "Standard" or better grade.

.3 Douglas fir plywood (DFP): to CSA O121, standard construction.

.4 Canadian softwood plywood (CSP): to CSA O151, standard construction.

.5 Poplar plywood (PP): to CSA O153, standard construction.

2.2 ACCESSORIES

.1 Sealants: See Section 07 92 00 – Joint Sealants.

.2 General purpose adhesive: to CSA O112 Series.

.3 Nails, spikes and staples: to CSA B111.

.4 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.

.5 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices recommended for purpose by manufacturer.

2.3 FASTENER FINISHES

.1 Fasteners for exterior work: Galvanizing: to CAN/CSA - G164, ASTM A653.

.2 Fasteners for use in ACQ pressure treated wood: Galvanizing to CAN/CSA – G185 or Stainless Steel types 304, 316.

.1 Stainless Steel fasteners not to be used in combination with galvanized steel.

2.4 PRESSURE TREATED WOOD

.1 Preservative: to CSA-O80 Series and to SCAQMD Rule #1113.

.1 Alkaline Copper Quaternary – ACQ.

.2 Borate preservative.

.3 Use of Chromated Copper Arsenate (CCA) is not permitted.

.2 Application: Treat wood to CSA O80 Series.

.3 Field application:

.1 Comply with AWPA M4 and revisions specified in CSA O80 Series, Supplementary Requirements to AWPA M2.

.2 Remove chemical deposits on treated wood to receive applied finish.

.4 Installation:

.1 Fasteners for use in ACQ pressure treated wood:

.1 Stainless Steel type 304 or 316.

.2 Hot dipped galvanized to G-185 and specifically certified as ACQ compatible by manufacturer.

.2 Aluminum materials shall not be installed in direct contact with ACQ pressure treated wood.

.5 Treated Wood Schedule:

.1 All wood on exterior of building air barrier and roof vapour retarder to be pressure treated with ACQ preservative.

.2 Interior: Wood in contact with concrete to be treated with Borate.

Part 3 Execution

3.1 PREPARATION

.1 Store wood products.

3.2 INSTALLATION

.1 Comply with requirements of NBC 2005 Part 9 supplemented by following paragraphs.

.2 Install members true to line, levels and elevations, square and plumb.

.3 Construct continuous members from pieces of longest practical length.

.4 Install spanning members with "crown-edge" up.

.5 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding, handrails, electrical equipment mounting boards and other work as required.

.6 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.7 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized fasteners.

.8 Use dust collectors and high quality respirator masks when cutting or sanding wood panels.

3.3 ERECTION

.1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.2 Countersink bolts where necessary to provide clearance for other work.

3.4 SCHEDULES

.1 Lumber, sheathing, blocking, strapping and similar – as indicated on drawings.

.2 Exterior wood strapping, blocking and plywood for construction of parapets, roof curbs and similar.

.1 To be pressure treated.

.3 Electrical equipment mounting boards:

.1 Plywood, DFP or CSP grade, or PP grade, square edge 13 mm thick.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

.1 Section Includes: Fiberglass-mat faced, moisture and mold resistant gypsum sheathing.

1.2 REFERENCES

.1 ASTM International (ASTM):

- .1 ASTM C472 Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete.
- .2 ASTM C473 Standard Test Methods for Physical Testing of Gypsum Panel Products.
- .3 ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- .4 ASTM C840 Standard Specification for Application and Finishing of Gypsum Board.
- .5 ASTM C1002 Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- .6 ASTM C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- .7 ASTM C1280 Standard Specification for Application of Gypsum Sheathing.
- .8 ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- .9 ASTM D6329 Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers**.**
- .10 ASTM E72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
- .11 ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
- .12 ASTM E661 Standard Test Method for Performance of Wood and Wood-Based Floor and Roof Sheathing Under Concentrated Static and Impact Loads.

.2 Gypsum Association (GA): GA-253 Application of Gypsum Sheathing.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.

.2 Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.

.3 Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged.

1.4 SUBMITTALS

.1 Product Data: Manufacturer's specifications and installation instructions for each product specified.

1.5 WARRANTY

.1 Provide products that offer twelve months of coverage against in-place exposure damage (delamination, deterioration and decay).

.2 Manufacturer's Warranty:

.1 Five years against manufacturing defects.

Part 2 Products

2.1 MATERIALS

.1 Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177:

.1 Thickness: 13mm.
.2 Width: 1220mm
.3 Length: as required.
.4 Weight: 1.9 lb/sq. ft.
.5 Edges: Square.
.6 Surfacing: Fiberglass mat on face, back, and long edges.
.7 Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 540 pounds per square foot, dry.
.8 Flexural Strength, Parallel (ASTM C473): 80 lbf, parallel.
.9 Humidified Deflection (ASTM C1177): Not more than 2/8 inch.
.10 Permeance (ASTM E96): 23 perms.
.11 R-Value (ASTM C518): 0.56.
.12 Mold Resistance (ASTM D3273): 10, in a test as manufactured.
.13 Microbial Resistance (ASTM D6329, GREENGUARD 3-week protocol): Will not support microbial growth.
.14 Acceptable Product: 13mm DensGlass Sheathing, Georgia-Pacific Gypsum, or approved equivalent in accordance with B6 Substitutes.

.2 Fire-Rated Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177, Type X:

.1 Thickness: 16mm.
.2 Width: 1220mm.
.3 Length: as required.
.4 Weight: 2.5 lb/sq. ft.
.5 Edges: Square.

.6 Surfacing: Fiberglass mat on face, back, and long edges.

.7 Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 654 pounds per square foot, dry.

.8 Flexural Strength, Parallel (ASTM C1177): 100 lbf, parallel.

.9 Humidified Deflection (ASTM C1177): Not more than 1/8 inch.

.10 Permeance (ASTM E96): Not more than 17 perms.

.11 R-Value (ASTM C518): 0.67.

.12 Mold Resistance (ASTM D3273): 10, in a test as manufactured.

.13 Microbial Resistance (ASTM D6329, GREENGUARD 3-week protocol): Will not support microbial growth.

.14 Acceptable Products: 16mm DensGlass Fireguard Sheathing, Georgia-Pacific Gypsum or approved equivalent in accordance with B6 Substitutes.

.3 Fiberglass-Mat Faced Gypsum Roof Board:

.1 Thickness: 13mm.

.2 Width: 1220mm.

.3 Length: as required.

.4 Weight: 1.975 lb/sq. ft.

.5 Surfacing: Fiberglass mat with non-asphaltic coating.

.6 Flexural Strength, Parallel (ASTM C473): 80 lbf, minimum.

.7 Flute Span (ASTM E661): 5 inches.

.8 Permeance (ASTM E96): Not more than 35 perms.

.9 R-Value (ASTM C518): Not less than 0.56.

.10 Water Absorption (ASTM C1177): Less than 10 percent of weight.

.11 Compressive Strength (Applicable Sections of ASTM C472): 500 - 900 pounds per square inch.

.12 Surface Water Absorption (ASTM C473): Not more than 2 grams.

.13 Acceptable Products: DensDeck Prime, Georgia-Pacific Gypsum, or approved equivalent in accordance with B6 Substitutes.

2.2 ACCESSORIES

.1 A. Screws: ASTM C1002, corrosion resistant treated.

Part 3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions:

.1 Inspection: Verify that project conditions and substrates are acceptable, to the installer, to begin installation of work of this section.

3.2 INSTALLATION

.1 In accordance with GA-253, ASTM C1280 and the manufacturer’s written instructions.

.2 Parapet sheathing underneath roofing materials:

.1 Coordinate to Modified Bituminous Membrane Roofing Section 07 52 00.

.2 Adhered or Mechanically Attached: As recommended by roof system and/or adhesive manufacturer and as required by FM or UL guidelines for wind uplift resistance.

3.3 PROTECTION

.1 Protect gypsum board installations from damage and deterioration until date of Substantial Completion.

END OF SECTION

Part 1 dGeneral

1.1 SECTION INCLUDES

.1 Materials and installation for asphalt for use as dampproofing.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
- .2 CAN/CGSB 37.3-M89, Application of Emulsified Asphalts for Dampproofing or Waterproofing.
- .3 CAN/CGSB 37.5-M89, Cutback Asphalt Plastic Cement.
- .4 CGSB 37-GP-6Ma-83, Asphalt, Cutback, Unfilled, for Dampproofing.
- .5 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
- .6 CGSB 37-GP-11M-76(R1984), Application of Cutback Asphalt Plastic Cement.
- .7 CGSB 37-GP-12Ma-84, Application of Unfilled Cutback Asphalt for Dampproofing.
- .8 CGSB 37-GP-15M-76(R1984), Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
- .9 CAN/CGSB 37.16-M89, Filled, Cutback, Asphalt for Dampproofing and Waterproofing.
- .10 CAN/CGSB 37.28-M89, Reinforced Mineral Colloid Type, Emulsified Asphalt for Roof Coatings and for Waterproofing.
- .11 CGSB 37-GP-36M-76, Application of Filled Cutback Asphalts for Dampproofing and Waterproofing.
- .12 CGSB 37-GP-37M-77, Application of Hot Asphalt for Dampproofing or Waterproofing.

.2 Canadian Standards Association (CSA International)

- .1 CSA A123.4-98, Bitumen for Use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing Systems.

.3 Health Canada

- .1 Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

.4 National Research Council Canada (NRC)/Institute for Research in Construction (IRC)

- .1 Canadian Construction Materials Centre (CCMC)

1.3 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures .

.2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.3 Submit product data sheets for bituminous dampproofing products. Including:

- .1 Product characteristics.
- .2 Performance criteria.
- .3 Application methods.
- .4 Limitations.

.4 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Provide and maintain dry, off-ground weatherproof storage.

.3 Store materials on supports to prevent deformation.

.4 Store at temperatures above 5 degrees C.

.5 Remove only in quantities required for same day use.

.6 Store materials in accordance with manufacturer's written instructions.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard and wood packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Ensure emptied containers are sealed and stored safely.

.5 Fold up metal banding, flatten and place in designated area for recycling.

.6 Divert unused bituminous dampproofing, sealing compoundsand asphalt primer materials from landfill to recycling facility approved by Contract Administrator.

1.6 PROJECT/SITE ENVIRONMENTAL REQUIREMENTS

.1 Temperature, relative humidity, moisture content.

.1 Apply dampproofing materials only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

.2 Do not proceed with Work when wind chill effect would tend to set bitumen before proper curing takes place.

.3 Maintain air temperature and substrate temperature at dampproofing installation area above 5 degrees C for 24 hours before, during and 24 hours after installation.

.4 Do not apply dampproofing in wet weather.

.2 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.

.3 Ventilation:

.1 Ventilate area of Work as directed by Contract Administrator by use of approved portable supply and exhaust fans.

.2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

.3 Provide continuous ventilation during and after dampproofing application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of dampproofing installation.

Part 2 Products

2.1 MATERIALS

.1 Gradebeam dampproofing coating for temperatures above 5 degrees C (40 degrees F):

.1 Dampproof asphalt emulsion primer conforming to the requirements of AN/CGSB-37.2 shall be 700-01 Asphalt Emulsion Dampproofing manufactured by Bakor (or approved equivalent in accordance with B6 Substitutes) diluted 20% with clean water.

.2 Asphalt emulsion dampproofing conforming to the requirements of CAN/CGSB-37.2 shall be 700-01 Asphalt Emulsion Dampproofing manufactured by Bakor or approved equivalent in accordance with B6 Substitutes.

.2 Foundation wall waterproofing membranes:

.1 Primary Waterproofing Membrane shall be Blueskin® WP200 manufactured by Bakor (or approved equivalent in accordance with B6 Substitutes) with the **CCMC 13297-R listing**.

.1 SBS modified bitumen, self-adhering sheet membrane with a cross-laminated polyethylene film, and having the following physical properties:

.1 Thickness: 1.5 mm (60 mils) min.

.2 Flexibility: Pass @ -40 degrees C to ASTM D1970

.3 Vapour permeance: 2.8 ng/Pa.s.m² (0.05 perms) to ASTM E96

.4 Tensile strength (membrane): 2.24 MPa to ASTM D412,

.5 Tensile strength (film): 34.5 MPa to ASTM D882,

.6 Elongation: 300% to ASTM D412,

.7 Puncture resistance: 222 N min. to ASTM E154.

.2 Foundation wall primer:

.1 Primer for self-adhering waterproofing membrane: Aquatac™ Primer manufactured by Bakor (or approved equivalent in accordance with B6 Substitutes).

.1 Polymer emulsion based adhesive type, quick setting for temperatures above –4 degrees C, having the following physical properties:

.1 Colour: Aqua

.2 Weight: 1.0 kg/l

.3 Solids by weight: 53%

.4 Water based, no solvent odours

.5 Drying time (initial set): 30 minutes,

.3 Oil interceptor and sump pit waterproofing:

.1 Apply waterproof cement-based coating on interior concrete walls of the elevator oil interceptor pit, elevator sump pit, and weeping tile sump pit. Acceptable product for use is Thoroseal Waterproof Cement-Based Coating or approved equivalent.

.1 Cement-based, micro-porous (breathing) seamless coating to fill, seal, waterproof and protect cast-in-place concrete.

.2 Suitable for interior or exterior, above or below grade applications.

.3 Highly resistant to standing water and intended for use on vertical and non-traffic bearing horizontal surfaces.

.4 Install strictly to manufacturer's instructions:

.1 Clean and Prepare Surfaces as per manufacturer's instructions.

.2 Fill all pores and voids.

.3 First coat must be well brushed into substrate, 2 lbs. per sq. yard, and finished with smooth horizontal strokes.

.4 Allow min. 24 hours to cure before applying second coat, or as recommended by manufacturer.

.5 Second coat to be applied at 1 lb. per sq. yard.

.6 Plug any weeping holes using Waterplug (or approved equivalent product) and then coat with Thoroseal as per manufacturer's instructions.

Part 3 Execution

.1 Condition of Surface

.1 Before commencing work, ensure environmental and site conditions are suitable for installation in accordance with manufacturer's instructions.

3.2 APPLICATION

.1 Gradebeam Dampproofing:

.1 Do dampproofing in accordance with CAN/CGSB-37.3, CGSB 37-GP-12Ma, CGSB 37-GP-36M, CGSB 37-GP-37M except where specified otherwise.

.2 Do sealing work in accordance with CGSB 37-GP-11M except where specified otherwise.

.3 Do priming of surface in accordance with CGSB 37-GP-15M except where specified otherwise.

.4 Application of Dampproofing Coating for Temperatures Above 5 degrees C.

.1 Apply a coat of asphalt emulsion dampproofing diluted 20% with clean water at the rate of 0.5l/m^2 (1 gal/100ft^2) as a primer and allow to dry.

.2 Apply a second coat of asphalt emulsion dampproofing at rate of 1.0 to 1.5 l/m^2 (2 to 3 gal/100ft^2) and allow to dry.

.2 Foundation Waterproofing: (Includes elevator shaft and high side of high-low slab grade beams.)

.1 Preparation

.1 All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar, frost or other contaminants. Fill spalled areas in substrate to provide an even plane.

.2 New concrete should be cured for a minimum of 7 days and must be dry before waterproofing membranes are applied. Lightweight structural concrete must be cured a minimum of 14 days.

.3 Use appropriate waterproofing membrane primer as recommended by manufacturer based on air and surface temperature at time of application.

.2 Primer

.1 Apply primer for self-adhered membrane by roller or spray at rate recommended by manufacturer.

.2 Allow minimum 30 minute open time. Primed surfaces not covered by waterproofing membrane during the same working day must be re-primed.

.3 Joint and Crack Treatment

.1 All cracks in concrete 1.5mm to 3mm wide are to be pre-treated with a 1.5 mm (60 mil) coating of liquid membrane 50 mm wide centred on the crack/joint. Alternately, apply a 150-mm wide strip of waterproofing membrane centred over crack. Provide 75 mm end laps.

.2 Horizontal to vertical inside corner transition areas are to be pre-treated with a liquid membrane fillet extending 19 mm vertically and horizontally from the corner. Apply a minimum 225 mm strip of waterproofing membrane centred at the joint.

.3 All outside corners are to be pre-treated with a minimum 225 mm strip of waterproofing membrane centred at the joint.

.4 Where three or more planes come into contact reinforce with cut sections of waterproofing membrane reinforcing sheet as per manufacturers instructions.

.4 Projections

.1 Extend waterproofing membrane tight to projection and seal with liquid membrane extending 65 mm along projection and 65 mm onto waterproofing membrane.

.5 Waterproofing Membrane - Vertical Applications

.1 Apply waterproofing membrane to prepared substrate in lengths of 2400 mm or less.

.2 Provide 65 mm laps at both sides and ends. Position for alignment and remove protective film. Press firmly into place. Promptly roll all laps with a counter top roller to effect seal. If more than one length is required on a vertical surface, apply in a shingle fashion.

.3 Terminate membrane using termination mastic or termination bar, reglet or counter flashing as indicated. Refer to manufacturers standard details.

.4 All laps within 300 mm of a 90 degrees change in plane are to be sealed with termination sealant.

3.3 SCHEDULE

.1 Apply continuous, uniform coating of dampproofing to entire exterior face of grade beams.

.1 Apply two additional coats of dampproofing to vertical corners and construction joints for a minimum width of 230 mm on each side, and all around and for 230 mm along pipes passing through walls.

.2 Apply waterproofing to exterior side of elevator and basement foundation walls.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International (ASTM):

.1 ASTM C165 - Standard Test Method for Measuring Compressive Properties of Thermal Insulations.

.2 ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus.

.3 ASTM C209 - Standard Test Methods for Cellulosic Fiber Insulating Board.

.4 ASTM C356 - Standard Test Method for Linear Shrinkage of Preformed High-Temperature Thermal Insulation Subjected to Soaking Heat.

.5 ASTM C411 - Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.

.6 ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

.7 ASTM C447 - Standard Practice for Estimating the Maximum Use Temperature of Thermal Insulation.

.8 ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

.9 ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

.10 ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation.

.11 ASTM C585 - Standard Practice for Inner and Outer Diameter of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing.

.12 ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

.13 ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

.14 ASTM C726 - Standard Specification for Mineral Fiber Roof Insulation Board.

.15 ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

.16 ASTM C1104 - Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.

.17 ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.

.18 ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

.19 ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

.20 ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

.21 ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degreesC.

.2 Underwriters' Laboratories of Canada:

.1 CAN/ULC-S702 - Standard for Thermal Insulation, Mineral Fibre for Buildings.

.2 CAN4 S114 - Standard Method of Test for Determination of Non-Combustibility in Building Materials.

.3 CAN/ULC S102 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.4 CAN/ULC S107 - Standard Methods of Fire Tests of Roof Coverings.

.5 CAN/ULC S115 - Standard Test Method of Firestop Systems.

.6 CAN/ULC S126 - Test for Fire Spread Under Roof Deck Assemblies.

.7 CAN/ULC S129 - Standard Method of Test For Smoulder Resistance of Insulation

.3 Underwriters' Laboratories:

.1 UL 181 - Maximum Air Velocity.

.2 UL Standard 263 Fire Resistance Classification.

.3 UL Standard 790 Classification.

.4 UL Standard 2218 Impact Resistance of Prepared Roof Covering Materials.

.4 Factory Mutual:

.1 FM Approvals 4450/4470 Class 1 - NCC (Noncombustible Core) rated roof insulation, Class 1-90 for BUR, Modified Bitumen and Single-Ply Systems.

.5 FM Approvals 4473 ñ Impact Resistance by Impacting with Freezer Ice Balls.

.6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.2 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's insulation products and adhesives.

.2 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

.1 Manufacturer: Minimum of 10 years experience in manufacturing of stone wool insulation.

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

.3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Convene pre-installation meeting one week prior to beginning work of this Section.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordinate with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver materials and products in original packaging, containers, or bundles stating the manufacturer's identification, brand name, thermal value, size and product code. Sequence product deliveries to avoid time delays and to minimize on-site storage.

.2 Store products in manufacturer's original packaging, containers, or bundles until ready for installation. Locate materials in dry locations free from moisture or sufficiently protected from moisture in such a manner to permit access for ease of handling and inspection. Provide supplementary protection to stored materials onsite, in addition to original manufacturer’s packaging.

.3 Handle materials in such a way to avoid damage to the products. When installing or otherwise handling Roxul insulation products, ensure proper personal protection equipment is used.

.4 When stored outside, stack insulation minimum 4 inches above ground or roof level and cover with tarpaulin or other suitable covering. Insulation shall be packaged with a plastic shroud to protect the material during shipping only.

1.5 PROJECT CONDITIONS

.1 Anticipate environmental conditions (temperature, humidity) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

.2 Product should not be exposed to moisture during shipment, storage and/or installation. Any insulation that has become wet or damaged during shipment, storage or installation shall be removed and replaced with new insulation.

1.6 WARRANTY

.1 Provide manufacturer's standard warranty against manufacturing defects in materials.

Part 2 Products

2.1 INSULATION

.1 Mineral Wool Insulation. Acceptable Product: Roxul CavityRock MD or approved equivalent.

.2 Exterior Cavity Walls: Provide stone wool fiber insulation with the following characteristics.

- .1 Compliance: ASTM C612 Type IVB and CAN/ULC-S702 Type 1 mineral fiber insulation.
- .2 Fire Performance: ASTM E136 and CAN4 S114, non-combustible.
- .3 Fire Performance, Surface Burning Characteristics: ≈STM E84 (UL 723) and CAN/ULC S102, flame spread 0 and smoke developed 0.
- .4 Water Vapor Transmission: ≈STM E96, CavityRock MD 33.1 perms (1895 mg Pa.s.m2). CavityRock DD 27.2 perms (1555 mg Pa.s.m2).
- .5 Moisture Resistance: ≈STM C1104, moisture sorption of CavityRock MD 0.03 percent and CavityRock DD 0.07percent
- .6 Thermal Resistance: ≈STM C518 (C177), CavityRock MD R-value of 4.2 per inch at 75 degrees F (RSI value 0.74 m2K/W at 24 degrees C).
- .7 Corrosive Resistance: ≈STM C665, Corrosiveness to Steel - Pass, ≈STM C795, Stainless Steel Stress Corrosion Specification as per Test Methods C871 and C692.
- .8 Density: ≈STM C612, CavityRock MD 4.4 lbs/ft3 (70 kg/m3)
- .9 Dimensions: 406 mm x 1219 mm, 610 mm x 1219 mm.

.3 Fasteners: Mechanically Attached insulation Fasteners.

- .1 Fasteners provided or as recommended by Roxul.
- .2 Mechanically fastened type.
- .3 Fastening pattern as recommended by Roxul:
  - .1 Minimum of 5 fasteners per board.
  - .2 Position fasteners 75mm from edge of corners and one fastener in middle of board.

.4 Grade beam extruded polystyrene insulation – See Section 07 44 56.

.5 Roof insulation: See Section 07 52 00 – Modified Bituminous Membrane Roofing.

.6 Curtain wall insulation: See Section 08 44 13 - Glazed Aluminum Curtain Wall.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 WORKMANSHIP

.1 Install insulation after building substrate materials are dry.

.2 Install insulation to maintain continuity of thermal protection to building elements and spaces.

.3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.

.4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN4-S604 type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and L vents.

.5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.

.6 Offset both vertical and horizontal joints in multiple layer applications.

.7 Do not enclose insulation until it has been inspected and approved by Contract Administrator.

3.3 EXAMINATION

.1 Examine substrates and immediately inform Contract Administrator in writing of defects.

.2 Prior to commencement of work ensure:

.1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.4 INSULATION INSTALLATION

.1 Adhere to manufacturer's instructions for conditions of installation. If descriptive installations procedures are not available, refer to local building codes and/or contact the manufacturer's technical representative for specific recommendations prior to start of work.

.2 Install full thickness of insulation over the entire surface to be installed as indicated on the project documents. Ensure tight fit around penetrating elements and abutting construction. All voids and or gaps should be filled, minimizing the potential for thermal bridging.

.3 Apply a single or double layer of insulation required to make up the total thickness, unless otherwise indicated or shown on the construction documents.

.4 Install mechanical fastening as per the manufacturer's recommendations, industry standards and/or by the local building codes.

.5 At the completion of a day's work, all exposed edges should be temporary sealed and or lapped by a moisture retardant barrier.

.6 Coordinate insulation work with installation of other materials.

3.5 PROTECTION AND CLOSEOUT

.1 Installed insulation shall be protected from construction traffic during and after completion. Damaged work shall be corrected prior to completion of work. Damaged work shall be corrected prior to completion of work.

.2 Prior to project close out remove related rubbish, material, tools and equipment shall be removed from the site. Dispose of the waste material approved by the applicable jurisdictions.

3.6 CLEANING

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C553-02, Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.

.2 ASTM C665-01e1, Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

.3 ASTM C1320-05, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.

.2 Canadian Gas Association (CGA)

.1 CAN/CGA-B149.1-05, Natural Gas and Propane Installation Code Handbook.

.2 CAN/CGA-B149.2-05, Propane Storage and Handling Code.

.3 Canadian Standards Association (CSA International)

.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.4 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S604-M1991, Type A Chimneys.

.2 CAN/ULC-S702-1997, Standard for Mineral Fibre Insulation.

1.2 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Manufacturer's Instructions: Submit manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

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

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Convene pre-installation meeting one week prior to beginning work of this Section.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordinate with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

Part 2 Products

2.1 INSULATION

.1 Batt and blanket mineral fibre: to ASTM C553, ASTM C665 and CAN/ULC S702.

.2 Interior fire rated walls / Parapet walls: Non combustible mineral wool insulation.

.1 To depth of wall and stud spacing required.

.2 Type 1.

.3 Smoke Developed = 0, Flame Spread = 0.

.4 Ecologo or Greenguard certified, Minimum 13% recycled content. (Post consumer plus ½ post-industrial content.)

.5 CFC and HCFC free production, manufacture from natural and recycled materials.

.6 Product: Roxul or approved equivalent in accordance with B6 Substitutes.

2.2 ACCESSORIES

.1 Insulation clips: Impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSULATION INSTALLATION

.1 Minimum Standard: Install insulation to maintain continuity of thermal protection to building elements and spaces to CBD-16 (Thermal insulation in dwellings) minimum standards. Keep insulation flush with face cavity for maximum thermal value.

.2 Install insulation to maintain continuity of thermal protection to building elements and spaces and to ASTM C1320.

.3 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.

.4 Do not compress insulation to fit into spaces.

.5 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN/ULC-S604 Type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 Type B and L vents.

.6 Do not enclose insulation until it has been inspected and approved by Contract Administrator.

3.3 CLEANING

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Urethane Foam Contractors' Association Inc. (CUFCA)

.2 Green Seal Environmental Standards

- .1 Standard GC-03-93, Anti-Corrosive Paints.
- .2 Standard GS-11-97, Architectural Paints.

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

- .1 Material Safety Data Sheets (MSDS).

.4 South Coast Air Quality Management District (SCAQMD), California StateSCAQMD Rule 1113-06, Architectural Coatings.

.5 Underwriters' Laboratories of Canada (ULC)

- .1 CAN/ULC-S101-04, Fire Endurance Tests of Building Construction and Materials.
- .2 CAN/ULC-S102-03, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .3 CAN/ULC-S705.1-01, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification.
- .4 CAN/ULC-S705.2-05, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Application.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

- .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit two copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.3 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.

- .1 Test reports: submit certified test reports for insulation from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
- .2 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.
- .3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

1.3 QUALITY ASSURANCE

.1 Applicators to conform to CUFCA Quality Assurance Program.

.2 Qualifications:

.1 Installer: person specializing in sprayed insulation installations with 5 years experience and approved by manufacturer.

.2 Manufacturer: company with minimum 3 years experience in producing of material used for work required for this project, with sufficient production capacity to produce and deliver required units without causing delay in work.

.3 Mock-up:

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up 10 lineal metres minimum, of sprayed insulation including one inside corner and one outside corner, door, window openings.

.3 Mock-up may be part of finished work.

.4 Allow 24 hours for inspection of mock-up by Contract Administrator before proceeding with sprayed insulation work.

.4 Health and Safety Requirements: worker protection:

.1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:

.2 Workers must wear protective clothing and equipment in accordance with manufacturer’s instructions when applying foam insulation.

.3 Workers must not eat, drink or smoke while applying foam insulation.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.3 Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly indicating manufacturer and material.

.4 Store materials in a dry area protected from precipitation, freezing and overheating, at temperatures not lower than 60 F (16 C) or above 90 F (32 C).

.5 Protect materials during handling and application to prevent damage and contamination.

1.5 SITE CONDITIONS

.1 Ventilate area in accordance with Section 01 51 00 - Temporary Utilities.

.2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hour after application to maintain non-toxic, unpolluted, safe working conditions.

.3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.

.4 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.

.5 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

Part 2 Products

2.1 IMPORTANT NOTE

.1 No sealants or air-barrier assembly materials may be used in contact with sprayed insulation without prior review and approval from product representatives for compatibility.

2.2 MATERIALS

.1 Low pressure spray polyurethane foam for use around perimeter openings of window and door frames.

.1 Acceptable Product: Dow Great Stuff Pro – Window and Door, or approved equivalent in accordance with B6 Substitutes.

.2 General purpose two-component, quick-cure polyurethane foam.

.1 Acceptable Product: Dow Froth-Pak, or approved equivalent in accordance with B6 Substitutes.

.3 Primers: in accordance with manufacturer's recommendations for surface conditions.

2.3 PRODUCT REQUIREMENTS

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 APPLICATION

.1 Apply insulation to clean surfaces in accordance with CAN/ULC-S705.2 and manufacturer's printed instructions.

.2 Use Low VOC primer recommended by manufacturer.

.3 Apply sprayed foam insulation in thickness as indicated.

.4 Spray foam insulation to be covered with Gypsum board after installation.

3.3 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-19.13M-M87, Sealing Compound, One Component, Elastomeric Chemical Curing.

.2 CAN/CGSB-19.24M-M90, Multi-Component, Chemical Curing Sealing Compound.

.3 CGSB 19-GP-14M-84, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

.2 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

.3 American Society for Testing and Materials.

.1 ASTM E 2178: Standard Test Method for Air Permeance of Building Materials.

.2 ASTM E 283: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.3 ASTM E 96: Water Vapour Transmission of Materials.

.4 ASTM C 920; Standard Specification for Elastomeric Joint Sealants.

.5 ASTM C 1193; Standard Guide for Use of Joint Sealants.

.6 ASTM E 84: Test Method for Surface Burning Characteristics of Building Materials.

.7 ICC-ES AC 38: Acceptance Criteria for Water-Resistive Barriers.

.8 ICC-ES AC 188: Acceptance Criteria for Roof Underlayments.

.9 ICC-ES AC 48: Acceptance Criteria for Roof Underlayment for use in Severe Climates.

.10 AAMA 2400: Standard Practice for Installation of Windows with a Mounting Flange in Stud Frame Construction.

.11 ASTM E 2112: Standard Practice for Installation of Exterior Windows, Doors and Skylights.

.12 AAMA 711-05: Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products.

.4 AATCC – American Association of Textile Chemists and Colorists.

.1 Test Method 127 Water Resistance: Hydrostatic Pressure Test.

.5 TAPPI

.1 Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area).

1.2 PERFORMANCE REQUIREMENTS

.1 Provide an air barrier constructed to perform as a continuous air barrier assembly and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation

or water which has penetrated the cladding. Membrane shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air seal materials at such locations, changes in substrate and perimeter conditions.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.3 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.

.1 Existing Substrate Condition: report deviations, as described in PART 3 –Clause 3.1 EXAMINATION in writing to Contract Administrator.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Submit manufacturer's product data sheets for each type of membrane, including manufacturer's printed instructions for evaluating, preparing, and treating substrate, temperature and other limitations of installation conditions, technical data, and tested physical and performance properties for all materials which comprise the manufacturers declared air barrier assembly.

.4 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 – Clause 3.6 FIELD QUALITY CONTROL.

.1 Submit test results of air permeability testing of primary air barrier material using either ASTM E 2178-01 or the CCMC Technical Guide for Air Barrier Materials testing protocol.

.2 Submit documentation from an approved independent testing laboratory certifying the air leakage and vapour permeance rates of the air barrier membranes exceed the requirements of the National Building Code (NBC) and in accordance with ASTM E 2178.

1.4 QUALITY ASSURANCE

.1 Project Requirements:

.1 Perform Work in accordance with manufacturer’s written instructions and this specification.

.2 Maintain one copy of manufacturer’s written instructions on site.

.3 Allow access to Work site by the air barrier membrane manufacturer’s representatives.

.4 Components used shall be sourced from one manufacturer, including sheet membrane, air barrier sealants, primers, mastics, flashings and adhesives.

.5 Single-Source Responsibility: Obtain air barrier materials from a single manufacturer regularly engaged in manufacturing the product.

.6 Provide products which comply with all federal, provincial, and local regulations controlling use of volatile organic compounds (VOCs).

.2 Mock-Up:

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct typical exterior wall window module, incorporating window frame, insulation, and overlap to existing Air Vapour Barrier.

.3 Test mock-up for air and water infiltration in accordance with ASTM E 783 and ASTM E1105.

.4 Locate where directed.

.5 Mock-up may remain as part of finished work.

.6 Allow 24 hours for inspection of mock-up before proceeding with air/vapour barrier Work.

.3 Contractor Qualifications:

.1 Applicator: company specializing in performing work of this section with minimum 3 years experience with installation of air/vapour barrier systems.

.1 Completed installation must be approved by the material manufacturer.

.2 Applicator: company:

.1 The air barrier contractor shall be, during the bidding period as well as for the duration of the installation, officially recognized as a Licensed Contractor by the Air Barrier Quality Assurance Program (QAP) used by NABA.

.2 Must maintain their license throughout the duration of the project.

.3 Submit document stating the applicator of the primary air barrier membranes specified in this section is authorized by the manufacturer as suitable for the execution of the Work.

.4 Site Meetings: as part of Manufacturer's Services described in PART 3 - Clause 3.6 FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.

.1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.

.2 Ensure all contractors responsible for creating a continuous plane of air tightness are present.

.3 Meet twice during progress of Work at 25% and 60% completion.

.4 Meet upon completion of Work, after cleaning is carried out.

1.5 INSPECTIONS

.1 Inspections in accordance with 01 21 00 - Allowances.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Refer to current Product MSDS for proper storage and handling.

.3 Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.

.4 Store role materials on end in original packaging. Protect rolls from direct sunlight and weather until ready for use.

.5 Store air barrier membranes, adhesives and primers at temperatures of 5 degrees C (40 degrees F) and rising.

.6 Keep solvent away from open flame or excessive heat.

.7 Contractor to verify compliance for Volatile Organic Compounds (VOC) limitations of products to comply with all federal, provincial, and local regulations controlling use of volatile organic compounds (VOCs).

1.7 AMBIENT CONDITIONS

.1 Install solvent curing sealants and vapour release adhesive materials in open spaces with ventilation.

.2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

.3 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.8 SEQUENCING

.1 Sequence work to permit installation of materials in conjunction with related materials and seals.

1.9 WARRANTY

.1 Provide manufacturer's standard 10-year assembly warranty.

.2 Warranty: include coverage of installed sealant and sheet materials which:

.1 Fail to achieve air tight and watertight seal.

.2 Exhibit loss of adhesion or cohesion.

.3 Do not cure.

1.10 DESCRIPTION

.1 Supply labour, materials and equipment to complete the Work as shown on the Drawings and as specified herein to bridge and seal the following air leakage pathways and gaps:

.1 Connections of the walls to the roof air barrier.

.2 Connections of the walls to the foundations.

.3 Seismic and expansion joints.

.4 Openings and penetrations of window and door frames, store front, curtain wall.

.5 Piping, conduit, duct and similar penetrations.

.6 Masonry ties, screws, bolts and similar penetrations.

.7 All other air leakage pathways in the building envelope.

.8 Materials and installation methods of the primary vapour permeable air barrier membrane system and accessories.

.9 Materials and installation methods of through-wall flashing membranes.

Part 2 Products

2.1 MATERIALS

.1 Air/vapor barrier membrane components and accessories must be obtained as a single-source from the membrane manufacturer to ensure total system compatibility and integrity.

.2 Acceptable manufacturer: Henry Bakor / Blueskin SA air barrier system or equivalent products approved by Contract Administrator. All products must be by same manufacturer and approved for use as a complete system and for compatibility with existing and adjacent building materials.

.3 **IMPORTANT NOTE:** No sealants, including foam insulation, may be used in contact with air-barrier assembly without prior review and approval from Bakor representative for compatibility.

2.2 MEMBRANES

.1 Primary sheet air/vapor barrier membrane shall be Blueskin® SA manufactured by Henry; an SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film. For application temperatures down to 10 degrees F use Blueskin® SA LT. Membrane shall have the following physical properties:

.1 Air leakage: <0.0001 CFM/ft² @1.6 lbs/ft^2 to ASTM E 2178 and ASTM E 283 and have no increased air leakage when subjected to a sustained wind load of 10.5 lbs/ft^2 for 1 hour and gust wind load pressure of 62.8 lbs/ft^2 for 10 seconds when tested at 1.6 lbs/ft^2 to ASTM E331

.2 Tested to ASTM E 2357 for the air barrier assembly,

.3 Vapor permeance: 0.05 perms to ASTM E96

.4 Membrane Thickness: 0.0394” (40 mils)

.5 Low temperature flexibility: -22 degrees F to CGSB 37-GP-56M

.6 Elongation: 200% to ASTM D412-modifed

.7 Meets CAN/CGSB-51-33 Type I Water Vapor Permeance requirements

.2 Through-wall flashing membrane (Self-Adhering) shall be Blueskin® TWF manufactured by Henry; an SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film. Membrane shall have the following physical properties:

.1 Membrane Thickness: 0.0394 inches (40 mils)

.2 Film Thickness: 4.0 mils

.3 Flow (ASTM D5147): Pass @ 212 degrees F

.4 Puncture Resistance: 134 lbf to ASTM E154

.5 Tensile Strength (film): 5723 psi ASTM D882

.6 Tear Resistance: 13lbs. MD to ASTM D1004

.7 Low temperature flexibility: -22 degrees F to CGSB 37-GP-56M

2.3 PRIMERS

.1 Primer for self-adhering membranes at temperatures above 25 degrees F shall be Aquatac™ Primer manufactured by Henry; a polymer emulsion based adhesive, quick setting. Primer shall have the following physical properties:

.1 Colour: Aqua

.2 Weight: 8.7 lbs/gal

.3 Solids by weight: 53%

.4 Water based, no solvent odours

.5 Drying time (initial set): 30 minutes at 50% RH and 70 degrees F

.2 Primer for self-adhering membranes at all temperatures shall be Blueskin® Adhesive manufactured by Henry, a synthetic rubber based adhesive, quick setting, having the following physical properties:

.1 Color: Blue,

.2 Weight: 6 lbs/gal,

.3 Solids by weight: 35%,

.4 Drying time (initial set): 30 minutes.

2.4 PENETRATION & TERMINATION SEALANT

.1 Termination Sealant shall be HE925 BES Sealant manufactured by Henry; a moisture cure, medium modulus polymer modified sealing compound having the following physical properties:

.1 Compatible with sheet air barrier, roofing and waterproofing membranes and substrate,

.2 Complies with Fed. Spec. TT-S-00230C, Type II, Class A

.3 Complies with ASTM C 920, Type S, Grade NS, Class 25

.4 Elongation: 450 – 550%

.5 Remains flexible with aging

.6 Seals construction joints up to 1 inch wide

Part 3 Execution

3.1 EXAMINATION

.1 Verify that surfaces and conditions are ready to accept the Work of this section. Notify Contract Administrator in writing of any discrepancies. Commencement of the work or any parts thereof shall mean acceptance of the prepared substrates.

.2 All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane. Strike masonry joints flush.

.3 Where curing compounds are used they must be clear resin based without oil, wax or pigments.

.4 Do not proceed with application of air barrier membrane when rain is expected within 24 hours.

.5 Condition materials to room temperature prior to application to facilitate handling.

3.2 SURFACE PREPARATION

.1 Surfaces must be sound, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane.

.2 New concrete should be cured for a minimum of 14 days and must be dry before air/vapor barrier membranes are applied.

.3 Ensure all preparatory Work is complete prior to applying primary air/vapor barrier membrane.

.4 Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid backing.

.5 Apply primer at rate recommended by manufacturer to all areas to receive self-adhering sheet air/vapor barrier membrane and or through-wall flashing membrane as indicated on drawings by roller or spray and allow minimum 30 minute open time. Primed surfaces not covered by self-adhering membrane or self-adhering through-wall flashing membrane during the same working day must be re-primed.

3.3 INSTALLTION OF AIR BARRIER SYSTEM

.1 OVERLAP TO EXISTING AIR BARRIER

.1 Site confirm existing air barrier material with Bakor representative for compatibility prior to proceeding. Confirm suitability of proposed installation method with Contract Administrator.

.2 Pull-back edge of existing insulation (behind edge of brick) to permit trowelling-in of 75mm overlap of 925 BES termination sealant to 3mm depth over existing AVB.

.3 Install new Blueskin SA over wet 925 BES sealant. Roll firmly to embed blueskin in 75mm overlap area and to promote adhesion to existing AVB materials.

.4 Press existing insulation back into place and fasten in place as required.

.2 INSIDE AND OUTSIDE CORNERS

.1 Seal inside and outside corners of sheathing boards with a strip of self-adhering air/vapor barrier membrane extending a minimum of 3 inches on either side of the corner detail.

.2 Prime surfaces as per manufacturers' instructions and allow to dry.

.3 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all end and side laps of membrane.

.4 Roll all laps and membrane with a counter top roller to ensure seal.

.3 TRANSITON AREAS

.1 Tie-in to structural beams, columns, floor slabs and intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials as indicated in drawings with self-adhering air/vapour barrier membrane.

.2 Prime surfaces as per manufacturers' instructions and allow to dry.

.3 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Provide minimum 3 inch lap to all substrates.

.4 Ensure minimum 2 inch overlap at all end and side laps of membrane.

.5 Roll all laps and membrane with a counter top roller to ensure seal.

.4 WINDOWS AND ROUGH OPENINGS

.1 Wrap rough openings with self-adhering air/vapour barrier membrane as detailed.

.2 Prime surfaces as per manufacturers' instructions and allow to dry.

.3 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps of membrane.

.4 Roll all laps and membrane with a counter top roller to ensure seal.

.5 THROUGH-WALL FLASHING MEMBRANE

.1 Apply through-wall flashing membrane along the base of masonry veneer walls and over shelf angles as detailed.

.2 Prime surfaces and allow to dry, press membrane firmly into place, over lap minimum 2 inches at all end and side laps. Promptly roll all laps and membrane to ensure the seal.

.3 Applications shall form a continuous flashing membrane and shall extend up a minimum of 8 inches up the back-up wall.

.4 Seal the top edge of the membrane where it meets the substrate using termination sealant. Trowel-apply a feathered edge to seal termination to shed water.

.5 Install through-wall flashing membrane and extend 1/2 inch from outside edge of veneer. Provide "end dam" flashing as detailed.

.6 PRIMARY AIR BARRIER

.1 Apply self-adhering air/vapour barrier membrane complete and continuous to prepared and primed substrate in an overlapping shingle fashion and in accordance with manufacturer's recommendations and written instructions. Stagger all vertical joints.

.2 Prime surfaces as per manufacturers' instructions and allow to dry.

.3 Align and position self-adhering air/vapour barrier membrane, remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps of membrane.

.4 Roll all laps and membrane with a counter top roller to ensure seal.

.5 At the end of each days work seal the top edge of the membrane where it meets the substrate with termination sealant. Trowel apply a feathered edge to seal termination and shed water.

3.4 APPLICATION OF TERMINATION SEALANT

.1 Seal membrane terminations, heads of mechanical fasteners, masonry tie fasteners, around penetrations, duct work, electrical and other apparatus extending through the primary water resistive air barrier membrane and around the perimeter edge of membrane terminations at window and door frames with specified termination sealant.

3.5 INSTALLATION OF INSULATION

.1 Install insulation in accordance with insulation manufacturer’s recommendations.

3.6 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 Make notification when sections of Work are complete to allow review prior to covering air/vapour barrier system.

.2 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - Clause 1.3 SUBMITTALS.

.3 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.4 Schedule site visits, to review Work, as directed in PART 1 - Clause 1.4 QUALITY ASSURANCE.

3.7 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

3.8 PROTECTION OF WORK

.1 Protect finished work in accordance with Section 01 61 00 - Common Product Requirements.

.2 Do not permit adjacent work to damage work of this section.

.3 Ensure finished work is protected from climatic conditions.

.4 Damp substrates must not be inhibited from drying out. Do not expose the backside of the substrate to moisture or rain.

.5 Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane, including wall openings and construction activity above completed air barrier installations.

.6 Air/vapour barrier membrane is not designed for permanent exposure. Good practice calls for covering as soon as possible. Special consideration must be given to the exposed un-insulated membrane during winter months of construction so as to avoid the risk of condensation.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for wall system consisting of compressed wood fibre panel in aluminum grid installed over rigid insulation and Z-girts.

.2 Materials and installation for cementitious grade beam finishing installed over rigid insulation and Z-girts

1.2 REFERENCES

.1 Aluminum Association (AA).

.1 AA-DAF-45-R03, Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials International, (ASTM).

.1 ASTM A653/A653M-02a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM B136 - Standard Method for Measurement of Stain Resistance of Anodic Coatings on Aluminum.

.3 ASTM B244 - Standard Test Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments.

.4 ASTM C834 - Standard Specification for Latex Sealants.

.5 ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

.6 ASTM C1186 - Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets.

.7 ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

.8 ASTM D1037 - Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.

.9 ASTM D1730 - Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting.

.10 ASTM E96 - Test Methods for Water Vapor Transmission of Materials.

.11 ASTM D1117 - Standard Guide for Evaluating Nonwoven Fabrics.

.12 ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

.13 ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

.14 ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure.

.15 ASTM E1333 - 96(2002) Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber.

.3 American National Standards Institute (ANSI)

.1 ANSI A135.6-2006, Hardboard Siding.

.4 Canadian General Standards Board (CGSB).

.1 CAN/CGSB 1-GP-71 Amendment 13-1995, Methods of Testing Paints and Pigments (including Amendments 1 to 12 and Supplement No. 1).

.2 CAN/CGSB 11.5 M-87: Hardboard, Precoated, Factory Finished, for Exterior Cladding.

.5 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act (CEPA), 1999.

.6 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.7 The Master Painters Institute (MPI).

.1 Architectural Painting Specification Manual - March 1998 (R2002).

.8 National Research Council (NRC).

.9 Transport Canada (TC).

.1 Transportation of Dangerous Goods Act (TDGA), 1992.

.10 AATCC127 - Water Resistance: Hydrostatic Pressure Test.

.11 TAPPI - T460 - Air Resistance of Paper (Gurley Method).

.12 Underwriters Laboratories' of Canada (ULC).

.1 CAN/ULC-S701-01, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.2 CAN/ULC-S702-1997, Standard for Thermal Insulation, Mineral Fibre, for Buildings.

.3 CAN/ULC-S704-2001, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

.4 CAN/ULC-S706-02, Standard for Wood Fibre Thermal Insulation for Buildings.

1.3 DESIGN REQUIREMENTS

.1 Design composite building panel wall to provide for thermal movement of component materials caused by ambient temperature range of 80 degrees C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.

.2 Include expansion joints to accommodate movement in wall system and between wall system and building structure, caused by structural movements, without permanent distortion, damage to infills, racking of joints, breakage of seals, or water penetration.

.3 Design members to withstand dead load and wind loads as calculated in accordance with NBC and applicable Municipal/Territorial regulations.

.4 Design wall system to accommodate specified erection tolerances of structure.

.5 Maintain following installation tolerances:

.1 Maximum variation from plane or location shown on approved shop drawings: 10 mm/m of length and up to 20 mm/100 m maximum.

.2 Maximum offset from true alignment between two adjacent members abutting end to end, in line: 0.75 mm.

1.4 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate dimensions, wall openings, head, jamb, sill and mullion detail, materials and finish, anchor details, compliance with design criteria and requirements of related work.

.3 Shop Drawings to indicate:

.1 Z-girt gauge and spacing as required for product installation.

.2 Fastener type and fastening pattern per panel.

.4 Shop drawings to be reviewed and sealed by a Professional Structural Engineer in the Province of Manitoba.

1.5 SUBMITTALS

.1 Product Data: Manufacturer's data sheets, and maintenance and installation instructions.

1.6 SAMPLES

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

.2 Submit full size sample of wall system, representative of materials, finishes and colours.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Store products in manufacturer's unopened packaging until ready for installation.

.2 Store flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.

1.8 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets (MSDS) acceptable to Labour Canada.

.2 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 QUALITY ASSURANCE

.1 Installer Qualifications: Minimum of 2 years experience with installation of similar products and listed by Manufacturer.

.2 Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

.1 Finish areas designated by Contract Administrator.

.2 Do not proceed with remaining work until approved by Contract Administrator.

.3 Mock-up may remain as part of finished work.

1.10 WARRANTY

.1 For work of this section, base warranty is extended to:

.1 30 year limited product warranty against manufacturing defects.

.2 Workmanship Warranty: Application limited warranty for 2 years.

.3 Manufacturer finished colour: 15 year paint and labour warranty.

Part 2 Products

2.1 CEMENTITIOUS PANEL SYSTEM

.1 Cementitious Siding Panels: Hardie HZ5 Reveal Panel as manufactured by James Hardie Building Products, or approved equivalent in accordance with B6 substitutes.

.1 11mm thickness.

.2 Smooth finish with Hardie Color Plus finish.

.3 1206 mm wide by lengths required.

.4 Colorplus factory finish.

.1 Colours from manufacturer's standard range.

.2 Baked on pigment.

.2 Code Compliance Requirement for Siding Materials:

.1 Fiber-cement siding, complies with ASTM C 1186 Type A Grade II.

.2 Fiber-cement siding, complies with ASTM E 136 as a noncombustible material.

.3 Fiber-cement siding, complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.

.4 Fiber-cement siding, complies with ASTM E 119 1 hour and 2 hour fire resistive assemblies listed with Warnock Hersey.

.5 Fiber-cement siding, tested to ASTM E330 for Transverse Loads.

.6 Intertek Warnock Hersey Product Listing.

.3 Fasteners: For attaching Hardie Reveal Panel direct to Z-girts provide the following:

.1 Colour matched TW-S 300 series austenitic stainless steel cladding fasteners by SFS intec Inc.

.1 Corrosion resistant when used for fastening into galvanized Z-girts.

.2 Compatible with James Hardie Board.

.3 10-12 / 0.189" thread diameter by lengths required with T20W Torx Pan Head.

.4 Attachment System:

.1 Horizontal Z-girts:

.1 Galvanized 16ga. x 125mm deep Z-girts.

.2 Spacing to 1220mm or as required. Final spacing and gauges to be engineered by engineer sealing shop drawings.

.2 Attachment hat channels:

.1 20ga by 25mm depth. (38mm x 25mm x 32mm)

.2 Galvalume AZM 150 coating.

.3 150mm wide middle attachment surface at joint locations.

.4 32mm wide middle attachment surface at intermediate (non-joint) locations.

.5 Spacing as required for panel layout. Final spacing and gauges to be engineered by engineer sealing shop drawings.

.5 Air/Vapour Barrier:

.1 Modified Bituminous self-adhering air-barrier system.

.2 See Section 07 27 00.01 – Air Barriers – Descriptive and Propreitary.

.6 Insulation:

.1 125mm mineral wool insulation.

.2 See Section 07 21 13 – Board Insulation.

.7 Joint finishing / trim system.

.1 Joint metal trim to be prefinished metal flashing to dimensions and colours indicated on the drawings.

.2 See Sheet Metal Flashing and Trim - Section 07 62 00.

2.2 GRADE BEAM FINISH

.1 MATERIALS

.1 Cement board fromed from aggregated portland cement slurry with polymer-coated, glass-fibre mesh encompassing edges, back and front surfaces. Smooth formed edges.

.1 Acceptable Product: CGC Durock Cement Board or approved equivalent in accordance with B6 Substitutes.

.1 12.7mm thickness.

.2 Flexural Strength: 750 psi to C947-81

.3 Indentation Strength > 1250 to D2394

.4 Shear bond strength > 50 to ANSI A118.4

.5 Uniform load – 30psf at 405mm o.c.

.6 Nail-pull resistance: 95lb to C473

.7 Freeze Thaw Resistance: 100 cycles – no deterioration to C666

.8 Mould resistance: no growth to G21, D3273

.9 Non-combustibility: Pass to ULC S-114

.10 Surface Burning: 0/0 to ULC S-102

.11 Thermal: R 0.26 to C518

.2 Below Grade: Extruded polystyrene (XPS): to CAN/ULC-S701.

.1 Acceptable Product: Owens Corning or approved equivalent.

.1 Type: 4

.2 Compressive strength: 30psi to ASTM D1621.

.3 Compressive modulus: 1350 psi.

.4 R Value: ≥ R5 per inch to ASTM C518.

.5 Water Absorption ≤ 0.7% to ASTM D2842.

.6 Flexural Strength: ≥ 60 psi to ASTM C203.

.7 Water Vapour Permeance: 0.6 perm max to ASTM E96.

.8 Thickness: as indicated.

.9 Edges: shiplapped.

.10 Product dimensions: Largest sizes available and practicable.

.2 ACCESSORIES & INSTALLATION

.1 Fasten to horizontal galvanized J-channels / Z-girt supports at max. 16” o.c.

.2 Install with smooth face outwards.

.3 Fasteners: Corrosion resistant buglehead tapping screws or as recommended for application by manufacturer.

.4 Finish with latex fortified Portland cement with 50mm wide high-strength alkali-resistant glass fibre tape over joints.

.5 Coloured acrylic finish – confirm colour with Contract Administrator.

Part 3 Execution

3.1 EXAMINATION

.1 Do not begin installation until substrates have been properly prepared.

3.2 PREPARATION

.1 Clean surfaces thoroughly prior to installation.

.2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

.1 Install materials in strict accordance with manufacturer's installation instructions.

.2 Place fasteners no closer than 3/4 inch (19mm) from panel edges and 2 inches (51 mm) from panel corners.

.3 Use fasteners as specified by manufacturer.

.4 Install panel using 1/2 inch (13 mm) spacers at horizontal joints. Leave bottom edge of panel above all horizontal trims exposed, no caulking shall be placed at this overlap of Horizontal Reveal Trim. Factory primed edge shall always be used.

.5 Install a kickout flashing to deflect water away from the siding at the roof intersection.

.6 Install a self-adhering membrane on the wall before the subfascia and trim boards are nailed in place, and then install the kickout.

.7 Allow minimum vertical clearance between the bottom edge of siding and any other material in strict accordance with the manufacturer's installation instructions and as determined by James Hardie Zone.

.8 Maintain clearance between siding and adjacent finished grade.

.9 Specific framing and fastener requirements - refer to the applicable building code compliance reports.

3.4 FINISHING

.1 Field cut edges shall be coated during the installation process using an exterior grade primer/sealer that is compatible with the type of paint to used on project.

.2 Provide Clear Anodized for shiny mill finish metallic aesthetic of Reveal Trims.

3.5 PROTECTION

.1 Protect installed products until completion of project.

.2 Touch-up, repair or replace damaged products before Substantial Completion.

3.6 ACCESSORIES

.1 Install all head and sill flashings, edge trim, cap pieces and fillers, and other trim as required for complete installation, including trim around wall penetrations.

.2 Control/expansion joints as per manufacturer’s requirements.

3.7 CLEANING

.1 Wash down exterior surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International Inc.

- .1 ASTM C726-05, Standard Specification for Mineral Fiber Roof Insulation Board.
- .2 ASTM C728-05, Standard Specification for Perlite Thermal Insulation Board.
- .3 ASTM C1177/C1177M-06, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- .4 ASTM C1396/C1396M-06a, Standard Specification for Gypsum Board.
- .5 ASTM D41-05, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
- .6 ASTM D312-00(2006), Standard Specification for Asphalt Used in Roofing.
- .7 ASTM D448-03a, Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
- .8 ASTM D2178-04, Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
- .9 ASTM D6162-00a, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
- .10 ASTM D6163-00e1, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.
- .11 ASTM D6164-05, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- .12 ASTM D6222-02e1, Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcement.
- .13 ASTM D6223-02e1, Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcement.
- .14 ASTM D6509-00, Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcement.

.2 Canadian General Standards Board (CGSB)

- .1 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
- .2 CGSB 37-GP-56M-80b(A1985), Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
- .3 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

.3 Canadian Roofing Contractors Association (CRCA)

- .1 CRCA Roofing Specifications Manual-1997.

.4 Canadian Standards Association (CSA International)

.1 CSA A123.21-04, Standard Test Method for the Dynamic Wind Uplift Resistance of Mechanically Attached Membrane-Roofing Systems

.2 CSA-A123.3-05, Asphalt Saturated Organic Roofing Felt.

.3 CSA-A123.4-04, Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.

.4 CSA A231.1-06, Precast Concrete Paving Slabs.

.5 CSA O121-08, Douglas Fir Plywood.

.6 CSA O151-04, Canadian Softwood Plywood.

.5 Factory Mutual (FM Global)

.1 FM Approvals - Roofing Products.

.6 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.7 Underwriters Laboratories' of Canada (ULC)

.1 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.2 CAN/ULC-S702.2-03, Standard for Mineral Fibre Thermal Insulation for Buildings.

.3 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

.4 CAN/ULC-S706-02, Standard for Wood Fibre Thermal Insulation for Buildings.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Convene pre-installation meeting one week prior to beginning waterproofing Work, with roofing contractor's representative and Contract Administrator.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Provide two copies of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Provide two copies of WHMIS MSDS and indicate VOC content for:

.1 Primers.

.2 Asphalt.

.3 Sealers.

.4 Filter fabric.

.3 Provide shop drawings:

.1 Indicate flashing, control joints, tapered insulation details.

.2 Provide layout for tapered insulation.

.4 Manufacturer's Certificate: certify that products meet or exceed specified requirements.

.5 Test and Evaluation Reports: submit laboratory test reports certifying compliance of bitumen membrane with specification requirements.

.6 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.

.7 Manufacturer's field report: in accordance with Section 01 45 00 - Quality Control.

.8 Reports: indicate procedures followed, ambient temperatures and wind velocity during application.

1.4 QUALITY ASSURANCE

.1 Installer qualifications: company or person specializing in application of modified bituminous roofing systems with 5 years documented experience and approved by manufacturer.

1.5 FIRE PROTECTION

.1 Fire Extinguishers:

.1 Maintain one cartridge operated type or stored pressure rechargeable type with hose and shut-off nozzle.

.2 ULC labelled for A, B and C class protection.

.2 Maintain fire watch for 1 hour after each day's roofing operations cease.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions andSection 01 61 00 - Common Product Requirements.

.2 Storage and Handling Requirements:

.1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.

.2 Provide and maintain dry, off-ground weatherproof storage.

.3 Store rolls of felt and membrane in upright position. Store membrane rolls with salvage edge up.

.4 Remove only in quantities required for same day use.

.5 Place plywood runways over completed Work to enable movement of material and other traffic.

.6 Store sealants at +5 degrees C minimum.

.7 Store insulation protected from daylight and weather and deleterious materials.

.3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, paddling, and wood packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.2 Fold up metal banding, flatten and place in designated area for recycling.

1.7 FIELD CONDITIONS

.1 Ambient Conditions

.1 Do not install roofing when temperature remains below -18 degrees C for torch application, or -5 degrees C for mop application.

.2 Minimum temperature for solvent-based adhesive is -5 degrees C.

.2 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

1.8 WARRANTY

.1 For Work of this Section 07 52 00 - Modified Bituminous Membrane Roofing , 12 months warranty period is extended to 120 months – no charge.

Part 2 Products

2.1 PERFORMANCE CRITERIA

.1 Compatibility between components of roofing system is essential. Provide written declaration to Contract Administrator stating that materials and components, as assembled in system, meet this requirement.

.2 The roof is to function as an assembly, with all components manufactured and designed by the same manufacturer for use as a system. Roof assembly to be by Soprema or approved equivalent in accordance with B6 Substitutes.

.3 Roofing System Requirements:

.1 Wind uplift 90 or as required for governing codes.

.2 CSA A123.21

.3 ASTM D6162

.4 ULC S107

2.2 PARAPET SHEATHING SUBSTRATE

.1 See Gypsum Sheathing – Section 06 16 43.

2.3 GYPSUM BOARD DECK COVERING

.1 See Gypsum Sheathing – Section 06 16 43.

2.4 VAPOUR RETARDER

.1 Self adhesive vapour barrier membrane composed of SBS modified bitumen.

.1 Thickness: 0.8mm
.2 Under Face: Silicone release film.
.3 Top face: Tri-laminate woven polyethylene.
.4 Tensile Strength, MD/XD 11.3/15.4 kN/m to ASTM D5147.
.5 Ultimate elongation, MD/XD 52/24% to ASTM D5147.
.6 Cold bending -35*C to ASTM D5147.
.7 Static puncture: 400N to ASTM D5602.
.8 Tear resistance, MD/XD 375/400 N to ASTM D5601.
.9 Lap adhesion 2000 N/m to ASTM D 1876.
.10 Water absorption 0.1 % max to ASTM D5147.
.11 Peel resistance 1200 N/m to ASTM D903.
.12 Water vapour permeance 0.017 perm to ASTM E96 Procedure B.
.13 Air permeability ≤ 0.007 L/sec.m2 to ASTM E283 (75 Pa)

.2 Product: Soprema Sopravap'r.

.3 Primer: Elastocol Stick

2.5 MEMBRANES FOR MECHANICALLY FASTENED SYSTEM

.1 Base & Cap Sheet membrane system: Styrene-Butadiene-Styrene (SBS) elastomeric polymer designed for mechanically fastened application in areas with concealed ceilings.

.1 Base & Cap sheet to function as a roofing system and approved for direct application over manufacturer approved poly-iso insulation.
.1 Soprema Soprafix base 630 with mechanically fastened base sheet and DUO selvedge.
.2 Base Sheet: Mechanically fastened.
.1 Soprema Soprafix Base-630.
.3 Cap Sheet: Torched on with white (or near-white) granular top surface.
.1 Soprema Traffic Cap-660.
.4 Base & Cap Sheet membrane properties:
.1 Strain energy (longitudinal/transversal) MD/XD: 18.4/18.1 kN/m.
.2 Breaking strength (longitudinal/transversal) MD/XD: 31/31 kN/m.
.3 Ultimate elongation (longitudinal/transversal) MD/XD: 60/60%.
.4 Tear resistance: 205 N.
.5 Initial and > 90 days: Cold bending at -30 degrees C.
.6 Static puncture resistance: 540.
.7 Dimensional Stability) MD/XD: 0.2/0 %.
.8 Plastic Flow: 105 degrees C.

2.6 ACCESSORIES

.1 Flashing products, adhesives, fasteners and primers as recommended by manufacturer and compatible with roofing system.

.1 Sopralene Flam Stick,
.2 Sopraflash Flam Stick,
.3 Elastocol Stick
.4 Sopralap Stick.
.5 Soprafix Fastners / Plates.

2.7 ADHESIVE

.1 Low-rise two-part urethane adhesive.

.1 Highly elastomeric formulation.
.2 No solvents.
.3 No temperature restrictions.
.4 Properties:
.1 Colour: Amber
.2 Tensile Strength 1.72 MPa to ASTM D412.
.3 Density: 1.02 kg/L to ASTM D1875.
.4 Viscosity: 22,000 – 60,000 cP to ASTM D2556.
.5 Peel Strength: 3 kN/m to ASTM D903.
.6 Flexibility: Pass @ -56 degrees C to ASTM D816.

.2 Product: Soprema Duotack.

2.8 POLYISOCYANURATE INSULATION

.1 Polyisocyanurate insulation to 100mm thickness in two 50mm layers, or as indicated on the drawings or required by existing conditions.

.1 Top layer perpendicular to base layer.
.2 Mechanically fastened.
.3 Sloped insulation as required for slopes.

.2 Base layer: polyisocyanurate foam core inserted between two facers.

.1 Soprema Isolant Colgrip B.
.2 ASTM C1289-95 Type 2.
.3 FM Standard 4450/4470 Approval: Class 1.
.4 To CAN/ULC-S704
.5 Properties:
.1 Dimensional Stabilty: < 2% liner change to ASTM D2126
.2 Compressive Strength: 20psi to ASTM D1621
.3 Water Absorption: < 1% by volume to ASTM C209
.4 Moisture vapour Transmission: < 1 Perm to ASTM E96

.5 Product Density: Nominal 2.0 pcf to ASTM D1622
.6 Flame Spread: 25-50 to ASTM E84
.7 Service Temperature: -73 to 122 degrees C.

.3 Top layer: polyisocyanurate foam core inserted between two fibreglass facers for smooth consistent surface free of loose fibres.

.1 Soprema Isolant Colgrip A.
.2 ASTM C1289-95 Type 2.
.3 FM Standard 4450/4470 Approval: Class 1.
.4 To CAN/ULC-S107
.5 Properties:
.1 Dimensional Stabilty: < 2% liner change to ASTM D2126
.2 Compressive Strength: 20psi to ASTM D1621
.3 Water Absorption: < 1% by volume to ASTM C209
.4 Moisture vapour Transmission: < 1 Perm to ASTM E96
.5 Product Density: Nominal 2.0 pcf to ASTM D1622
.6 Flame Spread: 25-50 to ASTM E84
.7 Service Temperature: -73 to 122 degrees C.

2.9 EXPANSION JOINT

.1 Soprema Soprajoint system or approved equivalent.

.1 Waterproofing membrane combining polyester fabric with SBS mod-bit.
.1 Thickness: 4mm
.2 Top face: Silicone release sheet and aluminum foil
.3 Underface: Thermofusible plastic film.
.4 Reinforcement: 70 g/m2 polyester fabric.
.5 Breaking Strength: 5kN/m to CAN/CGSB-37.56-M
.6 Ultimate Elongation: 120% at 20ºC to CAN/CGSB-37.56-M
.7 Ultimate Elongation: 100% at -20ºC to CAN/CGSB-37.56-M
.8 Cold Bending: -30ºC to CAN/CGSB-37.56-M
.9 Elasticity limit: 40% internal.
.10 Fatigue Resistance: No rupture at 1000 cycles to CAN/CGSB-37.56-M.
.2 Install in accordance with manufacturer's instructions over mineral wool cant strip.
.3 Install at roof joints between new and existing roofing at Firewall.

2.10 SEALERS

.1 Sealants: Caulking - see Section 07 92 00 - Joint Sealants.

2.11 CANT STRIPS

.1 Mineral Wool material by same manufacturer and fully compatible with roofing system.

2.12 FASTENERS

.1 Covering to steel deck: As recommended by manufacturer of roofing system.

.2 Insulation to deck: coated insulation fasteners and galvanized plates must meet FM Approval for wind uplift and corrosion resistance, and as recommended by insulation manufacturer.

Part 3 Execution

3.1 QUALITY OF WORK

.1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual and CRCA Roofing Specification Manual, particularly for fire safety precautions.

.2 Do priming in accordance with manufacturers written recommendations.

.3 Assembly, component and material connections will be made in consideration of appropriate design loads, with reversible mechanical attachments.

3.2 EXAMINATION OF ROOF DECKS

.1 Verification of Conditions:

.1 Inspect with Contract Administrator deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed.

.2 Evaluation and Assessment:

.1 Prior to beginning of work ensure:

.1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris. Do not use calcium or salt for ice or snow removal.

.2 Curbs have been built.

.3 Roof drains have been installed at proper elevations relative to finished roof surface.

.4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.

.3 Do not install roofing materials during rain or snowfall.

3.3 PROTECTION OF IN-PLACE CONDITIONS

.1 Cover walls, walks and adjacent work where materials hoisted or used.

.2 Use warning signs and barriers. Maintain in good order until completion of Work.

.3 Clean off drips and smears of bituminous material immediately.

.4 Dispose of rain water off roof and away from face of building until roof drains or hoppers installed and connected.

.5 Protect roof from traffic and damage. Comply with precautions deemed necessary by Contract Administrator.

.6 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed Work and materials out of storage.

.7 Metal connectors and decking will be treated with rust proofing or galvanization.

3.4 PREPARATION OF STEEL DECK (CHANNEL TYPE)

.1 Install sound absorbing insulation in flutes of acoustical steel roof deck in accordance with deck manufacturer's instructions and Section 05 31 00 - Steel Decking, 07 21 16 – Blanket Insulation.

.2 Steel decking will be treated with rust proofing or galvanization.

3.5 DECK SHEATHING

.1 Mechanically fasten Gypsum Board Sheathing to steel deck with reversible mechanical attachments to steel deck's upper rib surfaces, spaced 400 mm on centre each way.

.2 Place with long axis of each sheet transverse to steel deck ribs, with end joints staggered and fully supported on ribs.

3.6 GYPSUM PRIMER

.1 Substrate must be clean, dry and free of dust, grease or other contaminants.

.2 Apply primer to gypsum board roofing substrate at the rate and in manner recommended by manufacturer.

3.7 VAPOUR RETARDER

.1 Adhere vapour retarder strictly in accordance with manufacturer’s instructions.

3.8 CONVENTIONAL MEMBRANE ROOFING (CMR) APPLICATION

.1 Tapered insulation application:

.1 Install tapered insulation as first insulation layer, in accordance with shop drawings. Stagger joints between layers 150 mm minimum.

.2 Insulation: fully adhered, adhesive application:

.1 Adhere insulation.

.2 Place boards in parallel rows with ends staggered, and in firm contact with one another.

.3 Cut end pieces to suit.

.4 Apply adhesive in accordance to manufacturer’s instructions.

.3 Insulation: mechanically fastened application:

.1 Mechanically fasten insulation as per manufacturer's written recommendations.

.2 Number and pattern of screws per board to meet Factory Mutual requirements.

.3 Place boards in parallel rows with ends staggered, and in firm contact with one another.

.4 Cut end boards to suit.

.4 Base sheet application:

.1 Install in accordance with roofing manufacturer’s instructions.

.2 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and reroll from both ends.

.3 Unroll and embed base sheet in uniform coating of asphalt applied at rate of 1.2 kg/m^2, at 230 degrees C.

.4 Unroll and torch base sheet onto substrate taking care not to burn membrane or its reinforcement or substrate.

.5 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.

.6 Application to be free of blisters, wrinkles and fishmouths.

.5 Cap sheet application:

.1 Install in accordance with roofing manufacturer’s instructions.

.2 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.

.3 Unroll and embed cap sheet in uniform coating of asphalt applied at rate of 1.2 kg/m^2, EVT at point of contact.

.4 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.

.5 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.

.6 Application to be free of blisters, fishmouths and wrinkles.

.7 Do membrane application in accordance with manufacturer's recommendations.

.6 Flashings:

.1 Install in accordance with roofing manufacturer’s instructions.

.2 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.

.3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal by mopping or torch welding.

.4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.

.5 Provide 75 mm minimum side lap and seal.

.6 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.

.7 Do work in accordance with manufacturer's recommendations and Section 07 62 00 - Sheet Metal Flashing and Trim.

.7 Roof penetrations:

.1 Install roof drain pans, vent stack covers, solatubes and other roof penetration flashings and seal to membrane in accordance with manufacturer's recommendations and details.

3.9 FIELD QUALITY CONTROL

.1 Inspections:

.1 Inspection and testing of roofing application will be carried out by testing laboratory designated by Contract Administrator.

3.10 CLEANING

.1 Remove bituminous markings from finished surfaces.

.2 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and complying with their documented instructions.

.3 Repair or replace defaced or disfigured finishes caused by work of this section.

.4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management.

.1 Place materials defined as hazardous or toxic in designated containers.

.2 Clearly label location of salvaged material's storage areas and provide barriers and security devices.

.3 Ensure emptied containers are sealed and stored safely.

.4 Unused adhesive, sealant and asphalt materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.5 Dispose of unused adhesive material at official hazardous material collections site approved by Contract Administrator.

.6 Dispose of unused sealant material at official hazardous material collections site approved by Contract Administrator.

.7 Dispose of unused asphalt material at official hazardous material collections site approved by Contract Administrator .

.8 Divert unused gypsum materials from landfill to recycling facility as reviewed by Contract Administrator.

3.11 SCHEDULE

.1 SYSTEM 1: Mechanically fastened system above concealed interior ceilings.

.1 Mechanically fastened gypsum, insulation and base sheet. Torched cap sheet.

.2 Default roofing system unless indicated otherwise.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 The Aluminum Association Inc. (AAI)

.1 AAI-Aluminum Sheet Metal Work in Building Construction-2002.

.2 AAI DAF45-03, Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM A167-99(2004), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip..

.2 ASTM A240/A240M-07e1, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

.3 ASTM A606-04, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.

.4 ASTM A653/A653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.5 ASTM A792/A792M-06a, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.6 ASTM B32-04, Standard Specification for Solder Metal.

.7 ASTM B370-03, Standard Specification for Copper Sheet and Strip for Building Construction.

.8 ASTM D523-89(1999), Standard Test Method for Specular Gloss.

.9 ASTM D822-01(2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canada Green Building Council (CaGBC)

.1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.

.2 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.

.4 Canadian Roofing Contractors Association (CRCA)

.1 Roofing Specifications Manual 1997.

.5 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.

.2 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

.6 Canadian Standards Association (CSA International)

.1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.

.2 AAMA/WDMA/CSA 101/I.S.2/A440-2008, Standard/Specification for Windows, Doors, and Unit Skylights.

.3 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.7 Green Seal Environmental Standards

.1 Standard GS-03-93, Anti-Corrosive Paints.

.2 Standard GS-11-97, Architectural Paints.

.3 Standard GS-36-00, Commercial Adhesives.

.8 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.9 South Coast Air Quality Management District (SCAQMD), California State

.1 SCAQMD Rule #1113-04, Architectural Coatings.

.2 SCAQMD Rule #1168-05, Adhesives and Sealants.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's printed product literature for sheet metal flashing systems materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 43 - Environmental Procedures.

.3 Shop Drawings:

.1 Shop drawings: submit drawings stamped and signed by professional engineer registered or licensed in the Province of Manitoba, Canada.

.4 Samples:

.1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, finishes and colours.

.5 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.

.1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

1.3 QUALITY ASSURANCE

.1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative and Contract Administrator:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

1.4 DESIGN REQUIREMENTS:

.1 Flashing to resist

.1 Wind loads, positive and negative, expected in this geographical region NBCC climatic data, 50 year probability.

.2 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, overstressing of components, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and night-time sky heat loss.

1.5 WARRANTY

.1 Provide a manufacturer’s written warranty: Furnish panel manufacturer’s written warranty covering failure of factory-applied exterior finish within the warranty period. Warranty period for finish: 40 years after the date of Substantial Completion. The values below are based on normal environments and exclude any aggressive atmospheric conditions.

.1 WeatherX™ (Siliconized Polyester - SMP) will not crack, chip, or peel (lose adhesion) for forty (40) years from date of installation (40.5 yrs from application). This does not include minute fracturing that may occur during the normal fabrication process. WeatherX™ (Siliconized Polyester - SMP) will not chalk in excess of a number six (6) rating, in accordance with ASTM D-4214-98 method D659 at any time for thirty (30) years from date of installation (30.5 yrs from application); will not change colour more than eight (8.0) Hunter ΔE units as determined by ASTM method D-2244-02.

Part 2 Products

2.1 MATERIAL AND FABRICATION

.1 Flashing:

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details as indicated.

.2 Zinc coated steel sheet: 22 gauge minimum, commercial quality to ASTM A653/A653M, with Z275 designation zinc coating.

.3 Profiles selected from manufacturer’s range or custom formed where required to match architectural details. Double back exposed edges.

.4 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

.5 Cap flashing: Reinforced and ribbed to withstand high wind-loads and wind-speeds. Provide hidden fasteners / cleats to resist wind uplift.

.1 To meet highest applicable wind-speed requirements.

.6 Form pieces in 2400 mm maximum lengths.

.1 Make allowance for expansion at joints.

.7 Hem exposed edges on underside 12 mm.

.1 Mitre and seal corners with sealant.

.8 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.9 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

.2 Finishes: Prefinished steel with factory applied silicone modified polyester.

.1 Panel and Flashing Finishes: Prepainted with WeatherX™ system or equivalent product approved by Contract Administrator.

.2 Colour: Prefinished cladding and flashing colour to be selected from the manufacturer's full colour range. (Including metallic colours.)

.3 J-channels and Z-girts:

.1 Gauges as required. Galvanized.

.2 Z-girt / J-channel depth, gauge and spacing as required by manufacturer and to be reviewed and approved by engineer sealing shop drawings.

.4 Fasteners: Screws: ANSI B18.6.4.

.1 Manufacturer approved purpose made cadmium or zinc plated steel with all exposed fasteners colour matched.

.2 Fastener types and spacing as required by manufacturer and to be reviewed and approved by engineer sealing shop drawings.

.3 J-channel / Z-girt fasteners through sheathing into wall steel studs - #14 x 38mm self-drilling TEK fasteners.

.4 Cladding profile fasteners into J-Channel / Z-girts - #12 x 19mm self-drilling TEK fasteners.

.5 Flashing fasteners: length and thickness suitable for metal flashing application. Washers of same material as sheet metal, 1 mm thick with rubber packings.

.5 Accessories:

.1 Exposed trim: inside corners, outside corners, cap strip, drip cap, undersill trim, starter strip and window/door trim of same material, colour and gloss as cladding, with fastener holes pre-punched.

.2 Touch-up paint: as recommended by prefinished material manufacturer.

.3 Non-exposed accessories: galvanized.

.6 Isolation coating: alkali resistant bituminous paint.

.7 Caulking:

.1 Sealants: 07 92 00 – Joint Sealants.

.2 Plastic cement: to CAN/CGSB 37.5.

.8 **FABRICATION**

.1 Fabricate components to comply with dimensions, profiles, gauges and details as shown on the shop drawings, including wall cladding, soffit panels, and all companion flashing.

.2 Fabricate all components of the system in the factory, ready for field installation.

.3 Provide cladding and all accessories in longest practicable length to minimize field lapping of joints.

2.2 METAL FLASHINGS

.1 Form flashings, copings and fascias to profiles indicated on Drawings. 22 gauge prefinished steel.

2.3 OVERFLOW SCUPPERS

.1 Form scuppers from 22 gauge galvanized and prefinished steel.

.2 Sizes and profiles as indicated.

.3 Provide necessary fastenings.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Install sheet metal work in accordance with CRCA FL series details, FL, AAI-Aluminum Sheet Metal Work in Building Construction.

.2 Use concealed fastenings except where approved before installation.

.3 Provide underlay under sheet metal.

.1 Secure in place and lap joints 100 mm.

.4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs.

.1 Flash joints using S-lock forming tight fit over hook strips.

.5 Lock end joints and caulk with sealant.

3.3 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.3 Leave work areas clean, free from grease, finger marks and stains.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)

.1 ULC-S115-1995, Fire Tests of Fire stop Systems.

1.2 DEFINITIONS

.1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.

.2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.

.3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.

.4 Tightly Fitted; (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of noncombustible construction or have "0" annular space in buildings of combustible construction.

.1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.3 Shop Drawings:

.1 Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation.

.2 Construction details should accurately reflect actual job conditions.

.4 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.

.1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.

.1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

.4 Manufacturer's Field Reports: submit to manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

1.4 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: company specializing in fire stopping installations with 5 years documented experience and approved by manufacturer.

.2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section with contractor's representative and Contract Administrator.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

.3 Provide shop drawings of proposed ULC listed firestopping systems for approval by Contract Administrator.

.4 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.

.1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.

.2 Once during progress of Work at 50% complete.

.3 Upon completion of Work, after cleaning is carried out.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.

.2 Storage and Protection:

.1 Store materials indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.

.1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN-ULC-S115 and not to exceed opening sizes for which they are intended and conforming to specified special requirements described in PART 3.

.2 Service penetration assemblies: systems tested to CAN-ULC-S115.

.3 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.

.4 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.

.5 Do not use cementitious or rigid seal at openings intended for ease of re-entry.

.6 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.

.7 Do not use cementitious or rigid seals at openings around penetrations for pipes, ductwork or other mechanical items.

.8 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

.9 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.10 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

.11 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.12 Sealants for vertical joints: non-sagging.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 COORDINATION

.1 General Contractor is to coordinate work between sub-contractors to ensure proper firestopping work sequencing and coordination:

.1 Firestopping installer is to review conditions prior to and during installation of work by other trades.

.2 Ensure that work by all trades is installed in such manner to meet the requirements of ULC listed firestopping systems approved for used. Considerations include, but are not limited, to:

.1 Spacing and distribution of multiple penetrations.

.2 Annular space around penetrations.

.3 Adequate dimensional clearances for installation and performance of firestopping systems.

.4 Coordination of installed materials to available or selected firestopping systems.

.3 Do not enclose shafts, walls and other spaces until completion of all firestopping work.

.4 Photographically document completion of firestopping in all concealed spaces prior to enclosing.

3.3 PREPARATION

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.

.2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.4 INSTALLATION

.1 Mechanical Contractor is responsible for the fire stopping of all mechanical systems.

.2 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.

.3 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

.4 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.5 Tool or trowel exposed surfaces to neat finish.

.6 Remove excess compound promptly as work progresses and upon completion.

3.5 SEQUENCES OF OPERATION

.1 Proceed with installation only when submittals have been reviewed by Contract Administrator.

.2 Install floor fire stopping before interior partition erections.

.3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.

.4 Mechanical pipe insulation: certified fire stop system component.

.1 Ensure pipe insulation installation precedes fire stopping.

3.6 FIELD QUALITY CONTROL

.1 Inspections: notify Contract Administrator when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

.2 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.7 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

3.8 FIRESTOPPING SYSTEMS

.1 Select firestopping manufacturer ULC listed system for each firestopping condition.

.2 Manufacturer is to provide 'Engineering Judgments' for firestopping conditions that are not in conformance with an existing ULC listed firestopping system.

3.9 SCHEDULE

.1 Firestop and smoke seal:

.1 All existing and new penetrations through rated shaft, floor and wall assemblies.

.1 Rated wall assemblies as indicated on drawings – rated to 60 minutes.

.2 Rated exit assemblies – existing walls between new construction and existing exit stair is rated to 60 minutes.

.3 Floor assembly – rated to 60 minutes.

.4 Elevator shaft – rated to 60 minutes.

.5 Firestop all penetrations through rated assemblies indicated in the drawings.

.2 Joints in rated assemblies.

.3 Around mechanical and electrical assemblies or components penetrating fire separations.

.4 Rigid ducts through rated assemblies: greater than 129 cm^2 : fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

.1 Use non-intumescent firestopping around ducts unless intumescent is specifically permitted by ULC firestopping system.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials, preparation and application for caulking and sealants.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

- .1 ASTM C 510 - Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants.
- .2 ASTM C 719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
- .3 ASTM C 794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
- .4 ASTM C 834 - Standard Specification for Latex Sealants.
- .5 ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
- .6 ASTM C919-02, Standard Practice for Use of Sealants in Acoustical Applications.
- .7 ASTM C 1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.
- .8 ASTM C 1193 - Standard Guide for Use of Joint Sealants.
- .9 ASTM C 1247 - Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids.
- .10 ASTM C 1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants.
- .11 ASTM C 1311 - Standard Specification for Solvent Release Sealants.
- .12 ASTM D 2203 - Standard Test Method for Staining from Sealants.

.2 Canadian General Standards Board (CGSB)

- .1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
- .2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
- .3 CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
- .4 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
- .5 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.

.3 Department of Justice Canada (Jus)

- .1 Canadian Environmental Protection Act, 1999 (CEPA).

.4 General Services Administration (GSA) - Federal Specifications (FS)

.1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.6 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.3 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Manufacturer's product to describe.

.1 Caulking compound.

.2 Primers.

.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

.3 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.4 Submit duplicate samples of each type of material and colour.

.5 Cured samples of exposed sealants for each color where required to match adjacent material.

.6 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.

.1 Instructions to include installation instructions for each product used.

1.4 QUALITY ASSURANCE/MOCK-UP

.1 Perform work in accordance with the following:

.1 Building Joints: ASTM C 1193.

.2 Laboratory Pre-Construction Testing:

.1 Test sealants, joint accessories, and joint substrates in accordance with the following, before starting work of this section:

.1 Obtain samples of joint substrate products specified in other sections.

.2 Adhesion: ASTM C 794 and ASTM C 719; determine surface preparation and required primer.

.3 Compatibility: ASTM C 1087; determine materials forming joints and adjacent materials do not adversely affect sealant materials and do not affect sealant color.

.4 Staining: ASTM D 2203, ASTM C 510, or ASTM C 1248; determine sealants will not stain joint substrates.

.5 Immersion Adhesion: ASTM C 1247

.2 Pre-construction testing is not required when sealant manufacturer can furnish data acceptable to Contract Administrator based on previous testing for materials matching those of the Work.

.3 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.1 Construct mock-up to show location, size, shape and depth of joint s complete with back-up material, primer, caulking and sealant.

.2 Mock-up will be used to judge workmanship, substrate preparation, operation of equipment and material application.

.3 Locate where directed.

.4 Allow 24 hours for inspection of mock-up by Contract Administrator before proceeding with sealant work.

.5 When accepted, mock-up will demonstrate minimum standard of quality required for this Work. Approved mock-up may remain as part of finished Work.

.4 Field Pre-Construction Testing: Test each elastomeric sealant and joint substrate in accordance with the following, before beginning work of this section:

.1 Install sealants in mockups using joint preparation methods determined by laboratory pre-construction testing.

.2 Remove existing sealant, clean joint, and install new sealant using manufacturer's recommended joint preparation methods.

.3 Install field-test joints in inconspicuous location as approved by Contract Administrator.

.4 Test Method: Manufacturer's standard field adhesion test to verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.

.5 When test indicates sealant adhesion failure, modify joint preparation, primer, or both and retest until joint passes sealant adhesion test.

.5 Qualifications

.1 Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.

.2 Applicator Qualifications:

.1 Company specializing in performing work of this section with minimum three years documented experience, minimum three successfully completed projects of similar scope and complexity, and approved by manufacturer.

.2 Designate one individual as project foreman who shall be on site at all times during installation.

.6 Warranty: Submit signed copies of the following warranties against adhesive and cohesive failure of sealant and against infiltration of water and air through sealed joint for period of 3 years from date of completion.

.1 Manufacturer's standard warranty covering sealant materials.

.2 Applicator's standard warranty covering workmanship.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements and Manufacturer's Instructions.

.2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.6 PROJECT CONDITIONS

.1 Environmental Limitations:

.1 Do not proceed with installation of joint sealants under following conditions:

.1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.

.2 When joint substrates are wet.

.2 Joint-Width Conditions:

.1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:

.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.7 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.

.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.3 Ventilate area of work by use of approved portable supply and exhaust fans.

Part 2 Products

2.1 GENERAL

2.2 SEALANT MATERIALS

.1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant, in air handling units.

.2 Where sealants are qualified with primers, use only those primers.

.3 Use all sealants only in accordance with manufacturer's recommended applications.

.4 It remains the contractor's full responsibility to verify compatibility of the sealant with the substrate, primers, backer rods and weather conditions, prior to installation.

.1 Immediately bring all discrepancies or compatibility issues to the attention of the Contract Administrator.

.2 **Do not use any sealant in contact with the Air-Vapour-Barrier or roofing systems without prior approval of air-barrier manufacturer.**

2.3 SEALANT SELECTION

.1 Exterior joints in horizontal wearing (concrete) surfaces: Polyurethane, semi-self-levelling, moisture curing, non-staining, non-bleeding, colour as selected.

.1 ASTM C920
.2 Single Component
.3 Pourable
.4 Class – Cyclic Movement - 100/50
.5 CAN/CGSB – 19.13-M87
.6 Acceptable Product: Vulkem 45 SSL – Tremco Sealants, or approved equivalent in accordance with B6 Substitutes.

.2 General exterior use: Silicone, neutral cure ultra-low modulus, moisture curing, nonstaining, nonbleeding, colour as selected.

.1 ASTM C920
.2 Single Component
.3 Non-Sag
.4 Class – Cyclic Movement - 100/50
.5 Class 'A'
.6 ASTM C1248, C1382, E84
.7 CAN/CGSB – 19.13-M87
.8 Acceptable Product: Spectrem 1 – Tremco Sealants, or approved equivalent in accordance with B6 Substitutes.

.3 Glazing: Silicone, neutral cure, medium modulus, colour as selected.

.1 ASTM C920
.2 Single Component
.3 Non-Sag
.4 Class – Cyclic Movement - 50
.5 Class 'A'
.6 ASTM C1248
.7 CAN/CGSB – 19.13-M87
.8 Acceptable Product: Spectrem 2 – Tremco Sealants, or approved equivalent in accordance with B6 Substitutes.

.4 Air-Barrier to Window air-seal sealant: Silyl-terminated polyether polymer (STPe), moisture cure, medium modulus.

.1 Compatible with Air-Barrier system.

.2 ASTM C920

.3 Single Component

.4 Non-Sag

.5 Class – Cyclic Movement - 25

.6 Class 'A'

.7 Acceptable Product: Bakor HE925 BES, or approved equivalent in accordance with B6 Substitutes.

.5 General interior use: painted gypsum, painted concrete, painted concrete block: Acrylic latex, colour as selected.

.1 Low VOC.

.2 Single Component

.3 Non-Sag

.4 Class – Cyclic Movement - 12.5

.5 Class 'A'

.6 CAN/CGSB 19-GP-14M

.7 Acceptable Product: Tremflex 834 – Tremco Sealants, or approved equivalent in accordance with B6 Substitutes.

.6 Preformed Compressible and Non-Compressible back-up materials.

.1 Polyethylene, Urethane, Neoprene or Vinyl Foam.

.1 Extruded closed cell foam backer rod.

.2 Size: oversize 30-50 %.

.2 Neoprene or Butyl Rubber.

.1 Round solid rod, Shore A hardness 70.

.3 High Density Foam. Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m^3 density, or neoprene foam backer, size as recommended by manufacturer.

.4 Bond Breaker Tape.

.1 Polyethylene bond breaker tape which will not bond to sealant.

.7 Joint Cleaner.

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

.8 Accessories:

.1 All primers, bond breakers and other materials are to be used in accordance with the manufacturer's recommendations.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Perform all work in strict accordance with manufacturer's instructions.

.1 Sealant materials shall be verified for compatibility with adjacent materials and intended use.

.2 Materials shall be installed in strict accordance with manufacturer's instructions.

.3 Inform Contract Administrator of all discrepancies prior to proceeding with work.

3.2 PROTECTION

.1 Protect installed Work of other trades from staining or contamination.

3.3 SURFACE PREPARATION

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.4 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.5 BACKUP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.6 MIXING

.1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.7 APPLICATION

.1 Sealant.

.1 Apply sealant in accordance with manufacturer's written instructions.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.3 Apply sealant in continuous beads.

.4 Apply sealant using gun with proper size nozzle.

.5 Use sufficient pressure to fill voids and joints solid.

.6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.7 Tool exposed surfaces before skinning begins to give slightly concave shape.

.8 Remove excess compound promptly as work progresses and upon completion.

.2 Curing.

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until proper curing has taken place.

.3 Cleanup.

.1 Clean adjacent surfaces immediately and leave Work neat and clean.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

END OF SECTION

Part 1 General

1.1 Work Included

.1 As detailed or scheduled in the contract documents:

.1 Steel frame products including frames, transom frames (glazed or paneled), sidelight and window assemblies, fire-rated and non-rated.

.2 Steel panels, fixed or removable, flush or rabbeted, similar in construction to steel doors, for use in steel frame product.

.3 Steel doors, swing type, flush, with or without embossed face sheets, with or without glazed or louvered openings, fire-rated, with or without temperature rise ratings, and non-rated.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ANSI/NFPA 80-1999, Standard for Fire Doors and Fire Windows.

.2 ASTM A653/A653M-06a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.3 ASTM B29-03, Standard Specification for Refined Lead.

.4 ASTM B749-03, Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.

.5 ASTM C553-02, Specification for Mineral Fibre Blanket Insulation for Commercial and Industrial Applications

.6 ASTM C591-01, Specification for Un-Faced Pre-formed Rigid Cellular Polyisocyanurate Thermal Insulation.

.7 ASTM C592-04, Specification for Mineral Fibre Batt and Blanket Thermal Insulation for Light Frame Construction

.8 ASTM C1289-05a, Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

.2 CAN/CGSB-82.5-M, Insulated Steel Doors.

.3 CGSB 41-GP-19Ma-84, Rigid Vinyl Extrusions for Windows and Doors.

.3 Canadian Standards Association (CSA International)

.1 CSA-G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CSA W59-03, Welded Steel Construction (Metal Arc Welding).

.4 Canadian Steel Door Manufacturers' Association (CSDMA)

.1 CSDMA, Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2000

.2 CSDMA, Recommended Specifications for Commercial Steel Doors and Frames, 2000.

.3 CSDMA, Selection and Usage Guide for Commercial Steel Doors, 1990.

.4 HMMA 802-92 - Manufacturing of Hollow Metal Doors and Frames.

.5 HMMA 840-99 - Installation and Storage of Hollow Metal Doors and Frames.

.6 HMMA 841-07 - Tolerances and Clearance for Commercial Hollow Metal Doors and Frames.

.7 HMMA 863-04 – Detention Security Hollow Metal Doors and Frames.

.8 NFPA 80-07 - Standard for Fire Doors and Other Opening Protectives.

.5 Hollow Metal Manufacturer's Association

.1 HMMA 841 – Tolerances and clearances for Commercial Hollow Metal Doors and Frames.

.2 HMMA 863 – Guide Specifications for Detention Security Hollow Metal Doors and Frames.

.6 National Fire Protection Association (NFPA)

.1 NFPA 80-99, Standard for Fire Doors and Fire Windows.

.2 NFPA 252-03, Standard Methods of Fire Tests of Door Assemblies.

.7 South Coast Air Quality Management District (SCAQMD), California State

.1 SCAQMD Rule 1113-04, Architectural Coatings.

.2 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

.8 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S701-01, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.2 CAN/ULC-S702-97, Standard for Thermal Insulation, Mineral Fibre, for Buildings.

.3 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

.4 CAN4-S104-M80, Standard Method for Fire Tests of Door Assemblies.

.5 CAN4-S105-M85, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104.

1.3 SYSTEM DESCRIPTION

.1 Design Requirements:

.1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35 degrees C to 35 degrees C.

.2 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 NFPA 252 for ratings specified or indicated.

.3 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN4-S104, ASTM E152 or NFPA 252 and listed by nationally recognized agency having factory inspection services.

1.4 SUBMITTALS

.1 Provide submittals, product data, shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.

.2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, louvred, arrangement of hardware, fire rating, and finishes.

.3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing, fire rating, finishes.

.4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

.5 Submit test and engineering data, and installation instructions.

1.5 REGULATORY REQUIREMENTS

.1 Installed Door and Frame Assembly: Conform to NFPA 80 for fire rated class as scheduled.

.2 Installed Door and Frame Assembly: Conform to ANSI/ICC A117.1

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Section 01 61 00: Transport, handle, store, and protect products.

.3 Comply with HMMA 840.

.4 Weld minimum two temporary jamb spreaders per frame prior to shipment.

.5 Remove doors and frames from wrappings or coverings upon receipt on site and inspect for damage.

.6 Store in vertical position, spaced with blocking to permit air circulation between components.

.7 Store materials out of water and covered to protect from damage.

.8 Clean and touch up scratches or disfigurement caused by shipping or handling with zinc-rich primer.

.9 Waste Management and Disposal:

.1 Dispose of packaging and waste materials in appropriate on-site bins for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.7 OPENING SIZE DEFINITIONS

.1 Width: Widths of openings shall be measured from inside to inside of frame jamb rabbets. (Referred to as "frame rabbet width" or "nominal door width").

.2 Height: Heights of openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame. (Referred to as "frame rabbet height" or "nominal door height")

.3 Door Sizes: Doors shall be sized so as to fit the above openings and allow a 3 mm (0.125") nominal clearance at jambs and head of frame. A clearance of 19 mm (0.75") maximum shall be allowed between the bottom of the door and the finished floor (exclusive of floor coverings).

.4 Tolerances: Doors and frame product shall be manufactured and installed in accordance with the CSDMA's, "Recommended Dimensional Standards for Commercial Steel Doors and Frames".

1.8 QUALITY ASSURANCE

.1 Perform Work to requirements of CSDMA (Canadian Steel Door Manufacturers Association).

.2 Manufacturer: Minimum 5 years documented experience manufacturing hollow metal door assemblies.

1.9 DETENTION DOOR WARRANTY

.1 Manufacturer's Limited Warranty: Extend warranty to five (5) years from date of supply, covering material and workmanship.

1.10 POWERSMART REQUIREMENTS

.1 Insulated steel doors and their frames shall meet the requirements of CAN/CGSB-82.5-M “Insulated Steel Doors”.

Part 2 Products

2.1 MATERIALS

.1 Steel doors and frames manufactured in accordance with CSDMA.

.2 Commercial grade steel to ASTM A653, CS, Type B, Coating Designation ZF75 (A25) minimum. Minimum steel thicknesses shall be in accordance with Appendix 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".

2.2 DOOR CORE MATERIALS

.1 Honeycomb: Structural small cell 25.4 mm (1") maximum kraft paper 'honeycomb'. Weight: 36.3 kg (80 lb.) per ream minimum, density: 16.5 kg/m^3 (1.03 pcf) minimum, sanded to required thickness.

.2 Polyisocyanurate: Rigid, modified polyisocyanurate, closed cell board. Density; 32 kg/m3 (2.0 pcf) minimum, thermal values; RSI 1.9 (R 11.0) minimum, in accordance with ASTM C591 (un-faced) or C 1289 (faced).

.3 Temperature Rise Rated (TRR): Core composition to provide the fire-protection rating and limit the temperature rise on the unexposed side of door to 250°C at 30 or 60 minutes, as determined by governing building code requirements. Core to be tested as part of a complete door assembly, in accordance with CAN4-S104, covering the Standard Method of Tests of Door Assemblies and shall be listed by a nationally recognized testing agency having a factory inspection service.

2.3 ADHESIVES

.1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.

.2 Polystyrene and polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.

.3 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

2.4 PRIMER

.1 Prime and paint doors in accordance with Section 09 91 23 - Interior Painting.

.1 Protect weatherstrips from paint.

.2 Provide final finish free of scratches or other blemishes.

.2 Touch-up prime CAN/CGSB-1.181.

.1 Rust-inhibitive.

2.5 ACCESSORIES

.1 Door silencers: single stud rubber/neoprene type.

.2 Exterior top caps: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.

.3 Frame Thermal Breaks: Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.

.4 Glazing: Section 08 80 50 - Glazing

2.6 FRAME FABRICATION - GENERAL

.1 Interior frame product shall be 14 gauge. Interior frames and window assemblies shall be welded type construction.

.2 Interior transom frames shall be welded type construction. Interior sidelight assemblies shall be welded type construction.

.3 Frame product shall be mortised, blanked, reinforced, drilled and tapped at the factory for templated hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier.

.4 Mortised cutouts shall be protected with steel guard boxes (may be omitted on dry wall applications).

.5 Frame product shall be reinforced where required, for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware. Drilling and tapping is by others, on site, at time of installation.

.6 Provide anchorage appropriate to floor, wall and frame construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb. For rebate opening heights up to and including 1520 mm provide two (2) anchors, and an additional anchor for each additional 760 mm of height or fraction thereof, except as indicated below. Frames in previously placed concrete, masonry or structural steel shall be provided with anchors located not more than 150 mm from the top and bottom of each jamb, and intermediate anchors at 660 mm on centre maximum. Fasteners for such anchors shall be provided by others.

.7 Minimum reinforcing, anchor and other component gauges shall be in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".

.8 Each door opening shall be prepared for single stud rubber door silencers, three (3) for single door openings, two (2) for double door openings, except on gasketed frame product.

.9 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.

.10 Fire-rated frame products shall be provided for rated openings:

.1 Frames, transom and sidelight assemblies shall be listed for conformance with CAN4-S104.

.2 Window assemblies shall be listed for conformance with CAN4-S106.

.3 All fire-rated frame products shall bear the label of, and be listed by a nationally recognized testing agency having a factory inspection service. Labeling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer.

.4 Fire-rated frame products shall be constructed as listed for labeling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.

.11 Welded Type Frame Construction:

.1 Frame product shall be accurately mitered or mechanically jointed.

.2 As defined in Appendix 2 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products", frame product perimeter corner joints shall be:

.1 Face welded; continuously welded on the profile faces, with exposed faces filled and ground to a smooth, uniform, seamless surface.

.3 Joints at mullions, sills and center rails shall:

.1 Be coped accurately, butted and tightly fitted.

.2 At intersecting flush profile faces, be securely welded, filled and ground to a smooth, uniform, seamless surface.

.3 At intersecting recessed profile faces, be securely welded to concealed reinforcements, with exposed hairline face seams.

.4 At all other intersecting profile elements, have exposed hairline face seams.

.4 Welding shall conform to CSA W59.

.5 Where frame product is to be installed prior to the adjacent partition, a floor anchor shall be securely attached to the inside of each jamb profile. Each floor anchor shall be provided with two (2) holes for securing to the floor. For conditions that do not permit the use of a floor anchor, an additional wall anchor, located within 150 mm (6") of the base of the jamb, shall be substituted.

.6 Weld in two (2) temporary jamb spreaders per door opening to maintain proper alignment during shipment and handling, which shall not be used for installation.

.7 Glazing stops shall be formed steel channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.

.8 When required due to site access, when advised by the contractor responsible for coordination or installation, as specified on the Architect's drawings or due to shipping limitations, frame product for large openings shall be fabricated in sections as designated on the approved submittal drawings, with splice joints for field assembly and welding by others.

.9 Prior to shipment, mark each frame product with an identification number as shown on the approved submittal drawings.

2.7 DOOR FABRICATION - GENERAL

.1 Interior doors shall be 16ga. Face sheets with vertical steel stiffener laminated core, except where indicated on door schedule as temperature rise rated core.

.2 Longitudinal edges shall be:

.1 Unless indicated otherwise on the door schedule: Mechanically interlocked.

.2 Where indicated on the door schedule: Mechanically interlocked, tack welded at top and bottom of door, above and below each edge cutout and at 150 mm (6") on center with visible edge seams.

.3 Doors shall be mortised, blanked, reinforced, drilled and tapped at the factory for templated hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier.

.4 Holes 12.7 mm diameter and larger shall be factory prepared, except mounting and through-bolt holes, which are by others, on site, at time of hardware installation. Holes less than 12.7 mm diameter shall be factory prepared only when required for the function of the device (for knob, lever, cylinder, thumb or turn pieces) or when these holes over-lap function holes.

.5 Doors shall be reinforced where required, for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware. Drilling and tapping is by others, on site, at time of installation.

.6 Top and bottom of doors shall be provided with inverted, recessed, welded steel channels. Exterior doors, and where otherwise scheduled by the Contract Administrator, shall be provided with flush steel top caps.

.7 Minimum reinforcing and component gauges shall be in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".

.8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.

.9 Fire-rated doors shall be listed for conformance with CAN4-S104.

.1 All fire-rated doors shall bear the label of, and be listed by a nationally recognized testing agency having a factory inspection service. Labeling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer.

.2 Fire-rated doors shall be constructed as listed for labeling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.

.3 Prior to shipment, mark each door with an identification number as shown on the approved submittal drawings.

.10 Laminated Core Construction.

.1 Interior Doors: Both face sheets for interior doors shall be formed from a sheet steel with vertical steel stiffener core or temperature rise rated core, (as specified on the door schedule), laminated under pressure to face sheets.

.1 Vertical steel stiffeners shall be securely laminated to each face sheet at 150 mm (6") on center maximum.

.2 Voids between vertical stiffeners shall be filled with fiberglass batt type insulation.

.11 Manufacturer's nameplates shall be on hinge face and concealed from exposed view when the door is in a closed position.

2.8 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

2.9 MATERIALS

.1 Doors and frame product shall be removed from their wrappings or coverings upon receipt on site, be stored in a vertical position, and be spaced with blocking to permit air circulation between them.

.2 All materials shall be thoroughly inspected upon receipt and all discrepancies, deficiencies and/or damages shall be immediately reported, in writing, to the supplier.

.3 All damages incurred during shipment shall be noted on the carrier's Bill of Lading and immediately reported, in writing, to the supplier.

.4 Any scratches or disfigurement of doors or frame product caused by shipping or handling shall be promptly cleaned and touched-up with a zinc-rich primer.

.5 All materials shall be properly stored on planks or dunnage, out of water and covered to protect from damage from any cause.

2.10 INSTALLATION GENERAL

.1 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.

.2 Install doors and frames to CSDMA Installation Guide.

.3 Prior to installation, remove temporary shipping spreaders.

.4 Prior to installation, the area of floor on which the frame is to be installed, and within the path of the door swing, shall be checked and corrected for flatness.

.5 Door and frame product shall be checked for correct size, swing, rating and opening number.

.6 The supplier shall be advised of any discrepancies prior to installation.

.7 Set frames plumb, square, level and at correct elevation.

.8 Secure anchorages and connections to adjacent construction.

.9 Brace frames rigidly in position while building-in. Install wood spreaders at third points of frame rebate height to maintain frame width. Provide vertical support at centre of head for openings exceeding 1200 mm width.

.10 During the setting of frame product, check and correct as necessary for opening width, opening height, square, alignment, twist and plumb, in accordance with the CSDMA, "Recommended Dimensional Standards for Commercial Steel Doors and Frames".

.11 Remove wood spreaders after frames have been built-in.

.12 Make allowance for deflection to ensure structural loads are not transmitted to frame product.

.13 Install doors, and hardware in accordance with hardware templates and manufacturer's instructions.

.14 Adjust operable parts for correct clearances and function.

.15 Install louvers, glazing and door silencers.

.16 Finish paint in accordance with Section 09 91 23 - Interior Painting.

.17 Caulk perimeter of frames between frame and adjacent material in accordance with 07 92 00 - Joint Sealants.

2.11 FINISH REPAIRS

.1 Touch up with primer finishes damaged during installation.

.2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

2.12 GLAZING

.1 Install glazing for doors and frames in accordance with Section 08 80 50 - Glazing.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Aluminum entrance doors.

1.2 REFERENCES

.1 Aluminum Association (AA).

.1 DAF 45-03, Designation System for Aluminum Finishes.

.2 American Architectural Manufacturers Association (AAMA).

.1 AAMA 609-93, Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum.

.3 American Society for Testing and Materials International, (ASTM).

.1 ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.4 Canadian General Standards Board (CGSB).

.1 CGSB 1.40-97, Primer, Structural Steel, Oil Alkyd Type.

.2 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.

.3 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.

.5 Canadian Standards Association (CSA International).

.1 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CAN/CSA G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 SYSTEM DESCRIPTION

.1 Design Criteria.

.1 Design frames and doors in exterior walls to:

.1 Accommodate expansion and contraction within service temperature range of -35 to 35 degrees C.

.2 Limit deflection of mullions to maximum 1/175th of clear span when tested to ASTM E330 under wind load of 1.2 kpa submit certificate of tests performed

.3 Movement within system.

.4 Movement between system and perimeter framing components or substrate.

.2 Performance Requirements:

.1 Air Infiltration: For single acting offset pivot or butt hung entrances in the closed and locked position, the test specimen shall be tested in accordance with ASTM E

283 at a pressure differential of 6.24 psf (300 Pa) for single doors and 1.567 psf (75 Pa) for pair of doors. A single 3'0" x 7'0" (915 x 2134) entrance door and frame shall not exceed 0.50 cfm per square foot. A pair of 6'0" x 7'0" (1830 x 2134) entrance doors and frame shall not exceed 1.0 cfm per square foot.

.2 Structural: Corner strength shall be tested per the Kawneer dual moment load test procedure and certified by an independent testing laboratory to ensure weld compliance and corner integrity.

.3 Thermal Performance: Computer simulation testing shall be in accordance with NFRC 100/200/500 and AAMA 507-03.

.3 Size glass thickness and glass unit dimensions to limits in accordance with CAN/CGSB-12.20.

.4 Provide continuous air barrier and vapour retarder through exterior door / wall system. Primarily in line with inside pane of glass and heel bead of glazing compound.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheets in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for caulking materials during application and curing.

1.5 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate materials and profiles and provide full-size, scaled details of components for each type of door and frame. Indicate:

.1 Interior trim and exterior junctions with adjacent construction.

.2 Junctions between combination units.

.3 Elevations of units.

.4 Core thicknesses of components.

.5 Type and location of exposed finishes, method of anchorage, number of anchors, supports, reinforcement, and accessories.

.6 Location of caulking.

.7 Each type of door system including location.

.8 Arrangement of hardware and required clearances.

.3 Submit catalogue details for each type of door and frame illustrating profiles, dimensions and methods of assembly.

1.6 SAMPLES

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

.2 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

.3 Manufacturers' Field Reports: Submit two copies of manufacturers field reports.

1.7 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for cleaning and maintenance of aluminum finishes for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.8 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturer qualifications: company specializing in manufacturing the products specified in this section with minimum three years documented experience.

.2 Installer qualifications: company specializing in performing the work of this section with minimum 3 years documented experience.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.9 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

.3 Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle material and components to avoid damage. Protect curtain wall material against damage from elements, construction activities, and other hazards before, during and after curtain wall installation

1.10 WARRANTY

.1 For the Work of this Section, the 12 months warranty period prescribed in the General Conditions is extended to Twenty-four (24).

1.11 POWERSMART REQUIREMENTS

.1 Thermal Transmittance (U-factor): When tested to CSA Standard A453, the thermal transmittance (U-factor) shall not be more than: 2.7 $W/m^2 \cdot ºC$.

.2 Doors to be fully weather stripped. Leakage through doors to be no greater than 17 l/s per ASTM E283 at 75 Pa.

Part 2 Products

2.1 ENTRANCE DOORS

.1 Product: Kawneer Insulclad series doors or approved equivalent in accordance with B6 substitutes.

.1 Model 560

.2 Materials:

.1 Aluminum (Entrances and Components):

.1 Material Standard: ASTM B 221; 6063-T6 alloy and temper.

.2 The door stile and rail face dimensions of the 560 Insulclad® entrance door will be as follows:

.1 Vertical Stile: 141.3mm

.2 Top Rail: 141.3mm

.3 Bottom Rail:179.4mm

.2 Major portions of the door members to be 3.2mm nominal in thickness and glazing molding to be 1.3mm thick.

.3 Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of entrance members are nominal and in compliance with Aluminum Standards and Data, published by The Aluminum Association.

.4 Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.

.5 Thermal separators for door cladding shall be rigid polyvinylchloride (PVC) extrusions and VHB acrylic foam tape.

.6 Provide adjustable glass jacks to help center the glass in the door opening.

.7 Glazing stops: interlocking snap-in type for dry glazing. Exterior stops: tamperproof type.

.8 Provide thermally broken doors for exterior.

2.2 ACCESSORIES

.1 Fasteners: Where exposed, shall be aluminum, stainless steel or plated steel.

.2 Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

2.3 RELATED MATERIALS:

.1 Sealants: See Section 07 92 00 - Joint Sealants.

.2 Glass: See Section 08 80 50 - Glazing.

.3 Hardware: Section 08 71 00 – Door Hardware - General.

2.4 FINISHES:

.1 Kawneer Permanodic® AA-M12C22A31, AAMA 611, Architectural Class II Clear Anodic Coating (Color #17 Clear).

2.5 FABRICATION

.1 Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration plug welds and 1-1/8" (28.6) long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.

.2 Exposed portions of door cladding moldings shall be 3/32" (2.4) thick.

.3 Aluminum cladding shall be interlocked with PVC separators and applied with VHB acrylic foam tape. There shall be no metal to metal contact, direct or indirect, between the cladding or the cladding attachments and the door structure.

.4 Accurately fit and secure joints and corners. Make joints hairline in appearance.

.5 Prepare components with internal reinforcement for door hardware.

.6 Arrange fasteners and attachments to conceal from view.

.7 Fabricate aluminum entrances in accordance with entrance manufacturer’s prescribed tolerances.

.8 Doors and framing to be by same manufacturer.

.9 Provide structural steel reinforcement as required.

.10 Fit joints tightly and secure mechanically.

.11 Conceal fastenings.

.12 Mortise, reinforce, drill and tap doors, frames and reinforcements to receive hardware using templates provided under Section 08 71 00 - Door Hardware - General.

.13 Isolate aluminum from direct contact with dissimilar metals, concrete and masonry.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install entrance system in accordance with manufacturer's instructions and AAMA storefront and entrance guide specifications manual.

.2 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

.3 Provide alignment attachments and shims to permanently fasten system to building structure.

.4 Align assembly plumb and level, free of warp and twist. Maintain assembly dimensional tolerances aligning with adjacent work.

.5 Set thresholds in bed of mastic and secure.

.6 Adjusting: Adjust operating hardware for smooth operation.

.7 Set frames plumb, square, level at correct elevation in alignment with adjacent work.

.8 Make allowances for deflection of structure to ensure that structural loads are not transmitted to frames.

3.3 GLAZING

.1 Glaze aluminum doors and frames in accordance with Section 08 80 50 - Glazing.

3.4 CAULKING

.1 Seal joints to provide weathertight seal at outside and air, vapour seal at inside.

.2 Apply sealant in accordance with Section 07 92 00 - Joint Sealants. Conceal sealant within the aluminum work except where exposed use is permitted by Contract Administrator.

3.5 FIELD QUALITY CONTROL

.1 Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, protection and cleaning of its products, and submit written reports in acceptable format to verify compliance of Work with Contract.

3.6 CLEANING

.1 Perform cleaning of aluminum components in accordance with AAMA 609.1 - Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum.

.2 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.

.3 Clean aluminum with damp rag and approved non-abrasive cleaner.

.4 Remove traces of primer, caulking, epoxy and filler materials; clean doors and frames.

.5 Clean glass and glazing materials with approved non-abrasive cleaner.

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

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit catalogue details for each type of door illustrating profiles, dimensions and methods of assembly..

1.2 SAMPLES

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

.2 Submit one sample of each type of hand entry access door.

.3 Submit one 300 x 300 mm corner sample of each type of body entry door.

1.3 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for cleaning and maintenance of stainless steel finishes for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

Part 2 Products

2.1 ACCESS DOORS

.1 Sizes: Except as indicated otherwise, to be minimum sizes as follows:

.1 For body entry: 600 x 600 mm.

.2 For hand entry: 300 x 300 mm.

.2 Construction: Rounded safety corners, concealed hinges, screwdriver latch, anchor straps, able to open 180^{o}.

.3 Materials

.1 Tiled or marble surfaces and other special areas: Stainless steel with brushed satin or polished finish as directed by Contract Administrator.

.2 Other areas: Prime coated steel.

2.2 EXCLUSIONS

.1 Lay-in tile ceilings: use unobtrusive identification locators.

Part 3 Execution

3.1 LOCATION

.1 Provide and install access hatches where required for access to fire dampers and other mechanical service locations.

.2 Location: Locate access doors so that equipment is within view and accessible for operating, inspecting, adjusting, servicing without using special tools.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Architectural Aluminum Curtain Wall Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of curtain wall framing.

.1 Kawneer 1600 Wall System 2 or approved equivalent in accordance with B6 Substitutes.

1.2 REFERENCES

.1 Aluminum Association Designation System For Aluminum Finishes (AA)-1997.

.1 DAF 45 2003, Designation System For Aluminum Finishes.

.2 American Architectural Manufacturers Association (AAMA).

.1 AAMA CW-DG-1-96, Aluminum Curtain Wall Design Guide Manual.

.2 AAMA CW-10-97, Care and Handling of Architectural Aluminum From Shop to Site.

.3 AAMA CW-11-85, Design Wind Loads for Buildings and Boundary Layer Wind Tunnel Testing.

.4 AAMA T1R-A1-02, Sound Control for Fenestration Products.

.5 AAMA 501-94, Methods of Test for Exterior Walls.

.6 AAMA 503-92, Voluntary Specification for Field Testing of Metal Storefronts, Curtain Wall and Sloped Glazing Systems.

.7 AAMA 611-98, Voluntary Specifications for Anodized Finishes Architectural Aluminum.

.8 AAMA 612-02, Voluntary Specifications, Performance Requirements, and Test Procedures for Combined Coatings of Anode Oxide and Transparent Organic Coatings on Architectural Aluminum.

.9 AAMA 2603-02, Voluntary Specification Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

.10 AAMA 2604-02, Voluntary Specification Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.

.3 American Society for Testing and Materials International, (ASTM).

.1 ASTM A36/A36M-103a, Specification for Carbon Structural Steel.

.2 ASTM A123/A123M-02, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.3 ASTM A167-99, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.4 ASTM A653/A653M-03, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.5 ASTM B209-02a, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.6 ASTM B221-02, Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

.7 ASTM E283-91(1999), Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.8 ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls, by Uniform Static Air Pressure Difference.

.9 ASTM E331-00, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.

.10 ASTM E413-87(1999), Classification for Rating Sound Insulation.

.11 ASTM E1105-00, Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.

.4 Canadian General Standards Board (CGSB).

.1 CAN/CGSB 1.108-M89, Bituminous Solvent Type Paint.

.2 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.

.5 Canadian Standards Association (CSA International).

.1 CSA-G40.20/G40.21-98(R2003), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.

.2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CSA-S136-01, North American Specification for the Design of Cold-Formed Steel Structural Members.

.4 CAN3-S157-M83(R2002), Strength Design in Aluminum.

.5 CSA W59.2-M1991(R2003), Welded Aluminum Construction.

.6 Environmental Choice Program (ECP).

.1 CCD-45-95, Sealants and Caulking Compounds.

.2 CCD-47-1998, Surface Coatings.

.3 CCD-48-95, Recycled Water-Borne Surface Coatings.

.7 Society for Protective Coatings (SSPC).

.1 SSPC - Paint 20 Zinc Rich Coating.

.2 SSPC - Paint 25 Alkyd, Zinc Oxide Linseed Oil and Primer for Use Over Hand Cleaned Steel Type 1 and Type 2.

1.3 SYSTEM DESCRIPTION

.1 Vertical glazed aluminum curtain wall system includes thermally broken tubular aluminum sections with self supporting framing, shop fabricated, factory prefinished,

vision glass, insulated metal panel spandrel infill, column covers; related flashings, anchorage and attachment devices.

.2 Assembled system to permit re-glazing of individual glass (and infill panel) units from exterior without requiring removal of structural mullion sections.

1.4 PERFORMANCE REQUIREMENTS

.1 Design and size components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of system as calculated in accordance with NBC and as measured in accordance with AAMA CW 11, ASTM E330.

.2 Design and size components to withstand seismic loads and sway displacement as calculated in accordance with NBC.

.3 Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft^2 (0.3 l/s· m^2) at a static air pressure differential of 6.24 psf (300 Pa).

.4 Water Resistance, (static): The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a static air pressure differential of 12 psf (575 Pa) as defined in AAMA 501.

.5 Water Resistance, (dynamic): The test specimen shall be tested in accordance with AAMA 501.1. There shall be no leakage at an air pressure differential of 12 psf (575 Pa) as defined in AAMA 501.

.6 Uniform Load: A static air design load of 40 psf (1915 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member at design load. At structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.

.7 Seismic: When tested to AAMA 501.4, system must meet design displacement of 0.010 x the story height and ultimate displacement of 1.5 x the design displacement.

.8 Size glass units and glass dimensions to limits established in CAN/CGSB-12.20.

.9 Provide system to accommodate, without damage to components or deterioration of seals:

- .1 Movement within system.
- .2 Movement between system and perimeter framing components.
- .3 Dynamic loading and release of loads.
- .4 Deflection of structural support framing.
- .5 Shortening of building concrete structural columns.
- .6 Creep of concrete structural members.

.10 Vapour seal with interior atmospheric pressure of 25 mm sp, 22 degrees C, 40% RH: No failure.

.11 System to provide for expansion and contraction within system components caused by a cycling temperature range of 95 degrees C over a 12 hour period without causing detrimental affect to system components.

.12 Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

.13 Maintain continuous air barrier and vapour retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound. Position thermal insulation on exterior surface of air barrier and vapour retarder.

.14 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.

1.5 PRODUCT DATA

.1 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.2 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.3 Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details and water flow diagrams.

1.6 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate system dimensions, framed opening requirements and tolerances, adjacent construction, anchor details anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required.

1.7 TEST REPORTS

.1 Submit test reports in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit substantiating engineering data, test results of previous tests by independent laboratory which purport to meet performance criteria, and supportive data.

1.8 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturer qualifications: company specializing in manufacturing the products specified in this section with minimum three years documented experience.

.2 Installer qualifications: company specializing in performing the work of this section with minimum 3 years documented experience.

.2 Design structural support framing components to CAN3 S157 under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the Province of Manitoba.

.3 Perform welding Work in accordance with CSA W59.2.

.4 Pre-Installation Meetings:

.1 Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

.2 Convene one week before starting work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Handle work of this section in accordance with AAMA CW-10.

.3 Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

.4 Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle material and components to avoid damage. Protect curtain wall material against damage from elements, construction activities, and other hazards before, during and after curtain wall installation

1.10 WARRANTY

.1 For the Work of this Section, the 12 months warranty period prescribed in the General Conditions is extended to Twenty-four (24).

.2 Glazed aluminum curtain wall will stay in place and remain leak proof including coverage for complete system failure in accordance with GC 24, but for Twenty-four (24).

Part 2 Products

2.1 CURTAINWALL

.1 Product: Kawneer 1600 Wall System 2, or approve equivalent in accordance with B6 Substitutes.

.1 Outside glazed structurally silicon glazed curtain wall

.2 63.5mm Sight line

.3 152.4mm frame depth

.2 Materials

.1 Material Standard: ASTM B 221; 6063-T6 alloy and temper.

.2 Member Wall Thickness: Each storefront member shall provide structural strength to meet specified performance requirements.

.3 Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

.3 Accessories

.1 Fasteners: Where exposed, shall be Stainless Steel.

.2 Gaskets: Glazing gaskets shall comply with ASTM C 864 and be extruded of a silicone compatible EPDM rubber that provides for silicone adhesion.

.3 Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

.4 Thermal Barrier: Thermal separator shall be extruded of a silicone compatible elastomer that provides for silicone adhesion.

.4 Fabrication

.1 Fabricate components per manufacturer's installation instructions and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

.2 Accurately fit and secure joints and corners. Make joints flush, hairline and weatherproof.

.3 Prepare components to receive anchor devices. Fabricate anchors.

.4 Arrange fasteners and attachments to conceal from view.

2.2 RELATED MATERIALS:

.1 Sealants: See Section 07 92 00 - Joint Sealants.

.2 Glass: See Section 08 80 50 - Glazing.

2.3 FINISHES:

.1 Kawneer Permanodic® AA-M12C22A31, AAMA 611, Architectural Class II Clear Anodic Coating (Color #17 Clear).

2.4 GENERAL FABRICATION

.1 Fabricate system components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

.2 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

.3 Prepare components to receive anchor devices. Install anchors.

.4 Arrange fasteners and attachments to ensure concealment from view.

.5 Prepare system components to receive exterior doors, and hardware.

.6 Reinforce framing members for external imposed loads.

.7 Visible manufacturer's identification labels not permitted.

.8 Concealed steel items: galvanized in accordance with CAN/CSA-G164M ASTM A123 to 600 gm/m^2.

2.5 FABRICATION: CURTAIN-WALL SYSTEM INFILL PANELS

.1 Fabricate infill panels with metal covered edge seals around perimeter of panel assembly, enabling installation and minor movement of perimeter seal.

.2 Reinforce interior surface of exterior panel sheet from deflection caused by wind and suction loads.

.3 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

.4 Place insulation within panel, adhered to exterior face of interior panel sheet over entire area of sheet with impale fasteners.

.5 Ventilate and pressure equalize the air space outside the exterior surface of the insulation, to the exterior.

.6 Arrange fasteners and attachments to ensure concealment from view.

Part 3 Execution

3.1 EXAMINATION

.1 Verify dimensions, tolerances, and method of attachment with other work.

.2 Verify wall openings and adjoining air barrier and vapour retarder materials are ready to receive work of this section.

3.2 INSTALLATION

.1 General: Install curtain wall systems plumb, level, and true to line, without warp or rack of frames with manufacturer’s prescribed tolerances and installation instructions. Provide support and anchor in place.

.2 Dissimilar Materials: Provide separation of aluminum materials from sources of corrosion or electrolytic action contact points.

.3 Weathertight Construction: Install sill members and other members in a bed of sealant or with joint filler or gaskets, to provide weathertight construction. Coordinate installation with wall flashings and other components of construction.

.4 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

.5 Provide alignment attachments and shims to permanently fasten system to building structure. Clean weld surfaces; apply protective primer to field welds and adjacent surfaces.

.6 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.

.7 Provide thermal isolation where components penetrate or disrupt building insulation.

.8 Install sill flashings.

.9 Co-ordinate attachment and seal of perimeter air barrier and vapour retarder materials.

.10 Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

.11 Install glass and infill panels in accordance with Section 08 80 50 - Glazing to glazing method required to achieve performance criteria.

.12 Install perimeter sealant to method required to achieve performance criteria. Type, backing materials, and installation criteria in accordance with Section 07 92 00 - Joint Sealing.

3.3 SITE TOLERANCES

.1 Maximum variation from plumb: 1.5 mm/m non-cumulative or 12 mm/30 m, whichever is less.

.2 Maximum misalignment of two adjoining members abutting in plane: 0.8 mm.

.3 Maximum sealant space between curtain wall and adjacent construction: 13 mm.

3.4 MANUFACTURER'S FIELD SERVICES

.1 Curtain wall product manufacturers to provide field surveillance of installation of their Products.

.2 Monitor and report on installation procedures and unacceptable conditions.

3.5 CLEANING

.1 Remove protective materials from prefinished aluminum surfaces.

.2 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

.3 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

3.6 PROTECTION

.1 Protect finished Work from damage.

END OF SECTION

Part 1 General

1.1 Section Includes

.1 Furnish, Deliver and Install all Finish Hardware as required by this specification section. Include all screws, fasteners and material necessary for the proper installation of the hardware.

1.2 Related Sections

.1 Section 01 61 00 - Common Product Requirements.

.2 Section 01 78 00 - Closeout Submittals.

.3 Section 08 11 00 - Metal Doors and Frames.

.4 Section 08 11 16 - Aluminum Doors and Frames.

.5 Section 26: Electrical wiring for magnetic strikes, electric releases and electric locks.

1.3 Submittals

.1 General Requirements:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Schedules:

.1 Provide Six (6) copies of a detailed hardware schedule in the vertical format. Prior to preparation of the hardware schedule the hardware supplier is to visit the jobsite and site confirm all dimensions.

.3 Product Data:

.1 Include with the hardware schedule all product data sheets and catalogue cuts required for any related trades sections. Provide two copies of each.

.4 Samples:

.1 Samples of products in the hardware sets shall be provided upon request.

.5 Templates:

.1 Provide all templates required by related trade sections for the proper preparation of their product.

.6 Keying Schedule:

.1 Provide a complete keying schedule. Co-ordinate with the Contract Administrator and the City of Winnipeg the keying requirements for this project.

1.4 Quality Assurance

.1 Substitutes:

.1 The manufacturers products listed in the hardware sets establish a minimum guideline for the standard of quality. Similar items listed as an "acceptable substitute" may be supplied provided they are approved by the Contract Administrator, and provided required data and physical samples are submitted in accordance with Division One.

1.5 Delivery, Storage, and Handling

.1 Marking and Packaging

.1 Deliver to the project all hardware in the manufacturers packages with markings corresponding to the hardware schedule clearly shown.

.2 Packing, Shipping, Handling and Unloading:

.1 Deliver directly to the fabricator any items, which are requested for their use in fabrication.

.3 Storage and Protection:

.1 Store all finish hardware in its original packages in a secure, clean, dry and warm area, equipped with sufficient shelving.

1.6 Warranty

.1 Warranty all hardware for the period of one year. Door Closers to be warranted for five years.

Part 2 Products

2.1 Screws and Fasteners

.1 All hardware is to be installed with the standard fasteners supplied by the manufacturer unless called for otherwise in the hardware sets.

2.2 Hinges

.1 All hinges shall be Ives and of the size, type, and finish as indicated in the hardware sets. Stanley and Hager hinges matching those specified may be provided as a substitute.

.2 Provide non-removable pins on all exterior outswinging doors.

2.3 Flush Bolts

.1 Flush bolts solid brass or bronze. 1" projection and a 5/8" diameter. To be Gallery as specified. Hager flushbolts matching those specified may be provided as an acceptable substitute.

2.4 Locks

.1 Locks shall be cylindrical or mortise type as specified in the hardware sets. All locks to ANSI Grade 1 lever trim. Locks to be Schlage as indicated in the hardware set.

2.5 Exit Devices

.1 Shall be of the flush bar type. All devices whether rim or vertical rod to be surface mounted. Exit devices on wood doors shall be through bolted. All exit devices to Von Duprin as indicated in the hardware sets.

2.6 Door Closers

.1 All door closers shall be surface mounted with full covers. Manual closers with universal spring size must be adjusted to suit specific opening requirements. Follow manufacturers instructions. Provide LCN Closers as indicated in hardware sets.

2.7 Kickplates

.1 To be of brass or bronze construction, .050 thick. Provide Ives series as specified. Hager and Standard Metal are an acceptable substitute. Screw mounted.

2.8 Pulls

.1 To be of brass, bronze or stainless steel construction. All pulls to be thru bolt mounted. Provide Ives as specified. Hager and Standard Metal pulls are an acceptable substitute.

2.9 Protective Plates, Push Plates

.1 All plates to be of brass or bronze construction. To be .050 thick. Provide Penner Doors as specified.

.2 All kickplates on the push side of the door shall be 1 ½" less than the door width. If other hardware interferes with the above recommendations then the plate size shall be modified at the factory to suit the installation. Kickplates to be mounted behind vertical rod exit devices.

2.10 Thresholds and Weather-strip

.1 All weatherstrip, sweeps, automatic door bottoms, shall be anodized aluminum construction with polyurethane or neoprene gasketting as specified. All to be screw in mounting. K.N Crowder as specified. Reese weatherstrip matching that specified shall be an acceptable substitute.

2.11 Keying

.1 All new locks and cylinders shall be provided Masterkeyed from the factory for a new system according to the City of Winnipeg requirements. All locks and cylinders will be provided with two keys per lock and three masterkeys. All keys and cylinders shall have a visual key control on the keys and cylinders. Allow for three symbols per key or cylinder.

2.12 Key Control

.1 Provide a wall mounted key control cabinet capable of holding all of the required keys plus 20% for expansion. Provide cabinet complete with three way reference system. Telkee AWC Series or equal in accordance with B6.

Part 3 Execution

3.1 Examination

.1 Examine all doors and frames prior to installation of hardware to determine if the hardware can be installed correctly. Do not proceed with installation until defects are corrected.

3.2 Installation

.1 Install all hardware in accordance with the manufacturers installation instructions.

3.3 Hardware Sets

.1 Provide Finish Hardware as follows:

3.4 Schedule

.1 Hardware component Schedule Based On:

Hinge	IVES (IVES)
Cylinder-Rim	Schlage Lock Company (SCH)
Cylinder	Best Access Systems (BAS)
Lockset	Schlage Lock Company (SCH)
Passage Set	Schlage Lock Company (SCH)
Exit Device	Von Duprin, Inc. (VDI)
Electric Strike	Von Duprin, Inc. (VDI)
Door Pull	IVES (IVES)
Door Closer	LCN Closers (LCN)
Drop Plate	LCN Closers (LCN)
Automatic Operator	LCN Closers (LCN)
Protector Bar	Penner Doors (PD)
Wall Bumper	IVES (IVES)
Overhead Holder/Stop	Glynn-Johnson (GJ)
Weatherstripping	Furnished by Others (FBO)
Weatherstripping	K. N. Crowder Mfg., Inc. (KNC)
Sweep Strip	K. N. Crowder Mfg., Inc. (KNC)
Door Bottom – Auto	K. N. Crowder Mfg., Inc. (KNC)
Threshold	K. N. Crowder Mfg., Inc. (KNC)
Actuator	Wikk (WIK)
Smoke Seal	K. N. Crowder Mfg.,Inc. (KNC)
Power Supply	LCN Closers (LCN)
Motion Sensor	LCN Closers (LCN)

.2 **Door List:**

Door#	**Hardware Set#**
1	1
2	2
4	3

5	4
6	5
7	6

.3 Hardware Sets:

Hardware Set#: 1
Single: 1

Qty	UOM	Item Type	Item Series / Description	Finish
3.0	EA	Hinges	3CB1HW 4.5 x4 NRP	652
1.0	EA	Cylinder	1E72	626
1.0	EA	Exit Device	33NL-OP	626
1.0	EA	Door Pull	8190-18	630
1.0	EA	Drop Plate	9540-18 Mounting plate	689
1.0	EA	Automatic Operator	8310-806R On/Off Rocker Switch	689
1.0	EA	Automatic Operator	9542	689
1.0	EA	Protector Bar	CE-803-6 Curran Guard Rail	Alum
1.0	EA	Weatherstripping	By door supplier	
1.0	EA	Sweep Strip	W-13S	628
1.0	EA	Threshold	CT-65	627
1.0	EA	Actuator	136-3-NARR Ingress'r	630
1.0	EA	Actuator	136-5 Ingress'R	32D
1.0	EA	Actuator	B4S-SM-INGR Bollard	Alum
2.0	EA	Motion Sensor	8310-804-2 Safety Sensor	
2.0	EA	Motion Sensor	8310-847 Wiring Harness	

Hardware Set#: 2
Single: 2

Qty	UOM	Item Type	Item Series / Description	Finish
3.0	EA	Hinges	3CB1 4.5 x 4	652
1.0	EA	Cylinder – Rim	20-021	626
1.0	EA	Exit Device	98L-F	626
1.0	EA	Kick Plate	8400 10 x 1 ½ " less door width	630
1.0	EA	Wall Bumper	WS401CCV	626
1.0	EA	Door Bottom – Auto	CT-52	689
1.0	EA	Gasketing (Category H)	W-21	Black
1.0	EA	Electromagnetic Door Closer/Holder	LCN 4040SE 689	

Hardware Set#: 3
Single: 4

Qty	UOM	Item Type	Item Series / Description	Finish
3.0	EA	Hinges	3CB1 4.5 x 4 NRP	630
1.0	EA	Exit Device	98EO	626
1.0	EA	Door Closer	4111 EDA	689
1.0	EA	Kick Plate	8400 10 x 1 ½ " less door width	630
1.0	EA	Overhead Holder/ Stop	104S	630
1.0	EA	Weatherstripping	W-20S 3' Top Only	628

1.0	EA	Weatherstripping	W-50S 2/7 Sides Only	628
1.0	EA	Threshold	CT-45 36”	627

Hardware Set#: 4
Single: 5

Qty	UOM	Item Type	Item Series / Description	Finish
3.0	EA	Hinges	3CB1 4.5 x 4	652
1.0	EA	Lockset	ND80PD RHO	626
1.0	EA	Door Closer	4111 EDA	689

Hardware Set#: 5
Single: 6

Qty	UOM	Item Type	Item Series / Description	Finish
3.0	EA	Hinges	3CB1 4.5 x 4	652
1.0	EA	Lockset	ND80PD RHO	626
1.0	EA	Door Closer	4011	689

Hardware Set#: 6
Single: 7

Qty	UOM	Item Type	Item Series / Description	Finish
3.0	EA	Hinges	3CB1 4.5 x 4	652
1.0	EA	Passage Set	ND10S RHO	626
1.0	EA	Kick Plate	8400 10 x 1 ½ “ less door width	630
1.0	EA	Wall Bumper	WS401CCV	626
1.0	EA	Door Bottom – Auto	CT-52	689
1.0	EA	Gasketing (Category H)	W-21	Black
1.0	EA	Electromagnetic Door Closer/Holder	LCN 4040SE 689	

END OF SECTION

Century Arena Universal Accessibility

Winnipeg, Manitoba

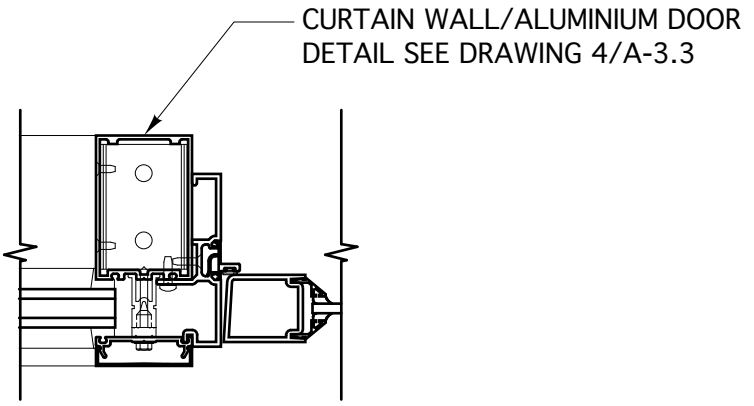
DOOR AND FRAME SCHEDULE

DOOR NO.	SIZE	TYPE	MATERIAL	FINISH	CORE	RAT'G	INSUL	HARD WARE	FRAME TYPE	MATERIAL	FINISH	RATING	REMARKS
1	1016x2134	A	ALUM					1	1	ALUM			AUTOMATIC POWER BUTTONS
2	1016x2134	B	METAL	PAINT	TRRC	3/4 HR		2	2	W.M.F.	PAINT	3/4 HR	Hold Open Device
3	914x2134		EXISTING	PAINT				-		EXISTING	PAINT		RE-INSTALL EXISTING DOOR - NEW LOCATION- REUSE HARDWARE
4	914x2134	C	METAL	PAINT			INSUL	3	3	W.M.F.	PAINT		
5	914x2134	C	METAL	PAINT	TRRC	3/4 HR		4	2	W.M.F	PAINT	3/4 HR	
6	914x2134	C	METAL	PAINT	TRRC	3/4 HR		5	2	W.M.F	PAINT	3/4 HR	
7	1016x2134	B	METAL	PAINT	TRRC	3/4 HR		6	2	W.M.F	PAINT	3/4 HR	Hold Open Device

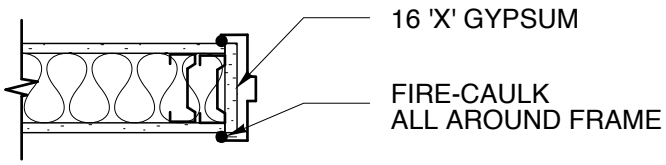
NOTE: ALL NEW METAL DOORS TO BE PAINTED AS SPECIFIED
ALL NEW HARDBOARD DOORS TO BE PAINTED AS SPECIFIED
ALL NEW ALUMINUM DOORS AND FRAMES ANODIZED
REUSE DOOR, FRAME & HARDWARE FOR EXISTING DOORS

NOTE: W.M.F - WELDED METAL FRAME
ALUM - ALUMINUM
HDBD - HARDBOARD
S.C.- SOLID CORE
WOOD VENEER -PARTICLE CORE - WOOD GRAIN
PREMIUM GRADE - VARNISH
G.W.G. - 6MM GEORGIAN WIRE GLASS
HOLD OPEN--HARDWARE HOLD OPEN
TRRC - TEMPERATURE RISE RATED CORE

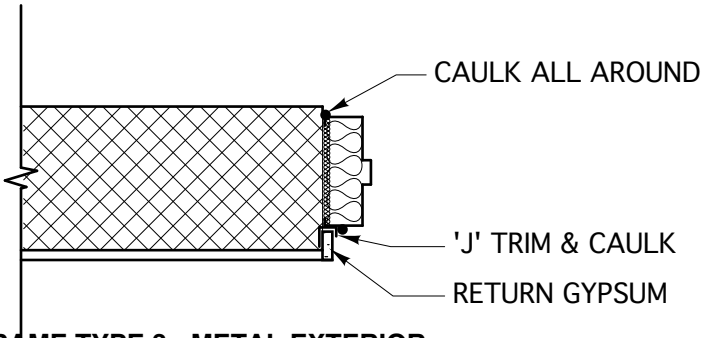
DOOR & FRAME SCHEDULE



FRAME TYPE 1 - ALUMINIUM EXTERIOR



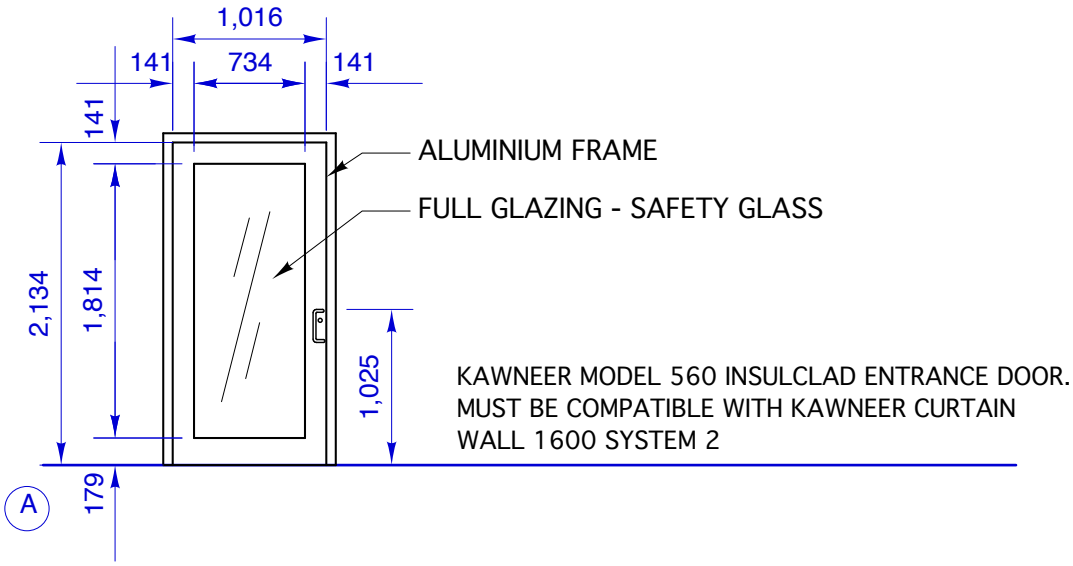
FRAME TYPE 2 - FIRE-RATED INTERIOR



FRAME TYPE 3 - METAL EXTERIOR

GENERAL DOOR, FRAME AND OPENING NOTES:

1. ALL GLAZING IN DOORS SHALL BE TEMPERED. ALL GLAZING IN RATED DOORS SHALL BE GEORGIAN WIRED GLASS.
2. EXTERIOR METAL DOORS SHALL BE INSULATED.
3. INSULATE ALL AROUND EXTERIOR DOOR FRAMES.
4. INSULATE ALL AROUND CORRIDOR SOUND WALLS.
5. DOOR AND FRAME SUPPLIERS SHALL REFER TO WALL TYPES FOR REQUIRED FRAME DEPTHS. FAILURE TO DO SO WILL BE THE RESPONSIBILITY OF THE SUPPLIER.
6. REFER TO THE DRAWINGS FOR INTERIOR DOOR GLAZING AND SIDELITE PROFILES.
7. CAULK AND SEAL ALL EXTERIOR FRAMES TO AIR BARRIER.
8. GLAZING IN EXTERIOR DOORS SHALL BE DOUBLE HERMETICALLY SEALED AND 6 mm TEMPERED UNITS.
9. ADD EQUIVALENT GYPSUM BOARD TO DOOR ROUGH OPENING WHERE THE WALL IS SHOWN TO BE FIRE RATED.
10. DOOR SUPPLIER TO REVIEW AND ADVISE CONTRACT ADMINISTRATOR OF ANY DISCREPANCIES AND/OR OTHERWISE AS REQUIRED.
11. GLAZING IN ACOUSTICALLY SEALED DOORS SHALL BE DOUBLE HERMETICALLY SEALED AND 6 mm TEMPERED UNITS.


1,016
141
734
141
141
ALUMINIUM FRAME
FULL GLAZING - SAFETY GLASS
2,134
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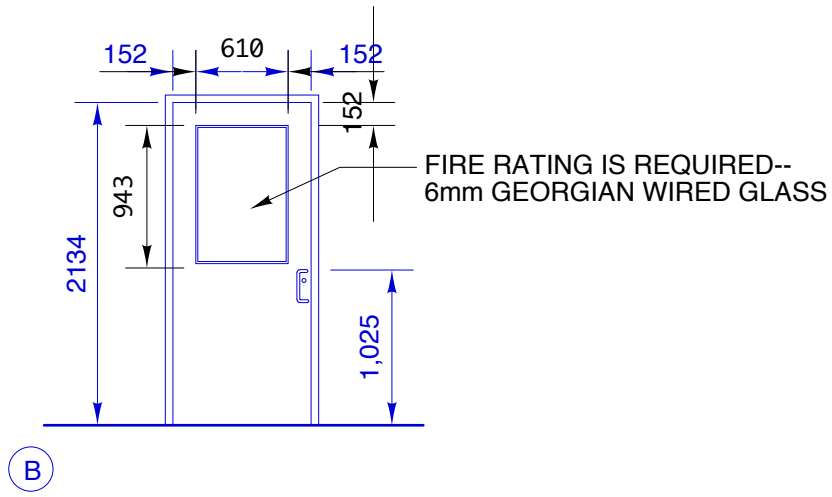
KAWNEER MODEL 560 INSULCLAD ENTRANCE DOOR.
MUST BE COMPATIBLE WITH KAWNEER CURTAIN
WALL 1600 SYSTEM 2
179
A


152
610
152
152
FIRE RATING IS REQUIRED--
6mm GEORGIAN WIRED GLASS
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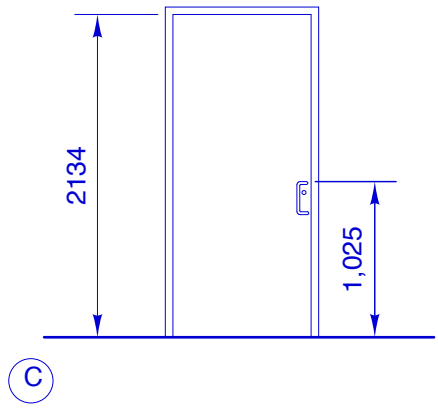
2134
1,025
C

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI).

.1 ANSI/ASTM E330-02, Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.2 ANSI Z97.1 - For Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2009

.2 American Society for Testing and Materials International, (ASTM).

.1 ASTM C542-94(1999), Specification for Lock-Strip Gaskets.

.2 ASTM D790-02, Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

.3 ASTM D1003-00, Test Method for Haze and Luminous Transmittance of Plastics.

.4 ASTM D1929-96(R2001)e1, Test Method for Determining Ignition Temperature of Plastics.

.5 ASTM D2240-02b, Test Method for Rubber Property - Durometer Hardness.

.6 ASTM E84-01, Test Method for Surface Burning Characteristics of Building Materials.

.7 ASTM F1233-98, Test Method for Security Glazing Materials and Systems.

.8 ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2011

.9 ASTM E2074 - Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side Hinged and Pivoted Swinging Door Assemblies; 2000

.3 National Fire Protection Association (NFPA):

.1 NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2010

.2 NFPA 251 - Standard Methods of Tests of Fire Endurance of Building Construction and Materials; 2006

.3 NFPA 252 – Standard Methods of Fire Tests of Door Assemblies; 2012

.4 NFPA 257 – Standard on Fire Tests for Window and Glass Block Assemblies; 2012

.4 Underwriters Laboratories, Inc. (UL):

.1 UL 9 – Standard for Fire Tests of Window Assemblies; 2009

.2 UL 10B – Standard for Fire Tests of Door Assemblies; 2008

.3 UL10C – Standard for Positive Pressure Fire Tests of Door Assemblies; 2009

.4 UL 263 – Standard for Fire tests of Building Construction and Materials; 2003

.5 Canada/Underwriters Laboratories of Canada (CAN/ULC):

.1 CAN/ULC-S101 - Standard Methods of Fire Endurance Tests of Building Construction and Materials; 2007

.2 CAN/ULC-S104 - Standard Method for Fire Tests of Door Assemblies; 2010

.6 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.

.2 CAN/CGSB-12.2-M91, Flat, Clear Sheet Glass.

.3 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.

.4 CAN/CGSB-12.4-M91, Heat Absorbing Glass.

.5 CAN/CGSB-12.5-M86, Mirrors, Silvered.

.6 CAN/CGSB-12.6-M91, Transparent (One-Way) Mirrors.

.7 CAN/CGSB-12.8-97, Insulating Glass Units.

.8 CAN/CGSB-12.9-M91, Spandrel Glass.

.9 CAN/CGSB-12.10-M76, Glass, Light and Heat Reflecting.

.10 CAN/CGSB-12.11-M90, Wired Safety Glass.

.11 CAN/CGSB-12.12-M90, Plastic Safety Glazing.

.12 CAN/CGSB-12.13-M91, Patterned Glass.

.7 Canadian Standards Association (CSA International).

.1 CSA A440.2-98, Energy Performance Evaluation of Windows and Sliding Glass Doors.

.2 CSA Certification Program for Windows and Doors 2000.

.8 Environmental Choice Program (ECP).

.1 CCD-045-95, Sealants and Caulking.

.9 Flat Glass Manufacturers Association (FGMA).

.1 FGMA Glazing Manual - 1997.

.10 Laminators Safety Glass Association (LSGA).

.1 LSGA Laminated Glass Design Guide 2000.

1.2 SYSTEM DESCRIPTION

.1 Performance Requirements:

.1 Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:

.1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.

.2 Size glass to withstand wind loads, dead loads and positive and negative live loads acting normal to plane of glass to a design pressure of 1 kPa as measured in accordance with ANSI/ASTM E330.

.3 Limit glass deflection to 1/200 flexural limit of glass with full recovery of glazing materials.

1.3 DEFINITIONS

.1 Fire Protection: As defined by the International Building Code (IBC), fire protection glass has fire rating of 45 or 90 minutes and is in compliance with NFPA 252, NFPA 257, UL 9, UL 10B, and UL 10C testing standards.

.2 Fire Resistance: As defined by the International Building Code (IBC), fire resistant glass has fire rating of 60 or 120 minutes and is in compliance with ASTM E119, NFPA 251, NFPA 252, NFPA 257, UL 9, UL 10B, UL 263, and CAN/ULC-S101 testing standards.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.3 Samples:

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

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

.5 Closeout Submittals:

.1 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 QUALITY ASSURANCE

.1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.2 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

.3 Glazing Standards: GANA Glazing and Sealant Manuals

.4 Fire Resistance Rated Glass: Each lite shall bear permanent, non-removable UL label certifying it for use in tested and rated fire resistive assemblies.

1.6 SITE CONDITIONS

.1 Environmental Requirements:

.1 Install glazing when ambient temperature is 10 degrees C minimum. Maintain ventilated environment for 24 hours after application.

.2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.7 WARRANTY

.1 Warranty Period for specialty rated glass: For period of five years commencing the date of original factory shipment of glazing materials to project site by manufacturer.

Part 2 Products

2.1 MATERIALS: FLAT GLASS

.1 Safety glass: to CAN/CGSB-12.1.

.1 6mm thick or as indicated.
.2 Type 2-tempered.
.3 Class B-float.

.2 Wired glass: to CAN/CGSB-12.11.

.1 Type 1-Polished both sides (transparent).
.2 Wire mesh styles 3-Square.

.3 Polycarbonate security glazing: Bayer / Sheffield Plastics Makrolon AR or approved equivalent in accordance with B6 Substitutes.

.1 Monolithic polycarbonate sheet: 6mm Gauge.
.2 One-sided hard-coated to resist abrasion, marring, and UV damage.
.3 7 year limited product warranty against coating failure, yellowing, and hazing.
.4 Minimum 25mm edge engagement at frame with sufficient rabbet depth for expansion. (Per manufacturer.)

.4 Patterned glass: AFG Glass Matelux or approved equivalent.

.1 to CAN/CGSB-12.13, use where indicated.
.2 Type 2-Tempered.
.3 Styles A-Figured one surface.
.4 Surface treatment: Etching.

.5 Low emissivity (LOW E) glass: AGC Comfort Ti-AC 40 low-e coating or approved equivalent.

.1 Thickness as determined by manufacturer for window sizing.
.2 Metallic coating: soft, sputtered.
.3 Light transmittance: 0.69
.4 Shading co-efficient: 0.45
.5 U-Value: 0.3 $h \cdot ft^{2} \cdot °F/Btu$
.6 Tempered panes where indicated by window schedule.

2.2 ASSEMBLIES: SEALED INSULATING GLASS

.1 Exterior insulating glass units: to CAN/CGSB-12.8, triple or double units as indicated in window schedule.

.1 Use 6mm tempered glass for all exterior glazing.

.2 Interior glazing must be tempered, to Building Code requirements, thickness per curtain wall manufacturer's recommendation.

.3 Inter-cavity space thickness: 12.7mm or to width required to accommodate glazing thickness. Warm edge, low conductivity spacers. Super spacer or approved equivalent.

.4 Glass coating: single low-e Comfort Ti-AC 40 or approved equivalent.

.5 Solar Heat Gain Co-efficient: 0.29

.6 U-value: 0.2 $h \cdot ft^2 \cdot °F/Btu$

.7 Manufacture glass units with dual seal to CGSB 12.8-90 and certified by the Glass Manufacturer's Association.

.8 Use tempered glazing where required by code.

2.3 MATERIALS

.1 Sealant: Section 07 92 00 - Joint Sealants.

2.4 ACCESSORIES

.1 Setting blocks and spacer shims: by manufacturer.

.2 Glazing tape and caulking: by manufacturer.

.3 Glazing splines: by manufacturer.

.4 Glazing clips: manufacturer's standard type.

.5 Lock-strip gaskets: to ASTM C542.

.6 Mirror attachment accessories:

.1 Stainless steel clips.

.2 Mirror adhesive, chemically compatible with mirror coating and wall substrate.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 EXAMINATION

.1 Verify that openings for glazing are correctly sized and within tolerance.

.2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.3 PREPARATION

.1 Clean contact surfaces with solvent and wipe dry.

.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.3 Prime surfaces scheduled to receive sealant.

3.4 INSTALLATION METHODS:

.1 In accordance with manufacturer’s recommended method and as appropriate for interior and exterior conditions of application.

.2 Exterior method is to afford continuity of air/vapour barrier system.

3.5 INSTALLATION: MIRRORS

.1 Set mirrors with adhesive, applied in accordance with adhesive manufacturer's instructions.

.2 Set mirrors with clips and rosettes. Anchor rigidly to wall construction.

.3 Set in frame.

.4 Place plumb and level.

3.6 CLEANING

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

.2 Remove traces of primer, caulking.

.3 Remove glazing materials from finish surfaces.

.4 Remove labels after work is complete.

.5 Clean glass and mirrors using approved non-abrasive cleaner in accordance with manufacture's instructions.

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

3.7 PROTECTION OF FINISHED WORK

.1 After installation, mark light with an "X" by using removable plastic tape or paste. Do not mark heat absorbing or reflective glass units.

3.8 SCHEDULE

.1 Refer to Drawings, Door schedules and Window schedules for Window and Door glazing.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 The Aluminum Association Inc. (AAI)

.1 AAI DAF-45-2003, Designation System for Aluminum Finishes - 9th Edition.

.2 Air Movement and Control Association International (AMCA)

.1 AMCA 500-D-98, Laboratory Methods of Testing Dampers for Rating.

.2 AMCA 500-L-99, Laboratory Methods of Testing Louvers for Rating.

.3 AMCA 501-03, Application Manual for Air Louvers.

.4 AMCA 511-99(R2004), Certified Ratings Program for Air Control Devices.

.3 American National Standards Institute (ANSI)

.1 ANSI H35.1/H35.1M-06, Alloy and Temper Designation Systems for Aluminum.

.4 American Society for Testing and Materials International (ASTM)

.1 ASTM A167-99(2004), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.2 ASTM A653/A653 M-05a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.3 ASTM A1008/A1008M-05b, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened and Bake Hardenable.

.4 ASTM B32-04, Standard Specification for Solder Metal.

.5 ASTM B209-04, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.6 ASTM B221-05a, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

.7 ASTM B370-03, Standard Specification for Copper Sheet and Strip for Building Construction.

.8 ASTM D523-89(1999), Standard Test Method for Specular Gloss.

.9 ASTM D822-01, Standard Practice for Filtered Open-Flame Carbon-Arc Exposure of Paint and Related Coatings.

.5 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.213-2004, Etch Primer (Pretreatment Coating of Tie Coat) for Steel and Aluminum.

.2 CAN2-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.

.2 Indicate fabrication and erection details, including anchorage, accessories, and finishes.

.4 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.

.1 Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

.5 Closeout Submittals:

.1 Provide operation and maintenance data for manual or motorized operated louvres for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.3 Deliver materials to the site in undamaged condition.

.2 Storage and Protection:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Protect louvres from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.3 Waste Management and Disposal:

.1 Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

.1 Weather resistant louvres, with bird screens made to withstand a wind load of not less than 1.44 kilopascals (30 p.s.f.)

.2 Wall louvers: complete with AMCA certified ratings program seal for air performance and water penetration in accordance with AMCA 500-D AMCA 500-L and AMCA 511.

.3 Ratings to indicate water penetration of 0.06 kilograms or less per square meter of free area at free velocity of 244 meters per minute.

.4 Aluminum extrusions: to Aluminum Association alloy AAI DAF-45, ANSI H35.1/H35.1M, ASTM B221 alloy 6063-T5.

.5 Nails and fasteners: same material as fabricated items.

.6 Primer: to CAN/CGSB-1.213 aluminum surfaces.

.7 Screens:

- .1 Insect screens: 0.3 mm diameter aluminum wire 18 x 14 mesh with 60% free area, secured to aluminum frame.

.8 Extruded aluminum louvres:

- .1 Construct louvres from aluminum extrusions of minimum 3 mm thickness to sizes and shapes indicated.
- .2 Arrange blades, mullions and frame extrusions as indicated.
- .3 Install concealed vertical stiffeners spaced to meet required loads.
- .4 Complete louvre assembly to have % free area required by Mechanical drawings and specifications.

.9 Door louvres:

- .1 Construct door louvres from aluminum extrusions minimum 3mm thick.
  - .1 Minimum free area of 35 % or as indicated in Mechanical drawings and specifications.
  - .2 Provide fasteners to suit louvre material.
- .2 Use sight-proof blades.
- .3 Provide separate adjustable trim member for clamping louvre in opening.
- .4 Miter frame and trim members at corners and secure rigidly with corner brackets.
- .5 Secure interior frame with countersunk tamperproof screws.

2.2 FINISHES

.1 Clear anodized finish.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Install louvres and vents where indicated.

.2 Set adjustable louvre blades for uniform alignment in open and closed positions.

.3 Adjust louvres so moving parts operate smoothly.

.4 Attach insect screen to inside face of louvre or vent.

.5 Repair damage to louvres and vents to match original finish.

.6 Install wall louvers using flanges or as appropriate for wall construction and in accordance with manufacturer's recommendations. To meet Contract Administrator’s approval.

3.3 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

3.4 PROTECTION

.1 Where aluminum contacts metal other than zinc, paint dissimilar metal with primer and two coats of aluminum paint.

.2 Paint metal in contact with mortar, concrete, or other masonry materials with alkali-resistant coatings.

.3 Paint wood or other absorptive materials that may become repeatedly wet and in contact with metal.

3.5 SCHEDULE

.1 Refer to Mechanical Drawings.

.2 Refer to Architectural Elevations and details, including soffit ventilation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Aluminum Association

.1 Designation for Aluminum Finishes-1997.

.2 American Society for Testing and Materials International, (ASTM)

.1 ASTM C36/C36M-01, Specification for Gypsum Wallboard.

.2 ASTM C79/C79M-01, Standard Specification for Treated Core and Non-treated Core Gypsum Sheathing Board.

.3 ASTM C442/C442M-01, Specification for Gypsum Backing Board, Gypsum Coreboard, and Gypsum Shaftliner Board.

.4 ASTM C475-01, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

.5 ASTM C514-01, Specification for Nails for the Application of Gypsum Board.

.6 ASTM C557-99, Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.

.7 ASTM C630/C630M-01, Specification for Water-Resistant Gypsum Backing Board.

.8 ASTM C840-01, Specification for Application and Finishing of Gypsum Board.

.9 ASTM C931/C931M-01, Specification for Exterior Gypsum Soffit Board.

.10 ASTM C954-00, Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.

.11 ASTM C960/C960M-01, Specification for Pre-decorated Gypsum Board.

.12 ASTM C1002-01, Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

.13 ASTM C1047-99, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

.14 ASTM C1280-99, Specification for Application of Gypsum Sheathing Board.

.15 ASTM C1177-01, Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

.16 ASTM C1178/C1178M-01, Specification for Glass Mat Water-Resistant Gypsum Backing Board.

.3 Association of the Wall and Ceilings Industries International (AWEI)

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.2 CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.

.5 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S102-1988(R2000), Surface Burning Characteristics of Building Materials and Assemblies.

1.2 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.

.2 Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.

.3 Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged.

1.3 SITE ENVIRONMENTAL REQUIREMENTS

.1 Maintain temperature minimum 10 degrees C, maximum 21 degrees C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost free surfaces.

.3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

Part 2 Products

2.1 MATERIALS

.1 Fiber-reinforced abuse and moisture resistant gypsum board: to ASTM C1278, ASTM C630, ASTM C1178. Thickness as indicated on wall types. 1200mm wide x maximum practical length.

.1 Joint compounds and installation in accordance with manufacturer's recommendations.

.2 Product: CGC Fiberock 16mm VHI abuse-resitant panel.

.1 Steel studs to be 20ga. (0.9mm).

.2 Joint reinforcement: Paper tape with Durabond 90 setting type compound to embed tape.

.3 Fasteners:

.1 Z180 galvanized fasteners.

.2 Wood blocking: Corrosion resistant Type W or S buglehead screws.

.3 Steel studs: Corrosion resistant Type S-12 buglehead screws.

.4 Control joints @ 9000mm.

.5 Corrosion resistant fasteners to ASTM C840.

.2 Metal furring runners, hangers, tie wires, inserts, anchors: to ASTM C1280.

.3 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.

.4 Resilient drywall furring : 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.

.5 Nails: to ASTM C514.

.6 Steel drill screws: to ASTM C1002.

.7 Stud adhesive: to CAN/CGSB-71.25, ASTM C557.

.8 Laminating compound: as recommended by manufacturer, asbestos-free and LEED compliant.

.9 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, metal, zinc-coated, 0.5 mm base thickness, perforated flanges, one piece length per location.

.10 Cornice cap: 12.7 mm deep x partition width, of 1.6 mm base thickness galvanized sheet steel, prime painted. Include splice plates for joints.

.11 Sealants: in accordance with Section 07 92 00 - Joint Sealants.

.12 Polyethylene: to CAN/CGSB-51.34, Type 2.

.13 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.

.14 Joint compound: to ASTM C475, asbestos-free.

Part 3 Execution

3.1 ERECTION

.1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.

.2 Do application of gypsum sheathing in accordance with ASTM C1280.

.3 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.

.4 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.5 Install work level to tolerance of 1:1200.

.6 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles.

.7 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.

.8 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.

.9 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.

.10 Install wall furring for gypsum board wall finishes in accordance with ASTM C840, except where specified otherwise.

.11 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.

.12 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

.13 Erect drywall resilient furring transversely across studs / joists / between the layers of gypsum board, spaced maximum 600 mm on centre and not more than 150 mm from ceiling/wall juncture. Secure to each support with 25 mm drywall screw.

.14 Install 150 mm continuous strip of 12.7 mm gypsum board along base of partitions where resilient furring installed.

3.2 APPLICATION

.1 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical work are approved.

.2 Apply single/double layer gypsum board to wood/metal furring or framing using screw fasteners for first layer, screw fasteners for second layer. Maximum spacing of screws 300 mm on centre.

.1 Single-Layer Application:

.1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C840.

.2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.

.2 Double-Layer Application:

.1 Install gypsum board for base layer and exposed gypsum board for face layer.

.2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.

.3 Apply base layers at right angles to supports unless otherwise indicated.

.4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.

.3 Apply single/double layer gypsum board to concrete and concrete block surfaces, where indicated, using laminating adhesive.

.1 Comply with gypsum board manufacturer's recommendations.

.2 Brace or fasten gypsum board until fastening adhesive has set.

.3 Mechanically fasten gypsum board at top and bottom of each sheet.

.4 Apply water-resistant gypsum board where wall tiles to be applied and in janitor rooms. 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.

.5 Apply 12 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, in partitions where perimeter sealed with acoustic sealant.

.6 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.

.7 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.

.8 Install gypsum board with face side out.

.9 Do not install damaged or damp boards.

.10 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

3.3 INSTALLATION

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm on centre.

.2 Install casing beads around perimeter of suspended ceilings.

.3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.

.4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.

.5 Install shadow mould at gypsum board/ceiling juncture as indicated. Minimize joints; use corner pieces and splicers.

.6 Construct control joints of two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint.

.7 Provide continuous polyethylene dust barrier behind and across control joints.

.8 Locate control joints where indicated, at changes in substrate construction and at approximate 10 m spacing on long corridor runs, at approximate 15 m spacing on ceilings.

.9 Install control joints straight and true.

.10 Construct expansion joints at building expansion and construction joints. Provide continuous dust barrier.

.11 Install expansion joint straight and true.

.12 Install cornice cap where gypsum board partitions do not extend to ceiling.

.13 Fit cornice cap over partition, secure to partition track with two rows of sheet metal screws staggered at 300 mm on centre.

.14 Splice corners and intersections together and secure to each member with 3 screws.

.15 Install access doors to electrical and mechanical fixtures specified in respective sections.

.1 Rigidly secure frames to furring or framing systems.

.16 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.

.17 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended Specification on Levels of Gypsum Board Finish:

.1 Levels of finish:

.1 Level 0: No taping, finishing or accessories required.

.2 Level 1: Embed tape for joints and interior angles in joint compound. Surfaces to be free of excess joint compound; tool marks and ridges are acceptable.

.1 Typical for ceiling spaces.

.3 Level 2: Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.

.4 Level 3: Embed tape for joints and interior angles in joint compound and apply two separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.

.5 Level 4: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.

.1 Typical for painted gypsum walls.

.6 Level 5: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges.

.1 Typical for walls exposed to direct sunlight along the length of the wall or as directed by Contract Administrator.

.2 Use on new drywall finish over existing exterior block wall on main floor

.3 Use on new elevator shaft wall in ground floor vestibule.

.18 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.

.19 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.

.20 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.21 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

.22 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.

.23 Mix joint compound slightly thinner than for joint taping.

.24 Apply thin coat to entire surface using trowel or drywall broad knife to fill surface texture differences, variations or tool marks.

.25 Allow skim coat to dry completely.

.26 Remove ridges by light sanding or wiping with damp cloth.

.27 Provide protection that ensures gypsum drywall work will remain without damage or deterioration at time of substantial completion.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).

.1 ASTM C645-00, Specification for Nonstructural Steel Framing Members.

.2 ASTM C754-00, Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

.2 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-1.40-97, Primer, Structural Steel, Oil Alkyd Type.

.3 Environmental Choice Program (ECP).

.1 CCD-047a -98, Paints - Surface Coatings.

.2 CCD-048-98, Surface Coatings - Recycled Water-borne.

1.2 QUALITY ASSURANCE

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

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

Part 2 Products

2.1 MATERIALS

.1 Non-load bearing channel stud framing: (interior walls.)

.1 to ASTM C645, to sizes indicated, roll formed from hot dipped galvanized steel sheet, for screw attachment of gypsum board.

.2 Knock-out service holes at 460 mm on centres.

.3 Steel studs min. 0.53mm (25ga) and 0.91mm (20ga) where indicated by listed wall assemblies or as otherwise indicated in drawings and as required by manufacturer’s engineering data.

.2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height.

.3 Metal channel stiffener: 38 x 13 mm size, 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.

.4 Acoustical sealant: to ASTM C919. See Section 07 92 00 – Joint Sealants.

.5 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self sticking adhesive on one face, lengths as required.

Part 3 Execution

3.1 ERECTION

.1 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.

.2 Install damp proof course under stud shoe tracks of partitions on slabs on grade.

.3 Place studs vertically at 406 mm on centre and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.

.4 Erect metal studding to tolerance of 1:1000.

.5 Attach studs to bottom and ceiling tracks using screws.

.6 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.

.7 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.

.8 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.

.9 Install heavy gauge single jamb studs at openings.

.10 Erect track at head of door/window openings and sills of sidelight/window openings 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.

.11 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.

.12 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.

.13 Install steel studs or furring channel between studs for attaching electrical and other boxes.

.14 Extend partitions to ceiling height except where noted otherwise on drawings.

.15 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use 50 mm leg ceiling tracks.

.16 Install continuous insulating strips to isolate studs from uninsulated surfaces.

.17 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions.

3.2 CLEANING

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

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Materials and application of acoustical units for application and installation within a suspended ceiling.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C423-02a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

.2 ASTM E1264-98, Standard Classification for Acoustical Ceiling Products.

.3 ASTM E1477-98a(2003), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction and Amendment No. 1 1988.

.2 CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units.

.3 Canadian Standards Association (CSA International)

.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.4 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

.2 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.6 Underwriter's Laboratories of Canada (ULC)

.1 CAN/ULC-S102-2003, Surface Burning Characteristics of Building Materials and Assemblies.

1.3 SUBMITTALS

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

.2 Product Data: submit WHMIS MSDS in accordance with Section 02 81 01 - Hazardous Materials.

1.4 QUALITY ASSURANCE

.1 Regulatory Requirements:

.1 Fire-resistance rated floor/ceiling and roof/ceiling assembly: certified by Canadian Certification Organization accredited by Standards Council of Canada.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Protect on site stored or installed absorptive material from moisture damage.

.2 Store extra materials required for maintenance, where directed by Contract Administrator.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Permit wet work to dry before beginning to install.

.2 Store materials in work area 48 hours prior to installation.

1.7 EXTRA MATERIALS

.1 Provide extra materials of acoustic units in accordance with Section 01 78 00 - Closeout Submittals.

.2 Ensure extra materials are from same production run as installed materials.

.3 Clearly identify each type of acoustic unit, including colour and texture.

.4 Deliver to Contract Administrator, upon completion of the work of this section.

Part 2 Products

2.1 MATERIALS

.1 Acoustic units for suspended ceiling system: to CAN/CGSB-92.1 ASTM E1264.

.2 Approved Product: Fine Fissure, 1755M as manufactured by Armstrong World Industries or approved equivalent in accordance with B6 Substitutes.

.3 Acoustical Panels Type ACT-1:

.1 Surface Texture: Fine

.2 Composition: Wet-formed Mineral Fibre

.3 Color: White

.4 Size: 600 mm x 1200 mm x 22 mm

.5 Edge Profile: Square Lay-In for interface with Prelude ML 15/16" Exposed Tee or approved equivalent in accordance with B6 Substitutes.

.6 Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton, 0.75.

.7 Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton, 35

.8 Flame Spread: ASTM E 1264; Class A (UL)

.9 Light Reflectance (LR): ASTM E 1477; White Panel: Light Reflectance: 0.86.

.10 Dimensional Stability: Standard

.11 Mold/Mildew Inhibitor: The front and back of the product treated with BioBlock, to inhibit the growth of mold or mildew, ASTM D 3273.

.4 Suspension System

.1 Components: All main beams and cross tees shall be commercial quality hot-dipped galvanized (galvanized steel, aluminum, or stainless steel) as per ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping pre-finished galvanized steel (aluminum or stainless steel) in baked polyester paint. Main beams and cross tees shall have rotary stitching (exception: extruded aluminum or stainless steel).

.1 Structural Classification: ASTM C 635 Intermediate Duty.

.2 Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.

.3 Acceptable Product: Prelude ML 15/16" Exposed Tee as manufactured by Armstrong World Industries, Inc. or approved equivalent in accordance with B6 Substitutes.

.2 High Humidity Finish: Comply with ASTM C 635 requirements for Coating Classification for Severe Environment Performance where high humidity finishes are indicated.

.1 SS Prelude Plus by Armstrong World Industries, Inc. - 100% Type 304 STAINLESS Steel or approved equivalent in accordance with B6 Substitutes.

.2 AL Prelude Plus by Armstrong World Industries, Inc. - all ALUMINUM or approved equivalent in accordance with B6 Substitutes.

.3 Prelude Plus XL Fire Guard by Armstrong World Industries, Inc., G-60 Hot dipped galvanized /aluminum capping or approved equivalent in accordance with B6 Substitutes.

.4 Structural Classification: ASTM C 635 duty class.

.5 Color: Stainless for SS only White aluminum Clear Anodized Aluminum

.3 Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

.4 Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least time three design load, but not less than 12 gauge.

.5 Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations, including light fixtures, that fit type of edge detail and suspension system indicated. Provide moldings with exposed flange of the same width as exposed runner.

Part 3 Execution

3.1 EXAMINATION

.1 Do not install acoustical panels and tiles until work above ceiling has been inspected by Contract Administrator.

3.2 INSTALLATION

.1 Install acoustical panels and tiles in ceiling suspension system.

3.3 APPLICATION

.1 Install acoustical units with directional pattern running in same direction. Refer to reflected ceiling plan.

.2 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

.3 No exposed Tee system member may be less than 610mm length.

3.4 INTERFACE WITH OTHER WORK

.1 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

3.5 SCHEDULE

.1 Main Floor Elevator Lobby 3.

.2 Ticket Office 8.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM F1066-04, Standard Specification for Vinyl Composition Floor Tile.

.2 ASTM F1344-04, Standard Specification for Rubber Floor Tile.

.2 Canada Green Building Council (CaGBC)

.1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-25.20-95, Surface Sealer for Floors.

.2 CAN/CGSB-25.21-95, Detergent-Resistant Floor Polish.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.5 South Coast Air Quality Management District (SCAQMD), California State

.1 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.

.3 Closeout Submittals:

.1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

1.4 ENVIRONMENTAL REQUIREMENTS

.1 Maintain air temperature and structural base temperature at flooring installation area above 20 degrees C for 48 hours before, during and for 48 hours after installation.

1.5 MAINTENANCE

.1 Extra Materials:

.1 Provide maintenance materials of resilient tile flooring, base and adhesive in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide 2 m^2 of each colour, pattern and type flooring material required for this project for maintenance use.

.3 Extra materials from same production run as installed materials.

.4 Identify each container of floor tile and each container of adhesive.

.5 Deliver to Contract Administrator, upon completion of the work of this section.

.6 Store where directed by Contract Administrator.

Part 2 Products

2.1 VINYL COMPOSITION TILE

.1 Description:

.1 Armstrong Standard Excelon Imperial Textured, or approved equivalent in accordance with B6 Substitutes.

.2 Colour: 4 colours selected from manufacturer's standard colour range.

.3 Nominal total thickness: 3.2mm.

.4 Size: 305 mm x 305mm

.5 Tile shall conform to the size, squareness, thickness, indentation, impact, deflection, resistance to chemicals and resistance to heat requirements of ASTM F 1066, Class 2 – through pattern.

.2 Adhesive: Low VOC

.1 Provide Armstrong Resilient Tile Adhesive of type recommended by manufacturer.

2.2 SKATE FLOORING

.1 Description: Skate-and-spike resistant Triumph Rubber Multi-functional and Sports Floor Tiles, or approved equivalent in accordance with B6 Substitutes. Designed specifically for weight rooms, ice rinks and other high impact applications.

.1 Construction:

.1 Manufactured of dual durometer layers composed of 100% synthetic and natural rubber, high quality additives, and colorants to meet ASTM F-1344, Standard Specification for Rubber Floor Tile.

.2 Two-ply vulcanized construction consists of high-resiliency rubber wear layer on elastic cushioned performance layer.

.2 Colours: Speckled Colorways and Solid Colors. Allow for 5 colours from manufacturer's standard colour range.

.3 Surface texture: Hammered.

.4 UnderLockTM Tile (Loose lay): 64.8 cm x 64.8 cm from edge to outside of tab. 9.5 mm thickness, wear layer thickness of 2.3 mm.

.2 Performance:

.1 Abrasion Resistance: ASTM D 3389 – less than 1 gram weight loss.

.2 Acoustical: ASTM E 492 (Impact Insulation Class) - 46 IIC.

.3 Slip Resistance: ASTM D 2047 – Meets or Exceeds a static coefficient of friction of 0.8

.4 Basketball Recovery: DIN18032–99%.

.5 Static Load Limit: ASTM F 970 – Passes at 250 PSI.

.6 FireResistance:

.1 ASTM E 648/NFPA 253 (Critical Radiant Flux) Class 1.

.2 ASTME662/NFPA258 (SmokeDensity), less than 450.

.7 Chemical Resistance: ASTMF925 – Passes.

.1 5% Acetic Acid, 70% Isopropyl Alcohol, 5% Sodium Hydroxide, 5% Hydrochloric Acid, 5% Ammonia, Bleach, 5% Phenol, and Sulfuric Acid.

2.3 RESILIENT WALL BASE

.1 Johnsonite Rubber Base or approved equivalent in accordance with B6 Substitutes.

.1 Complies with ASTM F-1861 Type TS (Thermoset Vulcanized Rubber), Group 1 (Solid)

.2 Thickness: 3.175 mm nominal

.3 Colours: 4 colours selected from manufacturer's standard range.

.4 Profile: Standard Toe (Cove base)

.1 Nominal Height 100mm

.2 Install in longest practicable lengths. Joints minimum 1000mm from end of wall.

.3 Corners: Formed by installer on site.

.2 Performance

.1 Thickness tolerance: Complies with ASTM F-386 2.

.2 Flexibility: Complies with ASTM F-137 3.

.3 Resistance to Heat Aging: Complies with ASTM F-1515 4.

.4 Resistance to Detergents: Complies with ASTM F-925 5.

.5 Resistance to Alkalis: No fading or softening

.6 Dimensional Stability: Complies with ASTM F 1861

.7 Squareness: 90 degrees +/- 0.5 degrees

.8 Does do not contain any of the hazardous chemicals listed in California Proposition 65 9. Collaborative for High Performance Schools (CHPS) 01350 Low-Emitting Material Criteria: Pass

2.4 STAIR TREADS

.1 Performance:

.1 F 2169 Standard Specification for Resilient Stair Treads – Type TS: Meets all applicable test requirements.

.2 F 386 Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces.

.3 Does do not contain any of the hazardous chemicals listed in California Proposition 65.

.4 Collaborative for High Performance Schools 01350 Low-Emitting Material Criteria: Pass.

.2 Resilient Rubber: Roppe Rubber Stair Treads, Risers, Nosing, Stringers, or approved equivalent in accordance with B6 Substitutes.

.1 Stair Treads:

.1 Skate-and-spike resistant Triumph Rubber Multi-functional and Sports Floor Tiles

.2 Rubber Risers:

.1 Standard Rubber Risers, color from manufacturer's standard range.

.2 Height: As required.

.3 Thickness: 2.54mm nominal.

.4 Toe Length: As required.

.3 Stair Nosing:

.1 #1 Commercial Stair Nosing.

.2 Colour from manufacturer's standard range.

.4 Rubber Stringers

.1 Colour from manufacturer's standard range.

.2 Height: 254mm.

.3 Thickness: 2.54mm nominal

.4 Length: Maximum lengths and as required. Do not place joints within 1200mm of end.

2.5 ACCESSORIES

.1 Sub-floor filler and leveller: where needed. To manufacturer's requirements.

.2 Sealer: to CAN/CGSB-25.20, Type 2-water based type recommended by flooring manufacturer.

.1 Adhesive: Low VOC

.3 Wax: to CAN/CGSB-25.21 type recommended by flooring manufacturer.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Installation in strict compliance with manufacturer's written recommendations and specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSPECTION

.1 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer.

3.3 SUB-FLOOR TREATMENT

.1 Remove existing resilient flooring.

.2 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.

.3 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

.4 Prime and Seal concrete to flooring manufacturer's printed instructions.

3.4 TILE APPLICATION

.1 Provide high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to outside. Do not let contaminated air recirculate through district or whole building air distribution system. Maintain extra ventilation for at least one month following building occupation.

.2 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.

.3 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.

.4 Install flooring to square grid pattern with joints aligned.

.5 As installation progresses, and after installation, roll flooring in 2 directions with 45 kg minimum roller to ensure full adhesion.

.6 Cut tile and fit neatly around fixed objects.

.7 Install feature strips and floor markings where indicated. Fit joints tightly.

.8 Install flooring in pan type floor access covers. Maintain floor pattern.

.9 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.

.10 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.

.11 Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.5 BASE APPLICATION

.1 Lay out base to keep number of joints at minimum. Base joints at maximum length available or at internal or premoulded corners.

.2 Clean substrate and prime with one coat of adhesive.

.3 Apply adhesive to back of base.

.4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.

.5 Install straight and level to variation of 1:1000.

.6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.

.7 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles, minimum 300 mm each leg. Wrap around toeless base at external corners.

.8 Install toeless type base before installation of carpet on floors.

3.6 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.7 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 Remove excess adhesive from floor, base and wall surfaces without damage.

.3 Clean, seal and wax floor and base surface to flooring manufacturer's instructions. In carpeted areas clean, seal and wax base surface before carpet installation.

3.8 PROTECTION

.1 Protect new floors until final inspection.

.2 Prohibit traffic on floor for 48 hours after installation.

.3 Use only water-based coating for linoleum.

3.9 SCHEDULE

.1 See Room Finish Schedule.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes material and installation of site applied paint finishes to new surfaces, including site painting of shop primed surfaces.

1.2 REFERENCES

.1 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act (CEPA), 1999, c. 33

.2 Environmental Protection Agency (EPA)

.1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - 1995, (for Surface Coatings).

.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 Master Painters Institute (MPI)

.1 MPI Architectural Painting Specifications Manual, 2004.

.5 National Fire Code of Canada - 1995

.6 Society for Protective Coatings (SSPC)

.1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.

.7 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

1.3 QUALITY ASSURANCE

.1 Qualifications:

.1 Contractor: minimum of five years proven satisfactory experience. Provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.

.2 Journeymen: qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.

.3 Apprentices: working under direct supervision of qualified trades person in accordance with trade regulations.

.2 Mock-Ups:

.1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.

.1 Provide 300 mm x 300 mm mock-up. Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen, textures.

.2 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.

.3 Locate where indicated by Contract Administrator.

.4 Allow 24 hours for inspection of mock-up before proceeding with work.

.5 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

.3 Pre-Installation Meeting:

.1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations in accordance with Section 01 32 16.06 - Construction Progress Schedule - Critical Path Method (CPM) Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Coordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

.4 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.4 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit product data and instructions for each paint and coating product to be used.

.2 Submit product data for the use and application of paint thinner.

.3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOCs during application and curing.

.3 Samples:

.1 Submit full range colour sample chips to indicate where colour availability is restricted.

.2 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:

.1 3 mm plate steel for finishes over metal surfaces.

.2 13 mm birch plywood for finishes over wood surfaces.

.3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.

.4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.

.3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.

.4 Test reports: submit certified test reports for paint from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.

.1 Lead, cadmium and chromium: presence of and amounts.

.2 Mercury: presence of and amounts.

.3 Organochlorines and PCBs: presence of and amounts.

.5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.6 Manufacturer's Instructions:

.1 Submit manufacturer's installation and application instructions.

.7 Closeout Submittals: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals, include the following:

.1 Product name, type and use.

.2 Manufacturer's product number.

.3 Colour numbers.

.4 MPI Environmentally Friendly classification system rating.

1.5 MAINTENANCE

.1 Extra Materials:

.1 Deliver to site extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Section 01 78 00 - Closeout Submittals.

.2 Quantity: provide one - four litre can of each type and colour of primer, stain and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

.3 Delivery, storage and protection: comply with Contract Administrator requirements for delivery and storage of extra materials.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Packing, Shipping, Handling and Unloading:

.1 Pack, ship, handle and unload materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.

.2 Acceptance at Site:

.1 Identify products and materials with labels indicating:

.1 Manufacturer's name and address.

.2 Type of paint or coating.

.3 Compliance with applicable standard.

.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.

.4 Storage and Protection:

.1 Provide and maintain dry, temperature controlled, secure storage.

.2 Store materials and supplies away from heat generating devices.

.3 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C.

.5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.

.7 Remove paint materials from storage only in quantities required for same day use.

.8 Fire Safety Requirements:

.1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

.9 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Place materials defined as hazardous or toxic in designated containers.

.4 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal, regulations.

.5 Ensure emptied containers are sealed and stored safely.

.6 Unused paint and coating materials must be disposed of at official hazardous material collections site as approved by Contract Administrator.

.7 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

.8 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.9 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.10 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out.

.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

.4 Dispose of contaminants in approved legal manner in accordance with hazardous waste regulations.

.5 Empty paint cans are to be dry prior to disposal or recycling (where available).

.11 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

.12 Set aside and protect surplus and uncontaminated finish materials. Deliver to or arrange collection by employees, individuals or organizations for verifiable re-use or re-manufacturing.

1.7 SITE CONDITIONS

.1 Heating, Ventilation and Lighting:

.1 Ventilate enclosed spaces.

.2 Provide heating facilities to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.

.3 Provide continuous ventilation for seven days after completion of application of paint.

.4 Coordinate use of existing ventilation system with Contract Administrator and ensure its operation during and after application of paint as required.

.5 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.

.6 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Unless pre-approved written approval by Paint Inspection Agency Authority and product manufacturer, perform no painting when:

.1 Ambient air and substrate temperatures are below 10 degrees C.

.2 Substrate temperature is above 32 degrees C unless paint is specifically formulated for application at high temperatures.

.3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.

.4 The relative humidity is under 85 % or when the dew point is more than 3 degrees C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 degrees C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.

.5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.

.6 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.

.2 Perform painting work when maximum moisture content of the substrate is below:

.1 Allow new concrete and masonry to cure minimum of 28 days.

.2 15 % for wood.

.3 12% for plaster and gypsum board.

.3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".

.4 Test concrete, masonry and plaster surfaces for alkalinity as required.

.3 Surface and Environmental Conditions:

.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

.2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.

.3 Apply paint when previous coat of paint is dry or adequately cured.

.4 Additional interior application requirements:

.1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.

Part 2 Products

2.1 MATERIALS

.1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.

.2 Provide paint materials for paint systems from single manufacturer.

.3 Conform to latest MPI requirements for interior painting work including preparation and priming.

.4 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing.

.5 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.

.6 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:

.1 Water-based, Water soluble, Water clean-up.

.2 Non-flammable, biodegradable.

.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.

.5 Do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.

.7 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.

.8 Flash point: 61.0 degrees C or greater for water-borne surface coatings and recycled water-borne surface coatings.

.9 Ensure manufacture and process of both water-borne surface coatings and recycled water-borne surface coatings does not release:

.1 Matter in undiluted production plant effluent generating 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to natural watercourse or sewage treatment facility lacking secondary treatment.

.2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15mg/L to natural watercourse or a sewage treatment facility lacking secondary treatment.

.10 Recycled water-borne surface coatings must not contain:

.1 Lead in excess of 600.0 ppm weight/weight total solids.

.2 Mercury in excess of 50.0 ppm weight/weight total product.

.3 Cadmium in excess of 1.0 ppm weight/weight total product.

.4 Hexavelant chromium in excess of 3.0 ppm weight/weight total product.

.5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.

2.2 COLOURS

.1 Contract Administrator will provide Colour Schedule after Contract award.

.2 Colour schedule will be based upon selection of Six (6) base and accent colours. Three (3) base colours and three (3) accents. No more than six colours will be selected for entire project and no more than three colours will be selected in each area.

.3 Selection of colours from manufacturers full range of colours.

.4 Where specific products are available in restricted range of colours, selection based on limited range.

.5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

.6 Acceptable product: Benjamin Moore Paints – Full range of colours.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site. Obtain written approval from Contract Administrator for tinting of painting materials.

.2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.

.3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.

.4 Thin paint for spraying in accordance with paint manufacturer's instructions.

.5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

.1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish (flat)	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	

.2 Gloss level ratings of painted surfaces as indicated and as noted on Finish Schedule.

2.5 INTERIOR PAINTING AND SYSTEMS

.1 Concrete:

.1 RINT / INT 3.1M - Institutional low odour / VOC.

.1 Gloss level 2

.2 Custom grade.

.3 Coat #1: MPI # 144 – Latex, Interior, Institutional Low Odor/VOC, (MPI Gloss Level 2). VOC ≤ 10g/l.

.4 Coat #2: MPI # 144 – Latex, Interior, Institutional Low Odor/VOC, (MPI Gloss Level 2). VOC ≤ 10g/l.

.2 Concrete Block:

.1 RINT / INT 4.2E - Institutional low odour / VOC.

.1 Gloss level 5

.2 Custom grade.

.3 Coat #1: MPI # 4 – Block Filler, Latex, Interior/Exterior. VOC ≤ 100g/l.

.4 Coat #2: MPI # 144 – Latex, Interior, Institutional Low Odor/VOC, (MPI Gloss Level 2). VOC ≤ 10g/l.

.3 Structural steel & metal fabrications: Misc. metals, etc.

.1 INT 5.1S – Institutional low odour / VOC.

.1 Gloss level 3.

.2 Custom grade.

.3 SSPC – SP-7 surface preparation. Shop applied.

.4 Rust-inhibitive primer – shop applied by manufacturer. To be fully compatible with substrate and site applied finish coats.

.5 Coat #1: MPI #145 – Latex, Interior, Institutional Low Odour/VOC (MPI Gloss Level 3). VOC ≤ 10g/l.

.6 Coat #1: MPI #145 – Latex, Interior, Institutional Low Odour/VOC (MPI Gloss Level 3). VOC ≤ 10g/l.

.4 Metal doors, frames, railings, misc. steel, etc.

.1 Coordinate primer coat to door manufacturer. See Section 08 11 00 – Metal Doors and Frames.

.2 INT 5.3N – Institutional low odour / VOC.

.1 Gloss level 5.

.2 Premium grade.

.3 Galvanized metal: MPI # 25 – Cleaner, Etching, for Galvanized Metal. VOC ≤ 50 g/l. Shop applied.

.4 Coat #1: MPI #134 – Primer, galvanized, water based. VOC ≤ 100 g/l. Shop applied by supplier / fabricator. Coordinate to 08 11 00 – Metal Doors and Frames.

.5 Coats #2 & 3: MPI # 147 – Latex, Interior, Institutional Low Odor/VOC, Semi Gloss (MPI Gloss Level 5). VOC ≤ 10g/l.

.5 Plaster and gypsum board: (Gypsum.)

.1 INT 9.2M – Institutional low odour / VOC.

.1 Gloss level 3.

.2 Premium grade.

.3 Coat #1: MPI # 50 – Primer Sealer, Latex, Interior. VOC ≤ 100 g/l.

.4 Coat #2 & 3: MPI # 145 – Latex, Interior, Institutional Low Odour/VOC (MPI Gloss Level 3). VOC ≤ 10g/l.

2.6 SOURCE QUALITY CONTROL

.1 Perform following tests on each batch of consolidated post-consumer material before surface coating is reformulated and canned. Testing by laboratory or facility which has been accredited by Standards Council of Canada.

.1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.

.2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.

.3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

3.2 GENERAL

.1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.

.2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.3 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Contract Administrator damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

.3 Maximum moisture content as follows:

.1 Stucco, plaster and gypsum board: 12%.

.2 Concrete: 12 %.

.3 Clay and Concrete Block/Brick: 12 %.

.4 Wood: 15%.

3.4 PREPARATION

.1 Protection:

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Contract Administrator.

.2 Protect items that are permanently attached, such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.4 Protect building occupants and general public in and about the building.

.2 Surface Preparation:

.1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.

.2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Contract Administrator.

.3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:

.1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.

.2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.

.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

.4 Allow surfaces to drain completely and allow to dry thoroughly.

.5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.

.6 Use trigger operated spray nozzles for water hoses.

.7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.

.1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.

.2 Apply wood filler to nail holes and cracks.

.3 Tint filler to match stains for stained woodwork.

.6 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

.7 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes, blowing with clean dry compressed air, or vacuum cleaning.

.8 Touch up shop primers with primer as specified.

.9 Do not apply paint until prepared surfaces have been accepted by Contract Administrator.

3.5 APPLICATION

.1 Method of application to be as approved by Contract Administrator.

.2 Apply paint by brush, roller, air sprayer or airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.

.3 Brush and Roller Application:

.1 Apply paint in uniform layer using brush and/or roller type suitable for application.

.2 Work paint into cracks, crevices and corners.

.3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.

.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.

.5 Remove runs, sags and brush marks from finished work and repaint.

.4 Spray application:

.1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

.2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.

.3 Apply paint in uniform layer, with overlapping at edges of spray pattern. Back roll first coat application.

.4 Brush out immediately all runs and sags.

.5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.

.5 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.

.6 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.7 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.8 Sand and dust between coats to remove visible defects.

.9 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.

.10 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6 MECHANICAL/ELECTRICAL EQUIPMENT

.1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.

.2 Boiler room, leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

.3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

.4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

.5 Do not paint over nameplates.

.6 Paint disconnect switches for fire alarm system and exit light systems in red enamel.

.7 Paint natural gas piping yellow.

.8 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

.9 Do not paint interior transformers and substation equipment.

3.7 SITE TOLERANCES

.1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.

.2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.

.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.8 FIELD QUALITY CONTROL

.1 Interior painting and decorating work shall be inspected by a Paint Inspection Agency (inspector) acceptable to the specifying authority and local Painting Contractor's Association. Painting contractor shall notify Paint Inspection Agency a minimum of one week prior to commencement of work and provide a copy of project painting specification, plans and elevation drawings (including pertinent details) as well as a Finish Schedule.

.2 Interior surfaces requiring painting shall be inspected by Paint Inspection Agency who shall notify Contract Administrator and General Contractor in writing of defects or problems, prior to commencing painting work, or after prime coat shows defects in substrate.

.3 Where "special" painting, coating or decorating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer shall provide as part of this work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to Contract Administrator.

.4 Standard of Acceptance:

.1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.

.2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.

.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

.5 Field inspection of painting operations to be carried out be independent inspection firm as designated by Contract Administrator.

.6 Advise Contract Administrator when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.7 Cooperate with inspection firm and provide access to areas of work.

.8 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Contract Administrator.

3.9 RESTORATION

.1 Clean and re-install hardware items removed before undertaking painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect freshly completed surfaces from paint droppings and dust to approval of Contract Administrator. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Contract Administrator.

END OF SECTION

CENTURY ARENA UNIVERSAL ACCESSIBILITY

Winnipeg, Manitoba

ROOM FINISH SCHEDULE

ROOM NO.	NAME	FLOOR	BASE	WALLS	FINISH	CEILING	FINISH	HEIGHT	REMARKS
1	ENTRANCE VESTIBULE	SKATE	R.B.	CURTAIN WALL	PAINT	GYPSUM	PAINT	101 550	
2	STAIR	SKATE	R.B.	CONC./GYSUM	PAINT	GYPSUM	PAINT	102 800	SKATE FLOOR WITH CONTRASTING NOSING
3	MAIN FLOOR ELEVATOR LOBBY	SKATE	R.B.	EXISTING CONC. BLOCK	PAINT	T-BAR		102 800	BULKHEAD @ 102 560
4	STAIR	EXISTING	EXISTING	EXISTING	PAINT	GYPSUM	PAINT	EXISTING	BULKHEAD @ 99 200
5	BASEMENT ELEVATOR LOBBY	SKATE	R.B.	CONC./ GYPSUM	PAINT	RATED GYPSUM	PAINT	99 347	
6	ELEVATOR SHAFT	CONC.		CONC. BLOCK		EXPOSED CONC.			
6A	ELEVATOR CAB	SKATE	R.B.		PAINT				
7	MECHANICAL ROOM	CONC. HARDENER	R.B.	GYPSUM	PAINT	RATED GYPSUM	PAINT	VARIES - U/S OF STAIRS	
8	TICKET OFFICE	VCT	R.B.	GYPSUM	PAINT	T-BAR		102 700	
9	EXISTING CONCOURSE	EXISTING	EXISTING	GYPSUM	PAINT	EXISTING		EXISTING	
10	EXISTING CORRIDOR	EXISTING	EXISTING	GYPSUM	PAINT	EXISTING		EXISTING	

NOTE: PATCH, REPAIR AND MAKE GOOD ALL CONNECTIONS BETWEEN NEW AND EXISTING. DAMAGED EXISTING WALL GYPSUM SHALL BE REPLACED AND PAINTED.

BH - BULKHEAD
W/ - WITH
CONC. - CONCRETE
GYP. - GYPSUM

CRPT. - CARPET
V.C.T. - VINYL COMPOSITE TILE
S.V. - SHEET VINYL
C.T. - CERAMIC TILE

R.B. - RUBBER BASE
S.C.B. - SEAMLESS COVE BASE
C.B. - CARPET BASE
L.V.T. -LUXURY VINYL TILE

BH - BULKHEAD
T.B. - T-BAR CEILING
SKATE - SKATE FLOOR

Part 1 General

1.1 RELATED WORK

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.3 Section 01 78 00 - Closeout Submittals.

1.2 REFERENCES

.1 Aluminum Association, Inc. (AA)

.1 Designation System for Aluminum Finishes - 1997.

.2 American Society for Testing and Materials (ASTM)

.1 ASTM A653/A653M-01a, Standard Specification for Steel Sheet, Zinc-Coated, (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM B32-00, Standard Specification for Solder Metal.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.

.2 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking.

.3 CGSB 41-GP-6M-1983, Sheets, Thermosetting Polyester Plastics, Glass Fibre Reinforced. Reaffirmation of September 1976.

.4 Canadian Standards Association (CSA)

.1 CSAW47.2-M1987(R1998), Certification of Companies for Fusion Welding of Aluminum.

.2 CSA W59-M1989(R2001), Welded Steel Construction (Metal Arc Welding) (Imperial Version).

.3 CSA W59.2-M1991(R1998), Welded Aluminum Construction.

.5 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - March 1998.

1.3 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate materials, thicknesses, sizes, finishes, colours, construction details, removable and interchangeable components, mounting methods, schedule of signs.

1.4 SAMPLES

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

1.5 QUALITY ASSURANCE

.1 Welding Certification in accordance with CSA W47.2.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

1.7 MAINTENANCE DATA

.1 Provide maintenance data for illuminated signs for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

Part 2 Products

2.1 MATERIALS

.1 IMPORTANT NOTE:

.1 All signage to meet the requirements of the City of Winnipeg Accessibility Design Standards for sign, shape, layout, contrast, braille, etc. City of Winnipeg Accessibility Design Standards – pages 47 to 49 – available at: *http://winnipeg.ca/ppd/UD/PDF/May%202011%20revised%20WADS%20Final.pdf*

.2 Provide shop drawings for the review of the Contract Administrator and City of Winnipeg Accessibility Advisor. Do not proceed with fabrication and installation until full review and approval.

.2 Exterior signage letters:

.1 Signage: Title case, thus:

ENTRANCE

.2 Thickness: 6.33 mm.

.3 Height: 200 mm aluminum letters (based on Capital letters)

.4 Halo lettering – white LED Illuminated w/ plastic backing.

.5 Font: Helvetica Bold

.6 Finish: atomized acrylic on epoxy primer.

.7 Provide extra backing in wall for mounting letters.

.8 Location as indicated on the drawings.

.9 Colour to match elevator shaft cement panel on elevator shaft.

.10 Provide full water and air seal at mounting locations.

.3 Exterior signage graphic:

.1 Signage:

.1 Universally Acceptable Elevator Symbol in accordance with the City of Winnipeg Accessibility Design Standards.

.2 Thickness: 6.33 mm.

.3 Size: 1550 mm high x 950 mm wide

.4 Colour to match canopy cement panel colour.

.5 Use 50 mm spacer between wall finish and sign.

.6 Finish: atomized acrylic on epoxy primer.

.7 Provide extra backing in wall for mounting letters.

.8 Provide full water and air seal at mounting locations.

.4 Door Plates:

.1 Fabricate sign faces of brushed aluminum. Size 51 mm x .16 mm thick x length required.

.2 Lettering: 25mm white letters raised (0.8 – 1.5mm) for Door Plates and 100mm lettering for level indicating plates.

.3 Fixed mounting: use self-stick foam tape.

.4 Mounting on transparent surfaces: use self-stick foam tape. Include blank back-up plate for opposite side.

.5 Sign to comply with City of Winnipeg Accessibility Design Standards: which include colour contrasting, tactile, and be accompanied by grade 1 braille.

.6 Font: Helvetica

.5 Sign graphics: apply by self-sticking vinyl film:

.1 Universally Acceptable Elevator Symbol with directional arrow. (raised 0.8 – 1.5mm)

.2 Fixed mounting: use self-stick foam tape.

.3 Mounting on wall where indicated on the drawings.

.4 Size: 275 mm height x 275 mm length

.5 Signage to comply with all regulations/standards in the "*2010 City of Winnipeg, Accessibility Design Standards*", which include colour contrasting, tactile, and be accompanied by grade 1 braille.

2.2 FABRICATION

.1 Fabricate signs in accordance with details, specifications and shop drawings.

.2 Build units square, true, accurate to size, free from visual or performance defects.

.3 Accurately fit and securely join sections to obtain tight, closed joints.

.4 Allow for thermal movement without distortion of components.

.5 Exposed fasteners permitted only where indicated or approved by Contract Administrator and to be inconspicuous and same finish and colour as base material, or as noted.

.6 Polish exposed edges of metal to smooth, slightly convex profile.

.7 Do aluminum welding to CSA W59.2. Finish exposed welds flush and smooth.

.8 Apply bituminous paint to aluminum in contact with dissimilar metals, concrete or masonry.

.9 Manufacturer's nameplates on sign surface locations visible in completed work not acceptable.

2.3 FINISHES

.1 Baked enamel: one coat of conditioner to CGSB 31-GP-107M one coat of CAN/CGSB-1.81, Type 2 primer and at least two coats of CAN/CGSB-1.88, one coat on interior surfaces. Individually bake each coat.

.2 Prefinished metals: see article 2.1 Materials.

Part 3 Execution

3.1 INSTALLATION

.1 Erect and secure interior signs plumb and level at height of 1600mm.

.2 Comply with sign manufacturer's installation instructions and approved shop drawings.

.3 Mechanical attachment:

.1 As recommended by manufacturer and supplier of exterior letters.

.4 Adhesive attachment:

.1 Use self-stick adhesive foam tape to manufacturer's instructions to adequately fix sign and prevent "rocking". Keep tape maximum 1.6 mm from edges.

3.2 CLEANING

.1 Leave signs clean. Remove debris from interior of sign boxes.

.2 Touch up any damaged finishes.

3.3 SCHEDULE

.1 Interior Signage:

.1 Door Plates:

.1 Name plates for the following rooms:

.1 Mechanical Room - 7

.2 Graphic Elevator Symbol

.3 Floor Indicating Sign - Location as indicated on drawing A-3.2.

.1 Main Floor.

.2 Basement Floor.

.4 Mount signs in accordance with "*2010 City of Winnipeg Accessibility Design Standards*". Center of sign mounted at 1475 – 1525 mm from finished floor.

.2 Exterior Signage:

.1 Graphic: "Universally Acceptable Elevator Symbol" as shown on drawing A-4.1

.1 Size: 1550 mm high x 950 mm wide

.2 Colour to match canopy cement panel colour.

.3 Use 50 mm spacer between wall finish and sign.

.4 Install as per manufacturer's instruction.

END OF SECTION

Part 1 GENERAL

0.1 DESCRIPTION

General Requirements: specified under Division 1 of these Specifications shall apply to and form an integral part of this Section's work as applicable.

0.2 RELATED WORK SPECIFIED ELSEWHERE

SECTION 01 51 00 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS (protection of floor openings and personnel barriers, temporary power and lighting)
SECTION 03 30 00 - CAST-IN-PLACE CONCRETE (Concrete work)
SECTION 04 22 00 – UNIT MASONRY (masonry hoistway enclosure, building in and grouting hoistway door frames, grouting sills)
SECTION 05 50 00 - METAL FABRICATIONS (pit ladder, hoist beam, etc.)
SECTION 09 65 19 - RESILIENT TILE FLOORING
- MACHINE ROOM VENTILATION
- PIT WATERPROOFING AND DRAIN
- ELECTRICAL SUPPLY FEEDERS, WIRES, AND SWITCHES.
- AUXILIARY CONTACT ON MAIN DISCONNECT SWITCH where battery emergency lowering is specified.
- TELEPHONE (wiring from elevator machine room to telephone controller)
- FIRE ALARM SIGNALS to initiate main and alternate floor recall, brought to elevator controller

1.3 ALL WORK

In all cases where a device or part of the equipment is referred to in the singular number, provide as many such devices of equipment as are required to complete all work of the Section.

1.4 SCOPE

This specification is intended to cover the complete furnishing and installing of one oil hydraulic passenger elevator as detailed except as specified under "Work Excluded From This Section". The work site is the Century Arena in Winnipeg. All work shall be performed in a workmanlike manner and is to include all labour and material in accordance with the drawings and as specified herein.

1.5 CO-OPERATION:

Elevator Sub-Contractors are encouraged to understand the full intent and scope of the work before submitting their Bid quotations. Where any inconsistency between the various parts of the Specification, details incorporated in the drawings, applicable Codes or standard Industry practice are noted, these shall be brought to the attention of the Contract Administrator, Mr. Lou Chubenko (204- 470-7881) e-mail LChubenko@winnipeg.ca for resolution before Bid close. No questions about the intent of the Bid documents, about conflicts or about extra work necessary to bring the various parts of the work together, intended to result in extra charges to the City of Winnipeg, will be allowed after the Bids have closed.

1.6 CODES & INSPECTIONS

All work shall be performed in accordance with the latest revised edition (as of the date bids are taken) of the CAN/CSA-B44-07 Canadian Standards Association Standard Safety Code for Elevators, Escalators, and

Dumbwaiters, the Canadian Standards Association Electrical Code, the City of Winnipeg Accessibility Design Standards and/or such Provincial and Local Codes as may be applicable. The Elevator Sub-Contractor will obtain and pay for all required government permits, inspections, re-inspections as necessary and licenses.

1.7 LIABILITY

The Elevator Sub-Contractor shall not be liable for any loss, damage, or delay caused by acts of government, strikes, lockouts, fire, explosions, theft, floods, riot, civil commotion, war, malicious mischief, acts of God, or any cause beyond his reasonable control and on no event shall he be liable for consequential damages.

1.8 DRAWINGS

The Elevator Sub-Contractor shall submit drawings showing the general arrangement of the elevator equipment, space requirements, electrical requirements, and load reactions imposed on the building structure. The building shall be constructed to conform to the information shown on the elevator layout drawings.

If required by the authorities having jurisdiction, the drawings shall bear the stamp of a Professional Engineer registered in the Province where the installation is taking place.

Approval of the drawings (and other approval forms submitted by the Sub-Contractor) shall in no way limit the responsibility of the Sub-Contractor to provide a complete installation in accordance with the requirements of this specification.

1.9 SPACE REQUIREMENTS

Confirm in the submitted Bid that all items of equipment in this contract can be accommodated in the openings and spaces provided, as shown on the drawings. Failure to do so at the time of Bid submission will be construed to mean complete acceptance of the bid documents, and that any adjustment to the building frame, hoistway and pit sizes or other affected work shall be done at the Elevator Sub-Contractor's expense.

The Bidders' special attention is drawn to the fact that no separate elevator machine room has been provided.

1.10 DOCUMENTS ON SITE

Maintain on site a complete set of contract specifications and drawings, including all Addenda incorporated into the specification text at the appropriate place, for the use of your mechanic and the City of Winnipeg.

1.11 WARRANTY

The Elevator Sub-Contractor shall warrant the equipment installed by him under these specifications against defects in materials and workmanship, and will correct any defect not due to ordinary wear or tear or improper use or care which may develop within one year from the date each elevator is completed and placed in operation.

The warranty is not intended to supply normal maintenance service and shall not be construed to mean that the Elevator Sub-Contractor will provide free service for periodic examination, lubrication, or adjustment due to normal use beyond that included in the Specification; nor will the Elevator Sub-Contractor correct without charge breakage, maladjustments, or other trouble arising from abuse, misuse or any other causes beyond his control.

1.12 STORAGE

A dry and protected area, conveniently located to the elevator hoistway, will be assigned to the Elevator Sub-Contractor without cost, for storage of his material and tools.

1.13 MAINTENANCE SERVICE

The Elevator Sub-Contractor shall furnish maintenance and call-back service on the elevator for a period of twelve (12) months after it is completed and placed in operation.

This service shall consist of scheduled monthly examinations of the equipment, adjustments, lubrication, cleaning, supplies and parts to keep the equipment in proper operation, except such adjustments, parts or repairs made necessary by abuse, misuse, or any other causes beyond the control of the Elevator Sub-Contractor. All scheduled work will be done during regular working hours of the Trade.

Provide, in addition, 24-hour, seven day per week call-back service to correct any fault which may develop between scheduled visits.

Provide and maintain on site or within a reasonable distance of the site a complete stock of replacement parts, including solid state cards specific to this installation, as required to keep the elevator in running condition at all times. Provide, during regular working hours, sufficient trained personnel to respond to an unscheduled service call by arriving on site within one-half hour of when then request for service was placed.

The City of Winnipeg will provide a logbook to be kept in the Elevator Machine Room. Record in the City of Winnipeg's logbook the detail of each maintenance visit to the site. Record each routine scheduled maintenance inspection, a description of work completed and a listing of any parts replaced. In the event of a call-back, record the reported failure, the finding of the mechanic and the remedial action taken to correct the fault, including a listing of any parts replaced. This logbook shall remain the property of the City of Winnipeg and shall remain on site at all times.

Provide, as part of the Bid, an agreement for a five-year continuing full maintenance contract to begin upon expiry of the twelve month warranty maintenance period. The on-going maintenance contract shall be in accordance with the Ministry of Infrastructure and Transportation standard contract, which is available for review by contacting the City of Winnipeg. State what escalation, if any, will be applied to the contract price throughout the life of the contract. The City of Winnipeg may accept this Agreement at any time up to the end of the warranty maintenance period. The City of Winnipeg may, at his option, enter into additional five-year extensions of the full maintenance contract using the same escalation formulae quoted in your Bid.

1.14 WORK EXCLUDED FROM THIS SECTION:

This specification does not include the following work and is subject to the proper performance of such work by others.

1.14.1 A "legal" hoistway of the exact size specified, properly framed and enclosed and including a pit of proper depth, provided with ladder, drains, lights, access doors, ventilation, and water-proofing if required.

1.14.2 Adequate foundations and supports to carry the loads of all equipment, including supports for guide rail brackets. Total pit reaction equals approximately

65,000 pounds dispersed load, guide rail reaction equals approximately 300 pounds lateral load, both parallel and perpendicular to the hoistway side wall.

1.14.3 Provide clear access and make good walls and/or floor for oil line between power unit and jack unit.

1.14.4 All cutting and making good of building structure necessary to permit proper installation of the elevator.

1.14.5 The entire hoistway wall at each landing is to be left open or a rough opening provided in accordance with the Elevator Manufacturer's layout drawings until after elevator entrances are installed. Finished walls will then be completed by others. Provide adequate wall supports above all entrance frames. The entrance frames are not designed to support overhead wall loads.

1.14.6 Provide temporary enclosures or other suitable protection for open elevator hoistway during the time the elevator is being installed.

1.14.7 All painting, except as otherwise specified.

1.14.8 Supply and install sheet vinyl, vinyl tile or carpet flooring for the elevator cab as specified.

1.14.9 Provide a drain in the pit. If the drain runs into a sump pit, ensure that the sump pump is located outside the elevator pit. The drain shall include a trap and a back-water valve. The discharge from the sump pump shall be routed in accordance with the local Codes having jurisdiction.

1.14.10 Provide in the pit drain an oil separator designed to prevent hydraulic oil form the elevator equipment from entering the sewer system in the event of an oil spill. The oil separator shall have a minimum capacity of 15 gallons and be sized to by-pass at least 3000 gallons per hour.

1.14.11 Provide ventilation as necessary to maintain the machine room temperature between 55 degrees and 90 degrees Fahrenheit (13 degrees and 32 degrees Celsius).
The elevator machinery is expected to produce approximately 10,176 BTU per hour. The elevator hoistway should be vented to outside air.

1.14.12 Provide and maintain proper electric feed wires to the terminals of the elevator control panel with all necessary main line switches, circuit breakers or fused disconnect switches, sized to accommodate a 20 horse power motor.

1.14.13 Provide separate 120 volts, 15 amp lighting branch circuit to controller with fused disconnect switch in the machine room.

1.14.14 Furnish, during installation, power of necessary characteristics to provide illumination, operation of required tools and hoist, and for testing and adjusting the elevator and signal equipment.

1.14.15 Provide permanent light fixtures and switches in pit and machine space. Provide a guard for the pit light fixture.

1.14.16 Provide permanent dedicated “ground fault interrupter” duplex outlet in the pit and machine space.

1.14.17 Furnish in place all fixed conduits, wiring and fittings for remote systems (telephones,

intercommunications, etc.) with feeders terminating at the elevator controller in the machine space.

1.14.18 Furnish, when Battery Emergency Lowering is specified, a four polled main line switch, circuit breaker or fused disconnect switch for each elevator so that the fourth poll may act as an auxiliary contact. Run a pair of signal wires from this contact to the elevator controller.

1.14.19 Furnish two normally closed circuits from the fire alarm panel to studs on the elevator controller, one circuit to send the car to the normal homing floor in the event of a fire alarm and one to send the car to the alternate homing floor should the fire alarm indicate a fire at the normal homing floor. Furnish similar signals to indicate a fire in the hoistway and a fire in the elevator machine space.

2 PRODUCTS

2.1 DESCRIPTION OF EQUIPMENT

2.1.1 TYPE:

One HydroFit oil hydraulic passenger elevator complete with twin rigid piston hydraulic jack units as manufactured by Otis Canada Inc.

2.1.2 CAR PLATFORM:

6'-8" wide by 5'-5 3/4" front-to-back clear inside dimensions; locate in a hoistway as shown on the Drawings. This hoistway cannot be changed and the Sub-Contractor must include his own provision to accommodate this hoistway size.

2.1.3 CAPACITY:

3500 pounds exclusive of car and piston

2.1.4 SPEED:

100 fpm up; 125 fpm down, under full load

2.1.5 TRAVEL:

11'-0" from Basement floor to Main floor

2.1.6 STOPS:

Three (3)

2.1.7 OPENINGS:

Three (3) – Two (2) at the front of hoistway and one (1) at the rear

2.1.8 POWER SUPPLY:

600 volts, 3 phase, 60 cycles (verify with electrical drawings)

2.1.9 ENTRANCES:

Total of three (3) sets of single-speed power operated entrances designed to provide a clear opening 3'-6" wide by 7'-0" high; doors, sight guards and frames finished in stainless steel ; 1 1/2 hour Underwriters' labels on hall doors and frames; frames to suit 203 mm. thick block walls with drywall finish.

Provide hoistway access switch at top and bottom floors

Provide entrance jamb tactile plates on both entrance jambs at all floors, mounted at 1500 mm 5'-0'' above the finished floor, finished in stainless steel. Include both raised markings and matching Braille.

Provide unlocking devices for each entrance.

2.1.10 FASCIAS:

Provide metal toe guards. Provide metal fascia plates between the front entrances of the elevator. Provide metal fascia plates to protect the opening of the rear car door for the entire hoistway height. The general contractor will not be providing a "stepped" hoistway or drywall fascias.

2.1.11 CAB:

Passenger cab design with raised plastic laminate panels finished in Formica from elevator contractor's standard range, mounted on a stainless steel background; stainless steel front return panel, entrance posts and header; overall fluorescent lighting; suspended ceiling with translucent panels; single-slide door finished in stainless steel; tubular stainless steel handrails with ends returned on three walls mounted at 800 mm. (31-1/2'') to 920 mm (36'') above the cab floor; one set of protective moving pads complete with brass grommets to match mounting pins.

2.1.12 TELEPHONE:

Supply and install a hands-free autodial telephone mounted integral with the car station. Provide a push button in the car station with the telephone symbol. Provide perforations in the car station cover plate for the telephone microphone and speaker so that the telephone is completely vandal resistant. Arrange that when the telephone push button is pressed the phone automatically dials a pre-set number. If that number does not result in the phone call being answered, arrange that the phone can call a second pre-set number. Provide a quality telephone such that clear communication is provided for the passengers from any point in the car. Provide a light to confirm that the call has been answered. Arrange the phone to automatically hang up only when the call is terminated from outside the car to allow further calls to be placed. Arrange that the phone can receive calls from outside the car. Arrange that the phone can continue to operate during a power failure. Provide a telephone capable of automatically identifying to the operator the building address and elevator number to confirm the location of the elevator.

2.1.13 OPERATION:

Selective collective operation with solid-state microprocessor "Memory" control, single push-button at each terminal floor and UP-DOWN push buttons at each intermediate floor, all set at wheelchair height; dispatch car to service car and hall calls in the most efficient manner; automatic levelling and re-levelling; low oil protection, furnish a keyed independent service switch to permit uninterrupted service use of the elevator.

Arrange that the door open time for a stop in response to a car call shall be independently adjustable from the door open time for a stop in response to a hall call. Initially, set the door open time at 8.0 seconds for both

car call and hall calls (special handicap access requirement). The door open time may be reduced by pressing the Door Close button in the car station.

Provide proof that you have not provided a control programmed to shut the elevator down after a pre-determined amount of time or number of trips whereby a special proprietary code or device must be applied to the control. If such a feature is provided with the control supplied, provide, in addition, the proprietary device required to restart the elevator plus written instructions on how to use the restart device.

2.1.14 PROVISIONS FOR NON-PROPRIETARY MAINTENANCE:

Provide a complete adjusters manual with the installation. The adjuster's manual shall detail which operational parameters are software selectable and which are hardware controlled. Provide a description of how to adjust these parameters and the values which have initially been set for this particular installation. Provide as part of the installation a Field Diagnostic and Adjustment Tool suitable to re-tune the installation should the controller lose all its memory, to read stored faults, etc. Include in the adjuster's manual a description of any coded outputs which the diagnostic tool may display. Provide also one duplicate of each solid state card used in the installation complete with all chips, such that any card may be substituted into the controller and the elevator continue to operate normally.

2.1.15 INDEPENDENT SERVICE:

Provide a two-position keyed switch in the car operating station marked "INDEPENDENT SERVICE". With the switch in the "ON" position, the elevator will not respond to hall calls but will stop for car calls only. Hall calls will not register. When the elevator stops at a floor, it shall park with its doors open and the doors shall close only when constant pressure is applied to the DOOR CLOSE button.

2.1.16 SOLID STATE STARTING:

Provide solid state closed transition starting for the pump motor such that the inrush current upon starting can be adjusted over a range of two to four times the normal running current of the motor.

2.1.17 HOISTWAY ACCESS:

Provide keyed hoistway access switches at the top and the bottom landing to allow safe entry onto the car top and into the pit.

2.1.18 DOOR OPERATION:

Provide a quality gearless door operator powered by a direct current motor. Provide advance door opening so that the doors are ¾ open as the car stops level at the floor. Provide door operator control such that the door opening and door closing speeds can be adjusted independently. Provide closed loop position and velocity control for door operator capable of adjusting the point of slowdown and the slowdown torque to compensate for a variety of building conditions. Provide smooth opening and closing and cushioning at final limits of door travel. The door operator shall provide a door open time of 3.5 seconds and a door close time of 4.5 seconds. Provide control to reverse the doors within 2.5 inches of breaking the photo cell beam at any point over the entire travel of the doors.

Arrange the door operation such that the doors remain open for a minimum of 8.0 seconds when stopping in response to both car and hall calls.

2.1.19 CAR POSITION INDICATOR:

Provide a Car Position Indicator, arranged to show the location for the elevator as it travels through the hoistway.

Provide a floor passing gong to indicate each time the elevator passes a floor.

2.1.20 HALL POSITION INDICATOR:

Provide a Position Indicator on the Main Floor, arranged to show the location for the elevator as it travels through the hoistway.

2.1.21 CAR STATION:

Provide a car station.

Arrange the car operating buttons at the bottom of the car station in accordance with the requirements of Appendix E of the Elevator Code. Provide buttons with a minimum 1 full inch diameter pressel (this is larger than the Appendix E requirement). Mount key switches for INDEPENDENT SERVICE, LIGHT and FAN, BATTERY EMERGENCY LIGHT TEST and STOP above the floor buttons. Mount the lowest car button at 35'' above the floor. Do not mount any button above 54'' above the floor. Provide "fishtail" Braille and tactile markings to the left of each button in accordance with Appendix E of the Elevator Code.

Provide LED illumination for call-registered lights in the car call and ALARM buttons and audible call registered buzzer.

2.1.22 VOICE ANUNCIATOR:

Provide a voice annunciator for the elevator. Arrange the voice annunciator to announce the floor name each time the elevator stops at a floor, the direction of travel of the next trip and special advisory messages such as instructions to clear the doorway, announcement of a fire alarm, etc. Provide a quality speaker such that the voice annunciator can be clearly understood anywhere in the cab.

2.1.23 HALL CALL STATIONS:

Supply and install a hall call station at each landing (a total of 3). Provide single puish buttons at each terminal landing and UP - DOWN push buttons at the intermediate landing. Provide buttons with a minimum 1 full inch diameter pressel (this is larger than the Appendix E requirement) Provide Braille and tactile markings located to the left of each button. Provide LED illumination for call registered lights in the hall call buttons.

Provide stations with call buttons centred at 36'' above the floor. (This is lower than the usual hall push button height.)

2.1.24 CAR RIDING LANTERN:

Supply and install a Car Riding Lantern mounted in the car door post. Arrange the control to cause the appropriate arrow to illuminate, indicating the direction in which the car will travel after it closes its door. Maintain illumination of the appropriate direction arrow while the car door remains open. Provide, in conjunction with the Car Riding Lantern, a gong to sound once for the UP and twice for the DOWN direction.

2.1.25 JACK UNIT:

Provide a twin jack arrangement with cylinders and single-section rigid pistons located on each side of the car sling, in line with the sling or one in front of the stiles and the other behind the stiles for a completely balanced system. Provide hydraulic cylinders complete with a quality, replaceable packing gland, oil collecting ring and drain tube leading to a collection pail. Provide a single rigid piston in each cylinder, with each piston identical and of sufficient diameter to maintain the working pressure of the system at full load below 400 PSI. Provide a uniform polished finish to the piston designed to give maximum wear characteristics to the jack packings. The pistons shall be fastened to the crosshead of car sling with substantial bearing plates, adequately gusseted to withstand the forces applied.

2.1.26 POWER UNIT:

Provide a Power Unit located in a machine space incorporated into the side wall of the elevator hoistway, as shown on the Drawings. The Power Unit shall consist of a squirrel cage motor connected directly to a hydraulic pump designed specifically for elevator service, producing the pressures and volumes required for this installation, all submerged in an oil reservoir. Provide a Valve Unit with independently adjustable, Up Accelerate, Up Slowdown, Up Stop, Down Accelerate, Down Slowdown and Down Stop to provide smooth starts and stops and accurate levelling in both directions of travel.

If a submersible pump unit is not available for the pressures and volumes required for this installation, provide motor, pump and valves located outside the oil reservoir. Provide minimum 1-inch thick soundproofing material completely surrounding the pump unit to reduce airborne noise.

Limit the noise produced by the Pump Unit to 85 decibels measured 3 feet from the pump Unit.

2.1.27 LOW PRESSURE SWITCH:

Because the pump unit is located below the top of the jack units, provide a low pressure switch to shut the elevator down so that, in the event that the car becomes stuck in the hoistway, opening the DOWN valve will not allow oil to return to the reservoir and reduce the pressure on the column of oil supporting the elevator car.

2.1.28 MUFFLER:

Provide a blowout-proof muffler in the oil line, capable of removing all pulsations from the pump unit and resulting in a smooth ride free of vibration. A flexible insert in the oil line is not acceptable under this specification.

2.1.29 ISOLATION COUPLINGS:

Provide a minimum of two (2) isolation couplings in the oil line between pump unit and the jack. Each sound isolation coupling shall consist of flanges separated by a gasket of material designed for use with hydraulic oil. Design each sound isolation coupling so that any vibration from the motor or pump is completely absorbed by the coupling and not passed on to the adjacent oil line.

2.1.30 GATE VALVE:

Provide a shut-off valve in the elevator machine room adjacent to the pump unit to isolate the supply of oil in the oil reservoir for maintenance purposes.

2.1.31 GUIDE SHOES:

Provide swivel-type guide shoes with non-metallic inserts or roller guides mounted on the car frame. Solid guide shoes are not acceptable.

2.1.32 PROVISIONS FOR THE HANDICAPPED:

Provide features to assist handicapped persons using wheelchairs, as detailed in Appendix E of the Elevator Code and the Universal Access Code. Mount car and hall fixtures at handicapped height; provide audible car call registered sound; provide tactile plates adjacent to car and hall buttons and on landing door jambs; provide multi-beam infra-red photo cell protection for car door complete with 3-D protection extending onto the landing; provide stainless steel handrails on all non-access; provide car riding lantern in car door jamb complete with gong to indicate future direction of travel of car.

2.1.33 PHOTO CELLS:

Supply and install multi-beam infra-red photocells to protect the elevator doorway and to provide a 3-D triangular zone of protection on the landing in front of the car doors. Provide at least 40 beams projecting horizontally across the car entrance providing detection over the whole area from 6 inches to 6 feet above the car sill. Provide, in addition, a zone of detection projecting out onto the corridor side of the elevator doors, capable of detecting an obstruction before it enters the doorway. Photocell device shall contain an automatic failure protection feature. If the door is held open in excess of 25 seconds by actuation of the photocell device, the photocell shall be disconnected from the door open circuit. The doors shall be allowed to close, but at reduced speed and torque, as detailed in the Elevator Code. In the event of failure of the photocell device or if the device times out, a buzzer shall sound while the doors are closing, to warn passengers that the detection feature is inoperable. In addition, if the triangular portion of the door protection device senses an obstruction but the doorway portion does not and this condition persists for a period of twenty seconds, disable the triangular portion and allow the doors to close with reference to the doorway portion only.

2.1.34 FIREFIGHTERS' EMERGENCY OPERATION:

Others to provide four pairs of signal wires from the fire control panel to the elevator controller, each forming a normally-closed circuit; one pair of wires will indicate a fire at any floor except the Main floor; the second pair of wires will indicate a fire at the Main floor for use in Alternate Floor Recall, the third pair to indicate a fire in the elevator machine space and the fourth pair to indicate a fire in the hoistway.

Provide Phase I Emergency Recall Operation. Provide a three-position keyed switch labelled "FIRE RECALL" and marked " RESET - OFF - ON" in the Main floor lobby. With the switch in the "OFF" position, in the event of a fire, cause all elevators to travel non-stop to the designated floor and park with doors open; with the switch in the "ON" position, similarly cause all elevators to travel non-stop to the Main floor; with the switch in the "RESET" position, over-ride the fire alarm system; provide cab materials with required fire ratings. If the fire sensor at the designated level is activated, cause the elevators to travel to the alternate floor.

Cause the "Fire Hat" signal in the car station to illuminate intermittently only when the smoke sensors in the Elevator Machine Space or in the elevator hoistway are activated.

Provide Phase II Emergency In-Car Operation. Provide in each car station a lockable cabinet containing the required controls: a keyed switch marked "FIRE OPERATION" having three positions marked "OFF - HOLD - ON", with the key removable in the "OFF" and "HOLD" positions only; with the switch in the

"ON" position, arrange for uninterrupted control of the elevator by the fireman; doors to close by constant pressure on the "Door Close" button; once doors are closed, a car call may be registered; arrange the car to travel non-stop to the selected floor, and park with its doors closed; open doors by constant pressure on the "Door Open" button. When the car is at a landing and the keyed switch is turned to the "HOLD" position, the doors shall remain open and car calls cannot be registered. When the keyed switch in the car is in the "OFF" position, the car shall automatically return to the recall floor.

Provide a “CALL CANCEL” button. Pressing the “CALL CANCEL” button shall cancel any registered car calls and cause the elevator to stop at the next available floor.

The elevator shall be returned to normal operation when the in-car switch is in the "OFF" position and the main floor lobby switch and the CACF switch (or Alternate Floor switch) are both in the "OFF" position.

2.1.35 BATTERY EMERGENCY LOWERING:

Provide the necessary rechargeable battery and battery charger and control circuits so that, in the event of failure of the normal power supply, the car will automatically return to the lowest landing, open its doors to release passengers, close its doors, and shut down. The car will then only respond to the "Door Open" button on the car station. When normal power is again connected, automatically return the car to normal operation.

2.1.36 PERFORMANCE CHARACTERISTICS:

Provide a quality of equipment capable of maintaining the following performance levels over the life of the equipment.

Erect the guide rails plumb to within 1/8 inch over the entire height of the hoistway. Provide guide rails with joints filed smooth so that the car travels throughout the hoistway without any noticeable sideways motion.

Provide a door operator capable of a door open time of 3.5 seconds and a door close time of 4.5 seconds. Provide control to reverse the doors within 2.5 inches of breaking the photocell beam at any point over the entire travel of the doors. The door operator and associated hardware shall produce less than 70 decibels of noise.

Adjust the equipment to perform a floor-to-floor run of 12.5 seconds on a typical 8’-8’’ floor. The floor-to-floor time shall be measured from the instant the doors begin to close until the car is stopped level at the next adjacent floor, with its doors at least ¾ open. This floor-to-floor time shall be achieved in both the UP and the DOWN directions.

Provide equipment capable of producing not more than 70 decibels of noise with the fan on, measured within the car at any point in its travel and 85 decibels in the machine space with the elevator running in the UP direction.

2.1.37 INSTRUCTIONS TO CITY OF WINNIPEG:

Include in your Bid price two hours to demonstrate the completed installation to the City of Winnipeg’s staff. Arrange a time suitable to the City of Winnipeg and conduct the instructional session with reference to the Operations Manual detailed in the

2.1.38 PERFORMANCE VERIFICATION

Include in your Bid price two hours to demonstrate the completed installation to the Contract Administrator. To facilitate testing, the Elevator Sub-Contractor shall provide such tools as a tachometer, sound level meter and other equipment as required to verify that the performance characteristics and optional features have been provided in the finished work as specified.

3 EXECUTION

3.1 PROTECTION

3.1.1 Aluminum or ferrous metal: placed next to concrete, protect using one heavy coat of bituminous paint on all surfaces in contact with concrete.

3.2 INSPECTION

3.2.1 Existing conditions: examine to ensure adequate clearances, reinforcing and the like has been provided as required to ensure for proper installation of work of this Section.

3.3 INSTALLATION/APPLICATION/PERFORMANCE

3.3.1 Work: carry out using trained employees during regular working hours normal for the trade; perform in a workmanlike manner as required to include all work as shown or reasonably implied by the Contract Documents.

3.3.2 Standard: conform to the approved manufacturer's latest printed installation directions and recommendations to all applicable codes and regulations, and to recognized good trade practice.

3.3.3 Hoisting: include all temporary hoisting facilities required for the placement and installation of the elevator equipment, including but not limited to crane, temporary beams, or any other means.

1. GENERAL REQUIREMENTS

1. Comply with all requirements of other Contract Administrator's specification.

2. This section applies to and is part of all sections of Division 22 and 26.

3. Mechanical contract price to include all necessary equipment, parts, labour and plant to complete the work shown on the drawings and described in the specifications and to ensure complete and operational mechanical systems.

4. Drawings are diagrammatic and approximately to scale. Do not scale them. For exact dimensions refer to dimensioned drawings.

5. Drawings and specifications establish scope of work only and are not detailed installation instructions. Follow manufacturer's recommendations and adhere to all applicable Codes, Standards, Regulations and Bylaws, hereafter referred to as Codes.

6. Connect to equipment specified in other sections, installed by other Subcontractors or the City of Winnipeg.

7. The Contract Administrator shall have the final say in matters of interpretation.

8. Use only new materials under this contract unless otherwise noted.

9. Apply for and pay for all required permits, licenses, inspections and fees.

10. In the event of conflict between contract documents and Codes, the more stringent requirement shall be adhered to at no additional cost.

11. All work shall be executed with good workmanship, and be guaranteed for one year from substantial completion.

12. Only skilled and qualified licensed tradesmen shall perform the work. Tradesmen to provide proof of registered status as requested.

13. Install mechanical systems in a workmanlike manner, neat in appearance and to function properly to the satisfaction of the Contract Administrator.

14. Supply and install rated access doors at all service points for mechanical equipment. Indicate on "as-built drawings" the location of all access doors. Arrange with drywaller for special framing required for access doors in drywall surfaces.

15. The Mechanical Subcontractor is responsible to carefully examine conditions at the intended place of work. Verify all services, connection points, and all access openings to permit installation of new equipment.

16. Openings shall be coordinated with the Contractor. Opening sizes to be kept to a minimum. Patching of openings shall be the responsibility of the trades normally engaged in installing the finishing materials (i.e. Drywall, brick, etc.).

17. Roof mounted mechanical equipment shall be mounted on factory insulated supplied curbs and flashed to industry standards. Review roofing materials, slopes and building support structure for proper installation for co-ordination.

18. Mechanical Subcontractor shall submit shop drawings for review by the Contract Administrator prior to commencing work. Shop drawings shall be specific to the equipment and materials for this project. Changes to location and arrangement shall be reviewed prior to installation. Review of shop drawings by the Contract Administrator is for the sole purpose of ascertaining conformance to design intent. The Mechanical Subcontractor retains responsibility for all aspects of installation, performance and co-ordination.

19. Mechanical Subcontractor shall maintain accurate "as-built" drawings on site and shall present for review at each site review. Submit these record drawings in AutoCAD 2010 or newer format for review at the completion of the project. Note that changes to architectural and structural floor plans must be included. (A minimum of $1,000.00 per drawing shall be held-back until all drawings are submitted and deemed complete.) The Contract Administrator will not perform final inspections nor certify for occupancy until the "as-built drawings" have been received, reviewed and accepted. After acceptance of "as-built drawings" by the Contract Administrator, provide one (1) complete set on CD-ROM and three (3) sets of prints.

20. Engineering Site Reviews: Contractor's work shall be periodically reviewed by the Contract Administrator for determining general quality of installation. Guidance will be offered as to interpretation of contract documents and to assist in performing the mechanical installation. Inspections, reviews and directives issued in no way relieve the Contractor, his agents, employees or subtrades from contractual obligations, conformance to codes or safe and recognized practices.

21. Operating and Maintenance Manuals: At the completion of work submit three (3) hard covered loose-leaf binders showing all major components divided by trade sections. Manuals shall be complete with all instructions for operation, maintenance and replacement parts as required. Include performance curves, detailed drawings, part lists, supplier information and any other pertinent data. Include copies of reviewed shop drawings, Contract Administrator contact information, Contractor and Sub-contractor information. Include copies of valve tag lists, all inspection certificates, and balancing reports. The Contract Administrator will not perform final inspections nor certify for occupancy until the O & M Manuals are received, reviewed, and approved.

    a. Provide manufacturers start-up reports and letters of certification that the following equipment and systems are started, commissioned and working correctly:
        1. Controls
        2. Air moving equipment
        3. Pumps

22. Provide one set of special tools required to service equipment as recommended by manufacturer. Provide a receipt signed by the City of Winnipeg's representative for each tool in each copy of the O & M Manual.

23. Contractor is to coordinate all shutdowns with the City of Winnipeg.

24. Prior to requesting any Substantial Performance site review, all aspects of the mechanical systems shall be complete and operational. Testing and balancing shall be complete along with valve and equipment identification, equipment start-ups,.

25. Each of the Subcontractors shall instruct the City of Winnipegs Operating Staff on the operation, maintenance, and adjustment of equipment and/or system that they have installed or set. Provide sign off sheets for training indicating who was trained and number of hours of training.

26. Work in Existing Building:

    1. The Contractor shall maintain the facility fully operational during the entire construction period, except as noted below.
    2. The Contractor shall develop a plan for phasing and staging of work and adhere to that program, and comply with instructions necessary to maintain the building in operation, including, if necessary, performing some of the work outside of the City of Winnipeg's normal operating hours.
    3. A request to disrupt existing services shall be made to the City of Winnipeg's representative at least three working days before the shutdown of any system that might affect others, and consent shall be obtained for each shutdown, which shall be as short as possible.

27. Use of Equipment before occupancy by City of Winnipeg:

    1. The Subcontractor may operate equipment for testing and balancing only. The use of equipment for any other purpose must be approved by the City of Winnipeg in writing prior to use.

    2. Any equipment that is placed in use for any reason prior to the beginning of the guarantee period shall be cleaned and provide with whatever maintenance and repair is required so that its condition is equal to that of new equipment, or it shall be replaced, at no cost to the City of Winnipeg.

28. Prior to final inspection or certification provide the following:
    - Fire damper certification
    - Copies of manufacturer's start-up or certification reports
    - TAB reports.

2. ACCEPTABLE MANUFACTURERS

Standard of Material & Equipment:

Description:

1. Plumbing and Drainage Approved List

Equipment	Acceptable Manufacturers
Hangers and Supports	Crane, Grinnell, Myatt
Roof Supports	C-Port, Miroind
Drainage Specialties	Ancon, Smith, Zurn, Mifab, Watts
Shock Absorbers	Ancon, Smith, Zurn, PPP, Watts
Gauges and Thermometers (swivel)	Dresser, Trerice, Weiss, Dwyer
Plumbing Brass	Kohler**,** Delta Commercial, Chicago Faucets, Symmons, Zurn, Moen, Toto, Delta Commercial
Sump Pumps	Barnes, GSW, Beatty, Monarch, Hydromatic
Backflow Preventer	Watts, Febco, Wilkins

2. Heat Transfer Approved List

Equipment	Acceptable Manufacturers

3. Ventilation Approved List

Equipment	Acceptable Manufacturers
Damper Hardware, Fan Connectors	Duro-Dyne, Elgin
Fire Dampers	NCA, Ruskin, Nailor, AMI
Fire/Smoke Dampers	NCA, Ruskin, Nailor, AMI
Utility Fans	Trane, Penn, Greenheck, Loren Cook, Delhi
Centrifugal Fans	Twin City, Northern Blower, Trane, Barry Blower, Greenheck
Inline Centrifugal Fans	Greenheck, Penn, Loren Cook, Delhi
Diffusers, Registers and Grilles	Titus, Price, Nailor Industries

Acoustic Duct Insulation	Owens Corning, J-M, Knauf, Ultralite
Flexible Ductwork	Thermoflex, Wire-mould, Flex Master
Duct Sealant	3M, Bakelite, Duro-Dyne, United

4. Insulation Approved List

Equipment	Acceptable Manufacturers
Pipe, Duct & Acoustic Insulation	Fibreglass, Knauf, John Manville

5. Controls Approved List

Equipment	Acceptable Manufacturers
Level Switch (Sump Pits)	Flygt, Barnes, Myers McDonnell Miller

6. Fire Protection Approved List

Equipment	Acceptable Manufacturers
Fire Extinguishers	National Fire Equipment, Flag, Ansul

3. PIPING & FITTINGS

1. Provide check stops at all pumps.

2. Tag all major zone and shut off valves with 38mm (1 ½") diameter brass tags. Index and list valves, insert list in each O & M Manual also frame and mount copy of list in a conspicuous area of the mechanical Room.

3. Identify all equipment with black lamacoid tags 100mm x 25mm (4"x1") with white lettering. Affix tags to equipment. Equipment names and number to match those listed on contract documents.

4. Identify all piping with stenciled lettering and directional arrows at intervals no greater than 6m (20') and at every change in direction. Labeling and identification to either the City of Winnipeg's standard or the CSA standard. Confirm system with City of Winnipeg prior to Bid.

5. Wherever pipes of dis-similar metals are joined the piping systems shall be protected and isolated by use of dielectric unions or brass valves.

6. Provide and install union or flange connections at all equipment and devices to allow for ease of service or future replacement.

7. Piping Systems:

1.	Sanitary & Storm Drainage - Above Ground:	Cast iron and copper. PVC DWV as permitted by the 2010 NPC.
2.	Sanitary & Storm Drainage - Buried:	PVC DWV as permitted by the 2010 NPC. PVC Sewer Pipe as permitted by the 2010 NPC.

8. Valves:
   1. Isolate all serviceable equipment, using ball and butterfly valves where possible unless
   2. All valves shall have a minimum certified rating of 150 psi.
   3. All drain valves shall be complete with cap and chain.
   4. Install ¼ turn ball valves prior to all pressure gauge devices.
   5. All gas system valves shall be CSA approved for application.

9. Hangers and Supports:
   1. All hangers shall be of same material as piping system, or shall be isolated from the pipe.
   2. Provide adjustable clevis hangers equal to pipe size and of same material as piping system.
   3. Provide oversized hangers on all cold water piping conveying liquid less than 21ºC (70F).
   4. Use only factory made inserts, coach screw rods, c-clamps, beam clamps and expansion shields rated for the intended load.
   5. "Caddy" clip or tension clip rod supports are not allowed on this project.
   6. Duct hangers shall be rod or strap 2 gauges heavier than duct.

10. Provide and install sleeves of suitable material where piping and duct systems pass through any and all separations.

11. Supply and install thermostats and gauges at all major pieces of equipment and where indicated on the drawings. (Note PSN-B Snubbers required at all gauges.) Mount all gauges and thermostats vertically and place so that ease of reading is ensured. Pressure and temperature ranges shall be suitable for the application.

12. Primer paint all miscellaneous metal supports channels and angle iron prior to installation.

13. Pipe all discharge from relief valves and equipment drains to nearest floor drain or suitable receptacle.

14. Install all valves, strainers, equipment, specialties, filters and the like to permit ease of operation and full access.

15. Acceptable joining systems include mechanical joints (sanitary) soldering, silver soldering, threaded joints, welding, grooved Victaulic (black) and grooved copper Victaulic.

    NOTE: Tee drilling and Press-fit systems are not acceptable on this project.

16. Where passing through roof structures, all piping must extend through the side of pitch boxes. (Exception – plumbing vents) Refer to Architectural details for co-ordination.

17. Test all systems to 1 ½ times working pressure for a minimum of two hours. All tests shall be recorded and independently witnessed. Submit recorded data for Contract Administrator's review and include in O & M Manuals.

18. Provide automatic air vents at piping high points in mechanical spaces, and manual air vents at all other piping high points.

4. INSULATION

1. Definitions:

    1. The word "exposed" where used in this Section means any work, which is not concealed in wall, shaft, or ceiling cavities or spaces. Work in mechanical rooms, utility spaces, behind doors in closets or cupboards or under counters is considered exposed.

2. Flexible Duct Insulation (FDI):

    1. R-24 flexible blanket with foil jacket, pin at 400mm on centre and tape all joints with aluminum tape.

3. Pre-molded Pipe Insulation (PPI):

    1. Provide ULC listed sectional fiberglass pipe insulation in compliance with ASTM C335-84 in pre-molded sections 900mm (36") long, split and ready for application with a minimum Thermal Conductivity of 0.033 W/m deg C at 24°C (75°F) mean temperature and be capable of use on service from -40°C to 260°C (-40F to 500F) and with factory applied vapour seal jacket of vinyl coated foil Kraft laminate with reinforcing of open mesh glass fibre.

4. Rigid Duct Insulation (RDI):

    1. Rigid board: 72kg/m^3 (4.5 lbs/ft^3) density ULC listed glass fibre board with glass fibre reinforced aluminum foil vapour seal facing and minimum thermal conductivity of 0.035 W/m deg C at 24 deg C mean temperature.

5. Finishes & Protective Coverings:

    C Canvas: 170 g/m^2 with lagging adhesive, ULC labeled.
    A Protective covering (aluminum): 020 Childers corrugated aluminum pre-formed covering complete with strapping and seals.
    M Trowelled-on weather protective coating: Bakor 110-14 asphalt mastic vapour barrier coating.

APPLICATION SCHEDULE

Ductwork	**Thickness**	**Type**	**Finish**
1. Supply ductwork concealed	25mm (1")	All FDI	None
2. Supply ductwork exposed	25mm (1")	All RDI	C
3. Exhaust ducts	38mm (1 ½") for last 3m (10')	All FDI	None

Piping (Provide canvas finish where exposed):	**Thickness**	**Type**	**Finish**
1. Rain water leaders & drain bodies	25mm (1")	All PPI	
2. Plumbing vents	12mm (½") last 3m (10')	All PPI	

5. TESTING AND BALANCING (TAB)

1. Select Contractor from the following: Air Movement, AHS, DFC, Airdronics. Other companies may apply for equal status provided they are members of AABC and they apply for equal status in accordance with the requirements of this specification.

2. Balance all supply air outlets and main ducts conveying 25% or more of system volume to ± 5% of design. Allow to replace belts and sheaves on new and existing equipment to meet air balance volumes.

3. Balance all air moving equipment to +/- 5%.

4. Balance all branch ductwork to +/- 10%.

5. Test all fire dampers, stops and flaps to industry standards. Tag each device listing company information and testing information.

6. Three (3) copies of the TAB report, including certification of fire dampers, stops and flanges shall be provided directly to the Contract Administrator prior to certification for occupancy. Include drawings, room numbers and identification numbers of fire dampers, types, and flaps on the schematics.

7. Arrange with Mechanical Subcontractor to have any necessary modifications to achieve the design and flow rates at no extra cost to City of Winnipeg.

8. Allow for an additional site review and adjustments at the request of the Contract Administrator after submission of final report.

PLUMBING

1. Supply and install fixtures indicated under contract documents to provide a complete and functional plumbing system.

2. Use only lead free solders when joining piping components.

3. Provide access doors at all concealed cleanouts, valves and water hammer arrestors.

4. Install trap primers as indicated on the contract documents and as required by local code authorities.

6. FIRE PROTECTION

1. Provide portable fire extinguishers; refer to NFPA 10 for type and location.

7. HEATING AND COOLING

1. Supply and install all systems as indicated on the drawings and in conformance with all local Codes and authorities.

2. Mount all devices to permit ease of operation, service and replacement.

3. Piping take-offs from mains shall be on a 45° angle from perpendicular.

4. Isolate all expansion tanks with lock shield style valves.

5. Maintain all required clearances as indicated on manufacturer's cut sheets and as required by code authority having jurisdiction.

8. VENTILATION

1. Supply and install a complete ventilation system as indicated on the drawings and as required by local Codes and authorities. Do all work to latest SMACNA Standards for applicable duct velocity.

2. System shall include all ducts, fire dampers, transfer air openings, fans, balance dampers, grilles, diffusers and hoods indicated on drawings and as required by Code.

3. Install all control dampers as supplied by Controls.

4. Provide access doors to comply with Code on both sides of fire dampers, control dampers and all coils. Access doors shall be constructed of 22-gauge material with flat iron framing complete with sash lock latching and seal.

5. Provide 1" thick acoustic insulation where indicated on drawings. Minimum 3-5 lbs per cubic foot density with Neoprene coating. Seal all joints and seams.

6. Provide ULC labelled fire dampers and flaps where indicated on drawings and at all rated separations. Protect ceiling diffusers with CK 2000 thermal blanket.

7. Provide locking splitter and quadrant dampers as indicated on drawings or as necessary to balance system and reduce objectionable noise.

8. Supply and install flexible duct connections at all air-handling equipment.

9. All open belt drives shall be complete with factory manufactured belt guards.

10. Provide and install drip pans constructed of galvanized iron with soldered joints lined with mastic as required by drawings and equipment and system operation and configuration.

11. Protect and keep closed open ends of duct systems while under construction to prevent dust and debris penetration.

12. Provide baffles to reduce objectionable noise as directed by the Contract Administrator at no additional cost.

13. Seal all joints in duct system with approved water based sealant.

14. Ceiling mounted components shall be installed in accordance with Architectural reflected ceiling plan. Coordinate with all ceiling mounted equipment.

9. CONTROLS

1. All controls shall be supplied by this section. Provide all wiring diagrams for line voltage wiring by Division 26 Electrical Contractor. Coordinate all requirements of Division 26 with Electrical Subcontractor prior to submitting bid.

2. Provide all control dampers for installation by Ventilation Subcontractor. Intake, exhaust and relief dampers to be insulated low leak type equivalent to Tamco 9000. Return air dampers to be Tamco 1000.

3. Provide all control valves for installation by Heating Subcontractor.

4. System shall be complete with all necessary wiring, interlocks, devices and software necessary to ensure a complete and operational system.

5. Set, operate and co-ordinate all devices for fully functional system.

6. All wiring to meet Division 27 specification requirements.

7. Sequence of operations:

    1. F-1 to run continuously during operating hours based on an occupied and unoccupied schedule. Coordinate schedule with City of Winnipeg.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 General Requirements

.2 All Electrical Drawings and Division 26, 27 and 28 Series Specification Sections.

1.2 QUALITY ASSURANCE

.1 Do complete installations in accordance with CSA C22.1-2006.

.2 While not identified and specified by number in this Division, comply with CSA Electrical Bulletins in force at time of bid submission. Comply with the requirements of all Provincial and local laws, rules, ordinances and codes.

.3 Electrical installation shall be in accordance with the current edition of the Canadian Electrical Code, Provincial and other codes, rules and regulations. Supply material and labour required to meet the requirements of these codes, rules and regulations even though the work is not shown on the drawings or mentioned in the specifications. Where the electrical installation calls for better quality materials or construction than the minimum requirements of these codes, rules and regulations, the electrical installation shall be as shown on the drawings and as specified.

.4 Electrical installation shall be in accordance with the requirements of the electrical supply authority and local inspection authority.

1.3 PERMITS, FEES

.1 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.

.2 Obtain all necessary permits required for the electrical installation.

.3 Pay all fees for permits and inspections as required for the electrical installation.

1.4 MATERIALS AND EQUIPMENT

.1 Provide labour, materials, transportation, equipment and facilities, etc., required for the complete electrical installation as indicated or implied on the drawings and specifications.

.2 Electrical equipment shall be new and of type and quality specified.

.3 Equipment and material shall be CSA certified, and manufactured to standards described. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from the appropriate Inspection Departments.

.4 Request for approval of material, as equal, shall conform to Section 26 00 10.1.16.4 herein.

1.5 SUBMITTALS

.1 Submit shop drawings and product data for review by the Contract Administrator. All drawings shall be in English and Imperial dimensions or in metric where indicated. Manufacture of equipment shall not commence until shop drawings have been reviewed. Shop drawings may be submitted electronically or 10 hard copies. The MCW/AGE shop drawing email address for electrical submission is wpg.shopdrawings@mcw.com. Shop drawings shall be reviewed prior to submittal to Contract Administrator, confirming that they meet all the design requirements. Mark up and sign Contractor approval on the drawings.

.2 Indicate details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material.

.3 Where applicable, include wiring, single line and schematic diagrams.

.4 Include wiring drawings or diagrams showing inter-connection with work of other sections.

.5 Submit samples in accordance with General Conditions. Samples shall be forwarded to the Contract Administrator's office and return. Approved samples will be retained until after bid closing, then all samples will be returned except for the sample submitted by the Manufacturer who has been listed by the successful Contractor in the bid documents. This sample will be used for comparison with the actual production run of successful manufacturer.

.6 Submit shop drawings of service entrance equipment to utilities.

.7 Material submitted for Contract Administrator's review shall bear Contractor's, and where applicable, Utility reviewed stamp.

1.6 OPERATIONS AND MAINTENANCE DATA

.1 Provide operation and maintenance data for incorporation into Maintenance Manuals.

.2 Include details of design elements, construction features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.

.3 Include technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items, and parts lists. Advertising or sales literature not acceptable.

.4 Include wiring and schematic diagrams and performance curves.

.5 Include names and addresses of local suppliers for items included in Maintenance Manuals.

.6 Submit Maintenance Manuals to the Contract Administrator for review. Manuals that are incomplete shall be returned to the Electrical Sub-Contractor for completion. Completed manuals shall be submitted, to the satisfaction of the Contract Administrator, before final payment may be considered to be due.

1.7 MAINTENANCE MANUALS

.1 Provide maintenance materials as specified.

.2 Turn materials over to City of Winnipeg in an orderly fashion upon completion of installation.

1.8 VOLTAGE RATINGS

.1 Operating voltages: to CAN3-C235-83.

.2 Motors, electrical heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment shall operate in extreme operating conditions established in above standard without damage to equipment.

1.9 INSPECTION

.1 Furnish a Certificate of Acceptance from the Inspection Authorities on completion of work. Copies of certificate shall be included in Maintenance Manuals.

.2 Certificate of Inspection of Approval shall be submitted before final payment may be considered to be due.

.3 During the course of the project construction, the Contract Administrator will carry out periodic site reviews and prepare a deficiency list for remedial action by the Electrical Subcontractor. When requested, the

Electrical Subcontractor shall respond in writing to the Contract Administrator, stating corrective action and completion date for each item listed as deficient. This response shall be in the hands of the Contract Administrator within three working days of receipt of the Inspection Report.

1.10 CARE, OPERATION AND START-UP

.1 Instruct the City of Winnipeg's operating personnel in the operation, care and maintenance of equipment. Arrangement of such instructional sessions shall be done at a time convenient to the City of Winnipeg.

.2 Arrange and pay for services of Manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components.

.3 Provide these services for such a period, and for as many visits as necessary to put equipment into operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

1.11 FINISHES

.1 Finish outdoor electrical equipment such as parking lot panels, to match light standards.

.2 Paint indoor switchgear and distribution enclosures light grey to EEMAC-2Y-1. Outdoor electrical equipment enclosures shall be painted "equipment green" to EEMAC 2Y-1.

.3 Clean and touch up surfaces of shop-painted equipment, scratched or marred during shipment or installation, to match original paint.

.4 Clean, prime and paint exposed hangers, racks, fastenings to prevent rusting.

1.12 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with lamacoid nameplates.

.2 Provide lamacoid nameplates, 1/8" (3mm) thick plastic engraving sheet, black or red face, white core, mechanically attached (screwed or riveted) unless specified otherwise. Sizes as follows:

Size 0	3.8" x 1 1/2"	(10 x 38 mm)	1 line	1/8"	(3mm) high letters
Size 1	3/8" x 4"	(10 x 100mm)	1 line	1/8"	(3 mm) high letters
Size 2	1/2" x 3"	(13 x 75mm)	1 line	3/16"	(5 mm) high letters
Size 3	1/2" x 3"	(13 x 75mm)	2 lines	1/8"	(3 mm) high letters
Size 4	3/4" x 3"	(19 x 75mm)	1 line	3/8"	(10mm) high letters
Size 5	3/4" x 4"	(19 x 100mm)	2 lines	3/16"	(5 mm) high letters
Size 6	1" x 4"	(25 x 100mm)	1 line	1/2"	(13mm) high letters
Size 7	1" x 4"	(25 x 100mm)	2 lines	1/4"	(6 mm) high letters

.3 Wording on nameplates shall be approved prior to manufacture. Submit schedule of nameplates and wording.

.4 Allow for average of twenty-five (25) letters per nameplate.

.5 Identification shall be English.

.6 Nameplates for terminal cabinets and junction boxes shall indicate system and/or voltage characteristics.

.7 Use black nameplates with white lettering for normal power and communications equipment. Use red nameplates with white lettering for emergency power and fire alarm equipment.

1.13 PROJECT RECORD DOCUMENTS

.1 Project record documents shall be transferred to electronic disc AutoCAD file and labelled "Record Drawings". The Electrical Subcontractor shall be responsible for the production of electrical as-

constructed drawings which shall provide a complete and accurate record of the actual electrical installation. The Electrical Subcontractor shall affix his company name and the words "Record Drawings" on the drawings, and sign and date them. Submit disc and hard copy for final review and submission to the City of Winnipeg upon completion. Record documents that are incomplete shall be returned to the Electrical Sub-Contractor for remedial measures. The Contract Administrators shall recommend a suitable deficiency holdback until such time as "record drawings" are submitted in the acceptable form.

.2 Indicate on record drawings, location of all buried services. This information is to be certified correct by Contract Administrator before backfilling commences.

.3 Contractor to take all schedules/details from specification and put onto additional drawing sheets for Record Drawings.

1.14 LABELS AND WARNING SIGNS

.1 Manufacturer's nameplates and CSA labels shall be visible and legible after equipment is installed.

.2 Provide warning signs on equipment, as required, to meet the requirements of the Inspection Authorities, including indication of multiple power sources.

1.15 LOCATION OF OUTLETS

.1 Locate outlets as indicated

.2 Do not install outlets back-to-back in wall; allow minimum 16" (400 mm) horizontal clearance between boxes.

.3 Drawings are schematic only and do not indicate all architectural or structural elements.

.4 Change location of outlets at no extra cost or credit, providing distance does not exceed 10'-0" (3 m) and information is provided before installation.

.5 Locate light switches on latch side of doors.

.6 Vertically align outlets of different systems when shown in close proximity to each other and occurring at different mounting heights.

.7 Coordinate mounting heights and location of all equipment with Architectural, Mechanical and Structural Drawings prior to installation of rough-in boxes.

1.16 MOUNTING

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicate otherwise.

.2 If mounting height of equipment is not indicated, verify with Contract Administrator before proceeding with installation.

.3 Install electrical equipment at the following heights unless indicated or directed otherwise.

.1 Outlets above counters: 6" (150mm); splashbacks: 4" (100mm).

.2 General receptacles, telephone and television outlets: 18" (450mm).

.3 Receptacles in mechanical and shop areas: 40" (1m).

.4 Switches, dimmers, push buttons, Luxo bracket: 48" (1.2 m).

.5 Fire alarm pullstations, thermostats: 46" (1.2 m).

.6 End of line resistors: 64" (1.6 m).

.7 Fire alarm bells, horns, speakers: 2.3m or 150mm below ceiling to top of device if ceiling is below 2.3m.

.8 Fire alarm horns complete with hush silence 48" (1.2m).

.4 Refer to accessibility design standards.

1.17 PROTECTION

.1 Protect exposed live equipment during construction for personnel safety.

.2 Shield and mark live parts "LIVE ( ) VOLTS", with appropriate voltage in English.

.3 Arrange for installation of temporary doors for rooms containing electrical distribution equipment. Keep these doors locked except when under direct supervision.

.4 Provide wire guards for all electrical equipment in Gymnasium or areas subject to damage.

1.18 LOAD BALANCE

.1 Measure phase current to panelboards with normal loads operating at time of measurement. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

.3 Submit, at completion of work, a report listing phase and neutral currents on panelboards, transformers and motor control centres, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

.4 Include load balance and voltage test results.

1.19 CONDUIT SLEEVES AND HOLES

.1 Install conduit, and sleeves, prior to pouring of concrete. Sleeves through concrete shall be sized for free passage of conduit.

.2 Holes through exterior walls and roof shall be flashed and made weatherproof.

.3 Make necessary arrangements for cutting of chases, drilling of holes and other structural work required to install electrical conduits, cables, pullboxes and outlet boxes.

.4 Install cables, conduits, and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

1.20 FIREPROOFING

.1 Where cables or conduits pass through floors, block or concrete walls and fire-rated walls, seal openings with fire-stopping material with intumescent properties.

.2 Fire proofing of electrical cables, conduits, trays, etc, passing through fire barriers shall conform to local codes and inspection authorities.

.3 Fire stop materials shall be asbestos free and have been tested in accordance with ASTM E-84, E-136 and E-814 and UC-1479.

.4 Fire stop and smoke seals shall be done in accordance with Section 07 84 00 Fire Stopping.

.5 Approved Manufacturer:

.6 Spec seal

1.21 TESTS

.1 Conduct and pay for tests including, but not limited to, the following systems:

.1 Circuits originating from branch distribution panels.

.2 Lighting and its control.

.3 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.

.4 Systems: Fire alarm.

.5 Grounding systems.

.2 Furnish Manufacturer's Certificate or letter confirming that entire installation, as it pertains to each system, has been installed to Manufacturer's instructions. Submit letter in accordance with Section 26 00 10.2.1.7.

.3 Carry out tests in presence of Contract Administrator where directed.

.4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

.5 Submit test results in Maintenance Manuals.

1.22 INSULATION RESISTANCE TESTING

.1 Megger circuits, feeders and equipment up to 350V with a 500V instrument.

.2 Megger 350-600V circuits, feeders and equipment with a 1000V instrument.

.3 Check resistance to ground before energizing.

1.23 CLEANING

.1 Do final cleaning in accordance with Section 01 74 11 Cleaning.

.2 At time of final cleaning, clean lighting reflectors, lenses, and other lighting surfaces that have been exposed to construction dust and dirt.

1.24 DELIVERY STORAGE AND HANDLING

.1 Deliver all materials to site in an orderly fashion.

.2 Store all materials in a clean and dry place, secure from vandalism or theft. All materials shall be left in shipping containers until required for use.

.3 Provide additional protection such as tarps, padding, wood skids, etc., where such is required to ensure protection of equipment and as directed by the Contract Administrator.

1.25 COORDINATION WITH OTHER TRADES

.1 Refer to Mechanical, Structural, Architectural and Interior Design drawings and specifications for additional electrical work in connection with other Divisions. Where such work is included in other sections of the specifications, provide equipment, conduit, wiring, etc. (in accordance with the Manufacturer's approved shop drawings), as required, for operation of the specified equipment.

.2 Schedule execution of electrical work with associated work specified in other Divisions.

.3 Coordinate electrical work with work of other trades to avoid conflicts with pipes, air ducts or other equipment. Provide additional supports, wiring, etc. to relocate electrical equipment, as required, where structural members, air ducts, piping or other equipment interferes with the electrical installation.

1.26 EXAMINATION OF SITE AND CONSTRUCTION DOCUMENTS

.1 Ensure that all equipment designated as "Existing to Remain" or "Existing to be Relocated" is suitable for its intended re-use, including panelboards and circuits. Report any discrepancies to the Contract Administrator BEFORE close.

.2 Refer to General Conditions for instructions regarding a pre-arranged site visit during the bid period.

1.27 CUTTING AND PATCHING

.1 Pay the costs of all cutting and patching required for the installation of electrical work. Payment for cutting and patching shall be made through the Contractor.

.2 Cutting and patching required for the installation of electrical work shall be done by the particular trade whose work is involved. No cutting or patching shall be carried out by the tradesman employed on the electrical work.

.3 Obtain the approval of the Contract Administrator and/or City of Winnipeg before arranging for any cutting. Patching shall restore the affected area to the original condition; materials and methods used for patching shall be in accordance with the requirements of the corresponding Divisions of the specification.

1.28 WORKMANSHIP

.1 Install equipment, conduit and cables in a workmanlike manner to present a neat appearance to the satisfaction of the Contract Administrator. Install conduit and cable runs parallel and perpendicular to building lines in chases, behind furring or above ceilings, where such concealment is possible. In areas where systems are shall be exposed, install neatly and group in a tidy appearance.

.2 Install equipment and apparatus requiring maintenance, adjustment or eventual replacement, with adequate clearances and accessibility for same.

.3 Include, in the work, all requirements shown on the shop drawings or Manufacturer's installation instructions.

.4 Replace work unsatisfactory to the Contract Administrator without extra cost.

1.29 ACCESS DOORS

.1 Access doors shall be a minimum #12 gauge prime coat painted bonderized steel. Each shall be complete with a heavy flush frame and anchor, concealed hinges, positive locking screwdriver lock, and mounting and finishing provisions to suit the finish material for which they are supplied. Access doors in fire rated ceilings, walls, partitions, structures, etc. shall be U.L.C. listed and labelled and of a rating to maintain the fire separation integrity.

.2 Where access doors are located in surfaces where special finishes are required, they shall be of a recessed door type capable of accepting the finish in which they are to be installed so as to maintain the fire separation integrity.

.3 Supply access doors in inaccessible construction shall give access to all concealed junction boxes, pullboxes, conductor joints and other similar electrical work which may need maintenance or repair.

.4 Before commencing installation of electrical work submit, to the Contract Administrator for approval, a list of required access doors showing the exact sizes and locations of such access doors. Locate access doors in walls and partitions to the Contract Administrator's approval, and arrange electrical work to suit. Access doors shall be, wherever possible, of a standard size for all application. Confirm exact dimensions with the Contract Administrator, prior to ordering.

.5 Access doors shall be installed by the Division responsible for the particular type of construction in which access doors are required. Supply the access doors to the Division installing same at the proper time to avoid construction delays.

1.30 SPARE PARTS

.1 Assemble spare parts as specified:

.2 Include the following:

.1 Part number.

.2 Identification of equipment or system for which parts applicable.

.3 Installation instructions as applicable.

.3 Provide a written list complete with City of Winnipeg's signature assuring that spare parts have been received by the City of Winnipeg.

1.31 Substantial Performance

.1 The Contract Administrator shall make a Representative available for one substantial performance inspection within one week of receipt of the following:

.1 Verification Certificate and complete report for fire alarm and life safety system by the fire alarm manufacturer indicating that the system is complete, tested and in conformance with the specification and local jurisdiction requirements. Refer to Fire Alarm System Section 28 31 30.

.2 A letter from the Electrical Subcontractor stating that the fire alarm and life safety system are complete, tested and fully operational as per the plans and specifications, including all formal changes to the Contract. The letter shall further state that all deficiencies sited by the Contract Administrator or local Electrical or Building Inspector have been completed and accepted.

.3 Completed and approved Maintenance Manuals as per Item 26 00 10.1.7.

.4 Completed and approved Project Record Drawings as per Item 26 00 10.1.13.

.2 Before or during the substantial performance inspection, the Electrical Subcontractor shall prove the proper performance of all fire alarm, nurse call, emergency call, and life safety systems, in the presence of and to the satisfaction of the Contract Administrator, local inspection authorities and the City of Winnipeg.

Part 2 Products

2.1 NOT USED

.1 Not Used

Part 3 Execution

3.1 NOT USED

.1 Not Used

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 26 00 10 – Basic Electrical Materials and Methods

.2 Section 26 05 34 – Conduit

.3 Section 26 05 29 – Fastenings and Supports

.4 Section 26 05 35 – Outlet Boxes and Fittings

.5 Section 26 27 26 – Wiring Devices

1.2 COORDINATION

.1 The building shall remain open and in normal operation during the construction period.

.2 Where existing services, such as electrical power, fire alarm system, sound system, etc., are required to be disrupted and/or shut-down, coordinate the shut-downs with the City of Winnipeg and carry out the work at a time and in a manner acceptable to them. Carefully schedule all disruption and/or shut-downs and ensure that the duration of same is kept to the absolute minimum. Submit for approval a written, concise schedule of each disruption at least 120 hours in advance of performing work and obtain City of Winnipeg's written consent prior to implementing.

.3 Should any temporary connections be required to maintain services during work in the existing building, supply and install all necessary material and equipment and provide all labour at no extra cost. Should any existing system be damaged, make full repairs without extra cost, and to the satisfaction of the City of Winnipeg and Contract Administrator.

.4 Refer to general conditions for phasing and staging of work and adhere to that schedule. Comply with instructions regarding working hours necessary to maintain the building in operation.

.5 Coordinate complete installation of relocated utility services, if required, with utilities to ensure minimum interruption of service. Coordinate the transfer of the existing Hydro service point to the new service point with the Hydro utility in order to keep power interruptions to a minimum.

1.3 EXISTING DEVICES IN NEW CONSTRUCTION

.1 Where existing devices (receptacles, switches, etc.) presently mounted on a wall which will be covered with a new finish, provide an extension ring, coverplate, etc., as required to mount the device to the new wall.

.2 Where existing conduits pass vertically through a floor area, relocate those conduits to be installed concealed in a new wall or surface-mounted in a service area. Extend conduit, wiring, etc., as required.

.3 Existing junction boxes in walls and ceiling spaces required to maintain existing circuits shall remain accessible.

1.4 SCHEDULE OF WORK

.1 Carefully note and refer to the general schedule of work and include for all requirements to conform to it.

Part 2 Products

2.1 MATERIALS

.1 Provide all materials required for the complete interface and reconnection installation as herein described and as indicated on the drawings.

.2 New fire alarm devices, speakers, starters, panelboards, etc., required to be tied into existing systems shall match the existing devices.

.3 New wiring required to interconnect new devices to existing systems shall be provided to suit the manufacturer's requirements and instructions.

Part 3 Execution

3.1 INSTALLATION

.1 Install boxes, conduit and wiring through existing areas as required for the new installation.

.2 Add modules, switches, etc., in existing control panels, as required, to extend existing systems to new or renovated areas.

.3 Patch and repair walls and ceilings in existing areas that have been damaged to cut open due to the new electrical installation.

.4 Where new cables or conduits have been installed through existing fire rated walls, seal opening around cables and conduit to maintain fire rating.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 26 00 10 - Basic Electrical Material and Methods

.2 Section 26 05 34 – Conduit

.3 Section 26 05 29 - Fastenings and Support

Part 2 Products

2.1 MATERIALS

.1 Conductors in Conduit (R-90):

Type:	RW-90
Conductors:	Solid copper #10 AWG and smaller. Stranded copper #8 AWG and larger. Sized as indicated (minimum #12 AWG)
Insulation:	Cross link polyethylene (XLPE), 90ºC. (194ºF)
Configuration:	Single conductor
Voltage Rating:	1000V
Certification:	CSA C22.22 No.38 or latest revision

.2 Armored Cable:

Type:	AC-90
Conductors:	Solid copper #10 AWG and smaller. Stranded copper #8 AWG and larger. Sized as indicated (minimum #12 AWG).
Insulation:	Cross link polyethylene (XLPE), 90ºC. (194ºF)
Configuration:	Multi-conductor, as required, complete with a separate bare CU ground wire.
Voltage Rating:	1000V
Armor	Bare interlocked aluminium.
Certification:	CSA C22.22 No.38 or latest revision

.3 Armored Cable (Teck):

Type:	Teck 90.
Conductors:	Solid copper #10 AWG and smaller. Stranded copper #8 AWG and larger. Sized as indicated (minimum #12 AWG).
Insulation:	Cross link polyethylene (XLPE), 90ºC. (194ºF).
Configuration	Multi-conductor, as required, complete with a separate bare CU ground wire.
Color Code:	Black, red, blue and white in 4/c cable. Cables of more than 4/c to be number coded.
Voltage Rating:	1 kV or 5 kV as indicated.*
Inner Jacket:	Black polyvinyl chloride (PVC) Low flame spread (LFS). Low gas emission (LGE).
Armor:	Interlocked aluminium.
Outer Jacket:	Black polyvinyl chloride (PVC), -40ºC. (-40ºF) Low flame spread (LFS).

	Low gas emission (LGE).
Fire Rated:	FT4.
Certification:	CSA C22.22 No. 131 or latest revision.

.4 Low Voltage Control Cables:

Type:	LVT.
Conductors:	Solid copper #18 AWG.
Insulation:	Thermoplastic, color coded.
Configuration:	Single. Two conductor – parallel, Three or more conductors twisted.
Voltage Rating:	30V.
Outer Jacket:	Thermoplastic.
Certification:	CSA C22.22 No. 35.

.5 Mineral Insulated Cables:

Type:	M.I.
Conductors:	Solid copper size as indicated.
Insulation:	Magnesium oxide.
Configuration:	Single, two, three or four conductor as indicated.
Voltage Rating:	600V.
Outer Jacket:	Copper.

.6 Pressure type connectors, fixture type splicing connectors, cable clamps and lugs, as required.

Part 3 Execution

3.1 INSTALLATION IN RACEWAYS

.1 Install wiring as follows:

1. In conduit systems in accordance with Section 26 05 34.
2. Ensure conduits are dry and free of debris before pulling cables.
3. Color coding and identification as per this Section.
4. Wires in outlet, junction and switch boxes, not having a connection within the box shall not be spliced, but shall continue unbroken through the box.

3.2 INSTALLATION OF FLEXIBLE ARMOURED CABLE

.1 Type AC-90 armoured cable (BX) shall be used for connections from conduit systems to recessed luminaires in accessible ceilings. Cable shall be of sufficient length to allow the lighting fixture to be relocated to any location within a 6’ (1.83 mm) radios. Cable shall be clamped before entering the lighting fixture and shall be clipped before entering the conduit system junction box. (Minimum requirements)

.2 Type AC-90 armoured cable may be used for connections from conduit systems to wiring devices in steel stud partitions and for interconnection of wiring devices within steel stud partitions, cable shall be clipped before entering junction or outlet boxes. Cable shall be clamped within partitioning with plastic tie-wraps. (See Section 26 05 34 1.7.4 for limitations.)

.3 Type AC-90 ISO-BX as supplied by Alcatel shall be used for isolated ground receptacles.

3.3 INSTALLATION OF MINERAL INSULATED CABLE

.1 M.I. cable shall be installed in complete unbroken lengths parallel with building lines and terminated as per manufacturer’s instructions. Care shall be taken at all times to prevent the entry of moisture into ends of the table.

.2 M.I. cable shall be surface-mounted to building surfaces with copper clips or straps.

3.4 INSTALLATION IN EQUIPMENT

.1 Group and lace-in neatly, wire and cable installed in switchboards, panelboards, cabinets, wireways and other such enclosures.

3.5 TERMINATIONS

.1 Terminate wires and cables with appropriate connectors in an approved manner.

3.6 MOTOR CONNECTIONS

.1 Flexible connections to motors shall not exceed 78" (2 m) unless authorized in writing by Contract Administrator.

3.7 IDENTIFICATION

.1 Wire in conduit #2 AWG and smaller shall have solid coloured insulation, color coded as listed below.

.2 Wire in conduit #1 AWG and larger and single conductor cables for normal power feeders shall be identified at each outlet box and termination with a 6" (150 mm) band of coloured vinyl tape of the appropriate color. Emergency power feeders shall be provided with an additional 3" (75 mm) band of red vinyl tape installed adjacent to the 6" (150 mm) band of the coloured phase identification tape, as listed below. Neutral and ground conductors shall be identified. Paint or other means of coloring the insulation shall not be used.

.3 Color code wire in conduit and single conductor cables as follows:

Phase A	red
Phase B	black
Phase C	blue
Neutral	white
Ground	green

Unless shown otherwise on the drawings.

.4 Maintain phase sequence and color coding throughout project.

.5 Use color coded wires in communication cables, matched throughout system.

.6 Identify control conductors in motor equipment, contactors, fire alarm panels, etc. with Mylar / cloth wire markers.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 26 00 10 - Basic Electrical Material and Methods.

.2 Section 26 05 19 - Wire and Cable

1.2 REFERENCES

.1 Ground equipment to: CSA C22.2 No. 41.

.2 Copper grounding conductors to: CSA G7.1

Part 2 Products

2.1 EQUIPMENT

.1 Grounding conductors system, circuit and equipment, grounding to be bare stranded copper, sized in accordance with the Canadian Electrical Code.

.2 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:

- .1 grounding and bonding bushings
- .2 protective type clamps
- .3 bolted type conductor connectors
- .4 thermit welded type conductor connectors
- .5 bonding jumpers, straps
- .6 pressure wire connectors

Part 3 Execution

3.1 INSTALLATION GENERAL

.1 Install complete permanent, continuous, system and circuit, grounding systems including electrodes, conductors, connectors and accessories to conform to requirements of local authority having jurisdiction over installation.

.2 Install connectors to manufacturer’s instructions.

.3 Protect exposed grounding conductors from mechanical injury.

.4 Use mechanical connectors for grounding connections to equipment provided with lugs. Soldered joints not permitted.

.5 Install bonding wire for flexible conduit, connected to both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

.6 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

.7 Bond single conductor, metallic armoured cables to cabinet at supply end, and provide non-metallic entry plate at load end and run separate ground conductor.

.8 Provide separate ground conductors in PVC conduit, plastic or fibreglass raceways.

3.2 SYSTEM AND CIRCUIT GROUNDING

.1 Install system and circuit grounding connections to neutral points of 600V and 208V systems.

3.3 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to: service equipment, transformers, frame of motors, motor control centres, starters, control panels, building steel work, generators, elevators distribution panels, outdoor lighting.

3.4 TESTS

.1 Perform tests in accordance with Section 26 00 10.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 26 00 10 – Basic Electrical Materials and Methods

.2 Section 26 05 19 – Wire and Cable

.3 Section 26 05 29 – Fastening and Supports

.4 Section 26 05 34 – Conduit

Part 2 Products

2.1 SUPPORT CHANNELS

.1 U-shape galvanized steel uni-strut, size 1.6" x 1.6" (40 x 40mm), 0.1" (2.5mm) thick, surface-mounted, suspended or set in poured concrete walls and ceilings as required.

2.2 MANUFACTURERS

.1 Acceptable manufacturers: Burndy, Electrovert, Unistrut, Pilgrim, Pursley.

Part 3 Execution

3.1 INSTALLATION

.1 Secure equipment to solid masonry, tile and plaster surfaces with lead anchors or nylon shields.

.2 Secure equipment to poured concrete with cast-in or expandable inserts.

.3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.

.4 Secure surface-mounted equipment with twist clip fasteners to inverted T-bar ceilings. Ensure that T-bars are adequately supported to carry weight of equipment specified before installation. Provide additional support where required.

.5 Support equipment, conduit or cables on support channels using clips, spring-loaded bolts, cable clamps designed as accessories to basic channel members.

.6 Fasten exposed conduit or cables to building construction or support system using straps.

- .1 One-hole steel straps to secure surface conduits and cables 1 ¼" (32mm) and smaller.
- .2 Two-hole steel straps for conduits and cables larger than 1 ¼" (32mm).
- .3 Beam clamps to secure conduit to exposed steel work.

.7 Suspended support systems.

- .1 Support individual cable or conduit runs with ¼" (6mm) dia. Threaded rods and spring clips.
- .2 Support 2 or more cables or conduits on channels supported by 3/8" (10mm) diameter threaded rod hangers where direct fastenings to building construction is impractical.

.8 For surface-mounting of two or more conduits use channels at 60" (1.52m) o.c.

.9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.10 Ensure adequate support for raceways and cables dripped vertically to equipment where there is no wall support.

.11 Do not use wire lashing or perforated pipe straps to support or secure raceways or cables.

.12 Do not use supports or equipment installed for other trades for conduit or cable support except when otherwise approved by the Contract Administrator.

.13 Install fastenings and supports as required for each type of equipment cables and conduits, in accordance with manufacturer's installation recommendations.

.14 Where conduit and cable runs are installed on support systems, they shall be run so as to be as inconspicuous as possible. Coordinate support system path with equipment, of other trades, to ensure proper installation of electrical equipment. Run support system path perpendicular or parallel to building lines.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 26 00 10 – Basic Electrical Materials and Methods.

.2 Section 26 05 29 – Fastenings and Supports

1.2 LOCATION OF CONDUIT

.1 Drawings do not show all conduits. Those shown are diagrammatic form only.

.2 Electrical Subcontractor shall produce layout sketches of conduit runs through mechanical and electrical service areas in order to pre-avoid any conflict with other construction elements and to determine the most efficient route to run conduit.

Part 2 Products

2.1 CONDUITS

.1 Electrical metallic tubing (EMT), with couplings: size as indicated.

.2 Flexible metal conduit and liquid-tight flexible metal conduit: size as indicated.

2.2 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits 1 ¼" (35mm) and smaller. Two hole steel straps for conduits larger than 1 ¼" (35mm).

.2 Beam clamps to secure conduits to exposed steel work.

.3 U-channel type supports as specified in Section 26 05 29.2.1.1 for two or more conduits at 60" (1.52m) intervals (surface-mounted or suspended).

.4 3/8" (10mm) diameter threaded rods to support suspended channels. One rod shall be non-ferrous.

2.3 CONDUIT FITTINGS

.1 Fittings manufactured for use with conduit specified.

.2 Manufacturer elbows where 90º bends are required for 2 ½" (63mm) and larger conduits.

.3 Die cast set screw connectors and couplings. Insulated throat liners on connectors.

.4 Raintight connector fittings complete with O-rings, for use on weatherproof or sprinklerproof enclosures. Raintight couplings shall be used for surface conduit installations exposed to moisture or sprinkler heads. Raintight connectors shall be used for all top entries to panels, contactors and motor control centres.

Part 3 Execution

3.1 INSTALLATION

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Conceal conduits except in mechanical and electrical service rooms.

.3 Use electrical metallic tubing (EMT) except where noted otherwise.

.4 Wiring home runs to panels and main branch wiring runs in ceiling spaces shall be run in conduit. Wiring drops from conduit systems into boxes for wiring devices in steel stud partitions may be wired with AC-90. AC-90 drops to light fixtures shall not run horizontally more than 6' (1.83m) from conduit system junction boxes in ceiling space. AC-90 drops from conduit system in the ceiling space to feed outlets in steel stud partitions shall not run more than 6' (1.83m) horizontally from the ceiling outlet box to the point where the AC-90 drops vertically into the partition.

.5 Use flexible metal conduit for connection to motors, fluorescent fixtures recessed in T-bar ceilings, suspended fixtures, transformers and equipment subject to movement or vibration. Provide a separate insulated grounding conductor within flexible conduit.

.6 Bend conduit cold. Replace conduit if kinked or flattened more than $1/10^{th}$ of its original diameter.

.7 Install polypropylene fish cord in empty conduits.

.8 Where conduits become blocked, remove and replace blocked section.

.9 Dry conduits out before installing wire.

.10 The length of any conduit run shall not exceed 100' (33m) and no conduit run shall have more than two 90º bends (or equivalent) before a pullbox is installed. Pullboxes shall be installed in accessible ceiling spaces. Conduits shall be supported within 12" (300mm) of entering any junction box, pullbox, cabinet, or panelboard.

.11 Conduit shall be sized as per Canadian Electrical Code or as shown on drawings. Note that the sizes of branch circuit conductors scheduled and/or specified on the drawings are minimum sizes and shall be increased as required to suit length of run and voltage drop in accordance with Canadian Electrical Code. Where conductor sizes are increased to suit voltage drop requirements, increase the conduit size to suit at no extra cost.

3.2 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Do not locate conduits within 78" (2m) of infrared or gas-fired heaters.

.3 Group conduits wherever possible on suspended or surface channels.

.4 Do not pass conduits through structural members, except as indicated.

.5 Do not locate conduits less than 6" (150mm) to steam or hot water lines.

3.3 CONCEALED CONDUITS

.1 Do not install conduit home runs horizontally in masonry walls.

.2 Do not install conduits in terrazzo or concrete toppings, unless otherwise indicated.

3.4 CONDUIT IDENTIFICATION

.1 Colour code coverplates of junction boxes in conduit systems as per the colour code list below.

.2 Colour code by spray painting the coverplate on each junction box in the conduit run.

.3 In addition to colour coding coverplates on junction boxes with power wiring, the circuits being run in the box shall be identified on the inside coverplate the permanent felt marker.

120/208V Normal Power	yellow
120/208V Emergency Power	fluorescent red
347/600V Normal	orange
347/600V Emergency Power	fluorescent orange

Fire Alarm	red
Telephone	purple
Security	royal blue
CCTV	black
Ground	green
PA/Sound	brown
Nurse Call	sky blue
Controls	white
Satellite or Cable TV	fluorescent green

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 26 00 10 – Basic Electrical Materials and Methods

.2 Section 26 05 34 – Conduits

1.2 SYSTEM DESCRIPTION

.1 Provide boxes to suit each specified application. Locate as indicated.

Part 2 Products

2.1 OUTLET AND CONDUIT BOXES – GENERAL

.1 Size boxes in accordance with CSA C22.1, Section 12.

.2 Gang boxes where wiring devices are grouped.

.3 Blank coverplates for boxes without wiring devices.

.4 347V outlet boxes for 347V switching devices.

.5 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 SHEET STEEL OUTLET BOXES

.1 Electro-galvanized steel device boxes for flush installation, minimum size 4” (100mm) square with extension and plaster rings, as required.

.2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit.

.3 4” (100mm) square or octagonal outlet boxes for lighting fixture outlets.

.4 4” (100mm) square outlet boxes with extension and plaster rings flush-mounting devices in finished plaster and tile walls.

2.3 CONDUIT BOXES

.1 Cast FS or FD feraloy boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacles where exposed to moisture.

2.4 FITTINGS – GENERAL

.1 Bushings and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of foreign materials.

.3 Conduit outlet bodies for conduit up to 1 ¼” (35mm) and pullboxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

2.5 SECTIONAL BOXES

.1 Do not utilize sectional boxes.

2.6 INSTALLATION OF BOXES

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of construction material.

.3 For flush installations, mount outlets flush with finished wall using plaster rings to permit wall finish to come within ¼" (6mm) of opening.

.4 Provide correct size of openings in boxes for conduit and cable connections. Reducing washers not allowed.

.5 Maintain continuity of vapour barrier where boxes are installed in exterior walls.

.6 Boxes shall be mounted plumb and square with building lines.

.7 Co-ordinate boxes in masonry with brick or block configuration. Boxes shall be sawcut in bottom of appropriate brick or block.

.8 Co-ordinate locations with millwork.

.9 Verify exact location of floor boxes with Contract Administrator. Adjust floor boxes level with finished floor.

.10 Verify exact location of service fittings with furniture drawings and/or Contract Administrator. Service fittings shall be installed parallel and perpendicular to building lines.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Division 22– Mechanical Specifications

.2 Section 26 00 10 – Basic Electrical Materials & Methods

.3 Section 26 05 34 – Conduit

.4 Section 26 05 19 – Wire and Cable

.5 Section 26 05 35 – Outlet Boxes and Fittings

.6 Section 26 29 13 – Motor Starters

.7 Section 26 28 16 – Motor and Circuit Disconnects

1.2 SYSTEM DESCRIPTION

.1 Provide complete electrical power and control connections for mechanical equipment, except as noted herein, or as noted on the drawings.

Part 2 Products

2.1 MATERIALS

.1 Include motor starters, disconnects, conduit, wire, fittings, interlocks, outlet boxes, junction boxes, and all associated equipment required to provide power wiring for mechanical equipment, unless otherwise indicated.

.2 Include pushbutton stations, motor protective switches, interlocks, conduit, wire, devices, and fittings required to provide control wiring for mechanical equipment, except for temperature/humidity control systems.

.3 Unless otherwise noted, motors and control devices shall be supplied by Division 22. Motor horsepower ratings shall be as shown in the Division 22 specifications. Motor voltage and phase ratings shall be as shown on the Division 26 drawings.

2.2 EXTERIOR EQUIPMENT

.1 All equipment, mounted on the exterior of the building, shall be weatherproof.

Part 3 Execution

3.1 POWER WIRING

.1 Install power feeders, starters, disconnects, and associated equipment and make connections to all mechanical equipment.

.2 Install branch circuit wiring for mechanical system control panels, time clocks, and control transformers.

.3 Install main power feeders to starter/control panels furnished by Division 22. Install branch wiring from starter/control panels to controlled equipment such as motors, electric coils, etc.

.4 Conduit, wire, devices and fittings required to wire and connect low voltage temperage control systems, shall be supplied and installed by the trade supplying the temperature control system. Control wiring shall be installed in conduit.

.5 Wire and connect electrical interlocks for starters supplied by Division 22.

.6 Wire and connect hi-limit cut-outs for remotely mounted electric heating coils provided by Division 22.

.7 Wire and connect thermistor control devices, built-in to large motors, to motor starters, as per wiring diagrams provided by Division 22.

3.2 CONTROLS

.1 Install all electrical controls, except low voltage temperature controls, unless otherwise noted herein. Controls which have both electrical and mechanical connections shall be installed by the trade supplying the control.

.2 Wire and connect line voltage remote thermostats and P/E switches for furnaces, condensing units, force flows, gas-fired unit heaters, electric heaters and rooftop units.

.3 Wire and connect float switches, pressure switches, alternators, alarms, etc. for sump pumps, sewage pumps, domestic hot water re-circulating pumps, booster pumps, jockey pumps and compressors.

.4 Conduit, wire, devices and fittings required to wire and connect low voltage controls, which are an integral part of a packaged unit, shall be supplied by the trade supplying the packaged unit, unless otherwise indicated. Control wiring shall be installed in conduit.

.5 Wire and connect electrical interlocks for starters supplied by Division 22.

.6 Wire and connect hi-limit cut-outs for remotely mounted electric heating coils provided by Division 22.

.7 Wire and connect thermistor control devices, built-in to large motors, to motor starters, as per wiring diagrams provided by Division 22.

3.3 CO-ORDINATION

.1 Refer to mechanical drawings for the exact location of motor control devices, and other mechanical equipment requiring an electrical connection.

.2 Obtain full information from Division 22, regarding wiring controls, overload heaters, equipment ratings and over-current protection. Notify the Division 22, at once, if any information provided is incorrect or unsatisfactory.

.3 Refer to Division 22 specifications for any further electrical requirements.

.4 Review both electrical and mechanical drawings and specifications and co-ordinate all controls with Mechanical Subtrades through Contractor. Report all discrepancies to both mechanical and electrical Contract Administrators before close of bid. No additional money will be justified for assumptions made on any duplication of information.

.5 Submit to Contractor, as part of the bid submission, a list of controls and wiring to be provided in the Electrical Contract.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 26 00 10 – Basic Electrical Materials and Methods

.2 Section 26 05 34 – Conduit

.3 Section 26 05 19 – Wire and Cables

.4 Section 26 05 35 – Outlet Boxes and Fittings

.5 Section 26 27 26 – Wiring Devices

.6 Section 26 28 16 – Motor and Circuit Disconnects

1.2 SYSTEM DESCRIPTION

.1 Make all required electrical connections to devices, equipment, appliances, etc., furnished by other trades or City of Winnipeg, as indicated or implied on the drawings or in the specifications.

.2 Provide and install miscellaneous electrical components where required.

1.3 COORDINATION

.1 Verify electrical supply characteristics of all equipment prior to rough-in. Report any discrepancies immediately. Revise wire sizing, device type, connection type, breaker size, etc., as required, to accommodate the electrical supply characteristics of the equipment supplied by other trades.

Part 2 Products

2.1 GENERAL

.1 Provide all required electrical devices, components, conduits, fittings, wiring, disconnects, and miscellaneous equipment to make all connections to equipment.

.2 Be familiar with the apparatus being supplied and carefully coordinate and cooperate with the supplier/installer to ensure a proper and complete installation.

2.2 RECEPTACLES

.1 Where equipment has line cord and plug, ensure cap is compatible with receptacle. Provide cord sets to equipment where required.

2.3 ILLUMINATED SIGNS

.1 Wire and connect all illuminated signs. Provide a disconnect at each sign.

.2 Utilize water-tight wiring methods.

2.4 EQUIPMENT SUPPLIED BY OTHER TRADES OR CITY OF WINNIPEG

.1 Wire and connect all equipment requiring an electrical connection. Install disconnect switches where required.

.2 Provide a direct connection or receptacle and cord set to suit hook-up requirements of each piece of equipment. Confirm connection method with City of Winnipeg or General Contractor.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 14 20 06 – Hydrolift Elevator

.2 Section 26 00 10 – Basic Electrical Materials and Methods

.3 Section 26 05 34 – Conduit

.4 Section 26 05 19 – Wire and Cables

.5 Section 26 28 16 – Motor and Circuit Disconnects

.6 Section 28 31 30 – Fire Alarm System

1.2 SYSTEM DESCRIPTION

.1 Provide all electrical equipment, conduit, and wiring necessary to interconnect the elevator and dumbwaiter components, equipment, machine rooms, pits and shafts to the power distribution, fire alarm and telephone system.

.2 System shall conform to Firefighters Emergency Operation CSA B44-07.

1.3 COORDINATION

.1 Obtain elevator shop drawings and install power supply, lighting, communication conduit and fire alarm interconnections as required.

.2 Firefighters emergency operation shall apply to all automatic elevators except where hoistway not required to be fire resistant construction (rise does not exceed 2000mm or hoistway penetrate a floor.

Part 2 Products

2.1 MATERIALS

.1 Provide separate lockable fused disconnect switches and fuses in the elevator machine room for each elevator motor, each controller and the lights in each elevator cab. Locate disconnects adjacent to the lock side of the door. Fuses and switch rating shall be sized to suit the elevator equipment supplier's requirements.

.2 Provide a telephone junction box in each machine room with a ¾" (19mm) empty conduit run to the closest telephone terminal location.

.3 Provide a fire alarm junction box in each machine room and tie in to the main fire alarm panel with 6#12 conductors in a ¾" (19mm) conduit.

.4 Provide smoke detector in each elevator machine room.

.5 Provide a fixed temperature heat detector at the top of each elevator shaft.

.6 Provide smoke detectors in each machine room and on each floor in elevator lobbies.

.7 Provide lighting, complete with switch and receptacle, in each machine room, elevator pit and top of shaft.

.8 Provide a connection from each controller to the standby generator transfer switch with 4#12 conductors in a ½" (13 mm) conduit.

.9 Provide a 1 ½" (38mm) empty conduit from each elevator pit (single or common shaft) to the control station location for the respective elevators.

.10 Provide smoke detector in each level elevator lobby to conform to CSA B-44 clause 2.27.3 for emergency recall and fire alarm interconnection where a building has a fire alarm system.

Part 3 Execution

3.1 POWER DISCONNECTS

.1 Install disconnects for the elevator motor, controller and cab lighting where indicated on elevator shop drawings. Wire and connect from power distribution to disconnects and from disconnects to the controller.

.2 Power disconnect shall be 4 pole or be complete with relay for disconnect of battery power supply.

3.2 TELEPHONE

.1 Install telephone junction box. Provide a ¾" (19mm) conduit from the telephone room to junction box and from the junction box to controller.

3.3 LIGHTING AND RECEPTACLES

.1 Provide machine lighting switches, receptacles and associated wiring. Locate as per elevator shop drawings.

.2 Provide pit and top of shaft lighting, switches, receptacles and associated wiring. Locate as per elevator shop drawings. Install wire guards on lights.

.3 All receptacles associated with Elevator shall be G.F.I. Type.

3.4 FIRE ALARM

.1 Install smoke detector and associated wiring in each machine room to home elevators for emergency recall operation.

.2 Install heat detectors and associated zone wiring at the top of each elevator shaft. Mount end of line resistors (where applicable) in elevator machine room or in mechanical room adjacent to shaft. Provide lamacoid as indicated in Section 26 00 10. Heat detector to activate emergency recall operation.

.3 Install wiring from the fire alarm control panel to elevator controllers to sequentially home elevators to main floor upon activation of the fire alarm system. Provide conductors and smoke detectors in elevator lobbies to activate emergency recall operation and alternate floor homing in all buildings where hoistway penetrates a floor level.

3.5 FEEDER

.1 Feeder shall be 2 hour rated cable or cable mounted in a 2 hour fire rating.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 26 00 10 – Basic Electrical Materials and Methods

.2 Section 26 05 35 – Outlet Boxes and Fittings

1.2 SUBMITTALS

.1 Submit shop drawings and product data in accordance with Section 26 00 10.

Part 2 Products

2.1 SWITCHES

.1 Toggle-operated general purpose AC switches 15A and 20A, 120V AC and 347V AC, single pole, double pole, three-way and four-way switches as indicated, with the following features:

.1 Terminal holes approved for No. 10 AWG wire.

.2 Silver alloy contacts.

.3 Urea molding.

.4 Suitable for back and side wiring.

.5 Brown or white toggle as indicated.

.6 Fully rated for tungsten filament and fluorescent lamps, and up to 80% of rated capacity of motor loads.

.2 Switches of one manufacturer throughout project.

.3 Switches shall be premium specification grade (Industrial spec grade or Commercial grade).

.4 Acceptable Manufacturers:

Manufacturer	120 Volt	347 Volt
Hubbell	1200 Series	18200 Series
Leviton	1200 Series	54500 Series
Pass & Seymour	15AC1 Series	3715 Series
Copper Wiring Devices	1200 Series	18201 Series

2.2 RECEPTACLES

.1 Duplex receptacles, NEMA No. 5-15R, 125V AC, 15A, U-ground with the following features:

.1 Nylon face. Confirm colour with Contract Administrator.

.2 Suitable for No. 10 AWG for back and side wiring.

.3 Break-off links for use as split receptacles.

.4 Triple wipe contacts and riveted grounding contacts.
Cooper Wiring Devices: BR Series – Commercial Grade #5252 Industrial Grade – 5 wire contacts, terminal covers, one piece grounding system.

.2 Single receptacles NEMA No. 5-15R, 125V AC, 15A, U-ground, with the following features:

.1 Nylon face. Confirm colour with Contract Administrator, Interior Designer or Contract Administrator.

.2 Suitable for No. 10 AWG for back and side wiring.

.3 Receptacles shall be identified isolated ground type where indicated either by orange colour face or orange triangle. Confirm option with Contract Administrator. Provide a separate insulated ground wire for each isolated ground circuit.

.4 Receptacles shall be of one manufacturer throughout project.

.5 Acceptable Manufacturers: Hubbell, Copper Wiring Devices, Bryant, Woodhead, Pass & Seymour. Catalogue No. 5252 for all manufacturers.

2.3 COVERPLATES

.1 Coverplates from one manufacturer throughout project.

.2 Stainless steel coverplates for wiring devices mounted in flush-mounted outlet boxes.

.3 Sheet steel utility box cover for wiring devices installed in surface mounted utility boxes.

.4 Cast gasketted coverplates for wiring devices mounted in surface mounted FS or FD-type conduit boxes.

.5 Weatherproof double lift spring-loaded cast aluminium coverplates, complete with gaskets for duplex receptacles as indicated.

.6 Weatherproof coverplates, complete with gaskets for single receptacles or switches as indicated.

.7 Confirm colour of Phenolic plates (if used), with Contract Administrator, Interior Designer of Contract Administrator.

Part 3 Execution

3.1 INSTALLATION – SWITCHES

.1 Install single throw switches with handle in “UP” position when switch closed.

.2 Install switches in gang-type outlet box when more than one switch is required in one location.

.3 Mount toggle switches at height specified in Section 26 00 10 or as indicated.

3.2 INSTALLATION – RECEPTACLES

.1 Install receptacles in gang-type outlet box when more than one receptacle is required in one location.

.2 Mount receptacles horizontally at height specified in Section 26 00 10, or as indicated.

.3 Install cord sets on ranges and dryers.

3.3 INSTALLATION – COVERPLATES

.1 Install suitable common coverplates where wiring devices are ganged.

.2 Do not use coverplates intended for flush outlet boxes on surface mounted boxes.

.3 Provide a coverplate on each outlet.

3.4 IDENTIFICATION

.1 Identify receptacles with size Ø nameplate indicating panel and circuit number. Nameplates to be pre-glued with peel-off paper backing.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 26 00 10 – Basic Electrical Materials and Methods

.2 Section 26 06 21 – Mechanical Equipment Connections

1.2 SUBMITTALS

.1 Submit product data in accordance with Section 26 00 10.

Part 2 Products

2.1 EQUIPMENT

.1 Fusible and non-fusible disconnect switches in EEMAC '1' enclosure for interior applications, and EEMAC '3' enclosure for exterior applications, unless otherwise indicated.

.2 Provision for padlocking in "ON-OFF" position.

.3 Mechanically interlocked door to prevent opening when handle in "ON" position.

.4 Fuses as required.

.5 Fuse holders in each switch suitable without adaptors, for type of fuse, as indicated.

.6 Quick-make, quick-break action.

.7 "ON-OFF" switch position indication on switch enclosure cover.

.8 Single-phase motor disconnect switches shall be one or two-pole toggle-type, 20 amp, 120/227V AC, brown handle with side and back wiring complete with pilot light.

.9 Three-phase motor disconnect switches for motors up to 5 HP at 208V or 10HP at 600V shall be 600V non-fusible safety switches, sized as required. Switch shall be non-teasing, quick-make, quick-break type with visible blades, line terminal shield and enclosure, as indicated, with cover interlock and lockable handle.

.10 Three-phase motor disconnect switches for motors above 5 HP at 208V or 10 HP at 600V shall be 600V non-fusible safety switches, sized as required. Switch shall be non-teasing, quick-make, quick-break type with visible blades, line terminal shield and enclosure, as indicated, with cover interlock and lockable handle.

2.2 EQUIPMENT IDENTIFICATION

.1 Indicate name of load controlled on Size 4 nameplate to Section 26 00 10.

2.3 MANUFACTURERS

.1 Acceptable manufacturers: Westinghouse, Federal Pioneer, Square D, Siemens.

Part 3 Execution

3.1 INSTALLATION

.1 Install motor disconnect switches where indicated.

.2 Install fused circuit disconnect switches where indicated or where required by the inspection authorities and/or for equipment supplied by other trades.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 26 00 10 – Basic Electrical Materials and Methods

1.2 SUBMITTALS

.1 Submit product data in accordance with Section 26 00 10.

.2 Include with requests for equal, time-current characteristic curves for breakers with ampacity of 800A and over, or with interrupting capacity of 25,000 symmetrical RMS and over at system voltage.

1.3 BREAKERS – GENERAL

.1 Bolt-on molded case circuit breaker, quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40°C (104°F) ambient.

.2 Common-trip breakers with single handle for multi-pole applications.

.3 Magnetic instantaneous trip elements in circuit breakers, to operate only when the value of current reaches setting. Trip settings on breakers with adjustable trips to range from 3-10 times current rating.

.4 Circuit breakers with interchangeable trips as indicated.

1.4 THERMAL MAGNETIC BREAKERS

.1 Molded case circuit breaker shall operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping under overload conditions and instantaneous magnetic tripping for short circuit protection.

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable manufacturers: Match existing.

Part 3 Execution

3.1 INSTALLATION

.1 Install circuit breakers as indicated.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 26 00 10 – Basic Electrical Materials & Methods

.2 Section 26 06 21 – Mechanical Equipment Connections

1.2 SUBMITTALS

.1 Submit shop drawings and product data in accordance with Section 26 00 10.

.2 Indicate:

.1 Mounting method and dimensions.

.2 Starter size and type.

.3 Layout of identified internal and front panel components.

.4 Enclosure types.

.5 Wiring diagram for each type of starter.

.6 Interconnection diagrams.

1.3 OPERATION AND MAINTENANCE DATA

.1 Provide data for incorporation into Maintenance Manual specified in Section 26 00 10.

.2 Include operation and maintenance data for each type and style of starter.

1.4 MAINTENANCE MATERIALS

.1 Provide maintenance materials in accordance with Section 26 00 10.

.1 4 contacts, stationary.

.2 4 contacts, movable.

.3 2 contacts, auxiliary.

.4 2 control transformers.

.5 2 operating coils.

.6 2 fuses.

.7 10 indicating lamps.

.8 OA kit.

Part 2 Products

2.1 MATERIALS

.1 Starters: to CSA C22.2 No. 14, EEMAC E14-1.

.1 Starters smaller than EEMAC “1” are not acceptable.

.2 EEMAC/NEMA rated type only – IEC type not allowed.

2.2 MANUAL MOTOR STARTERS

.1 Single-phase and three-phase manual motor starters of size, type, rating, and EEMAC “1” enclosure with components as follows:

.1 Switching mechanism, quick make and break.

.2 Overload heaters, manual reset, trip indicating handle.

.2 Accessories:

.1 Toggle switch.

.2 Indicating light.

.3 Locking tab to permit padlocking in "ON" or OFF" position.

.4 Flush-mounted type for public areas or as indicated.

2.3 FULL VOLTAGE MAGNETIC STARTERS

.1 Magnetic of size, type, rating and EEMAC "1" enclosure with components as follows:

.1 Contactor solenoid operated rapid-action type.

.2 Motor overload protective device in each phase, manually reset from outside enclosure.

.3 Power and control terminals.

.4 Wiring and schematic diagram inside starter enclosure in visible location.

.5 Identify each wire and terminal for external connections, within starter, with permanent number marking identical to diagram.

.6 Control transformer.

.2 Accessories:

.1 Pushbuttons and selector switches labelled as indicated.

.2 Two indicating lights:

.3 RED – "OFF" and GREEN – "ON

.4 Two N/O and two N/C spare auxiliary contacts, unless otherwise indicated.

.5 HOA selector switch.

2.4 CONTROL TRANSFORMER

.1 Single phase, dry type, control transformer with primary voltage, as indicated and 120V secondary, complete with secondary fuse, installed within starter enclosure.

.2 Size control transformer for control circuit load plus 20% spare capacity.

2.5 FINISHES

.1 Apply finishes to enclosure in accordance with Section 26 00 10.

2.6 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 00 10.

.2 Identify manual starters with Size 2 nameplates, indicating motor number, description and horsepower.

.3 Identify magnetic starters with Size 4 nameplates, indicating motor number, description, horsepower and voltage.

2.7 MANUFACTURERS

.1 Acceptable manufacturers are: Westinghouse Canada Inc., Square D Company Limited, Allen Bradley Canada Company, Siemens Canada Ltd., and Cutler Hammer Canada Limited.

Part 3 Execution

3.1 INSTALLATION

.1 Install starters, connect power and control as indicated.

.2 Install correct fuses and overload devices.

3.2 TESTS

.1 Perform tests in accordance with Section 26 00 10 and manufacturer's instructions.

.2 Operate switches and contactors to verify correct functioning.

.3 Perform starting and stopping sequences of motors and controls.

.4 Check that sequence controls, interlocking with other separate related starters, equipment, control devices, operate as indicated.

.5 Ensure that motor rotation corresponds with the direction required by the driven equipment.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1	Finishes	Division 9
.2	Basic Electrical Materials and Methods	Section 26 00 10
.3	Fastenings and Supports	Section 26 05 29
.4	Outlet Boxes	Section 26 05 35

1.2 SUBMITTALS

.1 Submit shop drawings and product data in accordance with Section 26 00 10.

.2 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified for approval by Contract Administrator.

.3 Submit list of replacement lamp data for each luminaire. Include lamp type, voltage, wattage, base type and order code. Include list in maintenance manual.

1.3 GUARANTEE

.1 Replace:

.1 Incandescent and tungsten halogen lamps burnt out within 3 months of takeover.

.2 Fluorescent and HID lamps burning out within 12 months of takeover.

.3 Ballasts that fail or exceed their labelled noise level rating within 12 months of takeover.

1.4 COORDINATION

.1 Coordinate luminaire locations with work of other trades.

.2 Coordinate luminaire types with ceiling finishes to ensure compatibility.

Part 2 Products

2.1 GENERAL

.1 Luminaires shall carry the CSA label.

.2 Provide supporting devices, plaster frames, junction boxes and outlet boxes where required.

.3 Provide lenses or diffusers of glass or acrylic material as indicated. Acrylic lenses used with fluorescent luminaires shall be a minimum of .125" (3 mm) thick.

.4 Include finishes to Section 26 00 10 and as indicated.

.5 Where soffits or ceilings have thermal insulation, provide fixtures which are CSA approved for such use.

.6 Conduct lamp burn in procedures as per manufacture recommendations.

.7 All 347 volt luminaires shall be complete with integral disconnect switch to meet CEC Part 1 Rule 30-308(4).

2.2 LAMPS

.1 Provide lamps as indicated.

.2 Incandescent lamps shall be extended service type rated 2500 hours, 130 volts, inside frosted, unless indicated otherwise.

.3 Fluorescent lamps shall be rapid start, 3050 lumens, rated 24,000 hours, and 3500°K lowest mercury content maximum of 1.7mg unless otherwise indicated.

.4 Fluorescent lamps shall be Phillips Alto Plus Series.

2.3 BALLASTS AND ACCESSORIES

.1 Provide ballasts and accessories as indicated.

.2 Provide ballasts with non-PCB type capacitors with pressure sensitive devices to prevent rupturing.

.3 Provide fluorescent ballasts of 120 and 347V design, automatic reset thermal protected, 90% power factor, group A noise rating. Ballasts shall be electronic.

.4 Ballasts used in exterior luminaires shall be rated at -20°C (-4°F) starting.

.5 Electronic fluorescent ballasts of 347V design shall be Magnetek rapid start and shall have integral disconnect switch.

.6 Ballasts shall be program start. HF except for occupancy sensor control which shall be rapid start.

2.4 LED LIGHTING

.1 All LED lighting shall have the following I.E.S. testing to be considered for installation.

.1 LM 80 08 Approved methods measuring lumen maintenance for SSL light sources.

.2 LM 79 08 Approved methods for electrical photo and metric measurements of solid state lighting products.

.2 All LED lamps and drivers shall have minimal hours of operation of 50,000 hours or equal to luminaires hours.

.3 Heat dissipation and maximum heat build up shall be submitted for review.

Part 3 Execution

3.1 INSTALLATION (LUMINAIRES)

.1 Install luminaires at locations indicated, complete with all wiring, connections, fittings, hangers, aligners, box covers and accessories, as required.

.2 Install luminaires and lens materials in architectural details, as indicated.

.3 Install luminaires parallel with building lines. Wall-mounted luminaires shall be installed plumb.

.4 Review all ceiling type, construction details and mounting arrangements before placing luminaire orders and ensure that all mounting assemblies, frames, rings and similar features are included for and match the required installation.

.5 All luminaires and assemblies shall be properly secured and supported. Support luminaires independent of the ceiling construction, complete with all fasteners, framing and hangers, as may be required. Do not secure luminaires to mechanical ductwork or other vibration producing apparatus, unless specifically detailed on the drawings.

.6 Where a luminaire is suspended from the ceiling using a self-aligning box cover, an additional ground wire from the outlet box to the luminaire shall be provided.

.7 Coordinate the installation of luminaires with the work of other trades, ensuring that the necessary depths and mounting spaces are provided. Luminaires which cannot be installed due to a conflict with structural members, pipes or ductwork shall be relocated to a more suitable location, as directed by the Contract Administrator.

.8 Install post top, landscape and roadway luminaires plumb.

3.2 WIRING

.1 Connect luminaires to lighting circuits as indicated.

3.3 LAMPS

.1 Adjust lamp position in adjustable lamp holder-type luminaires to produce the proper beam distribution for the specified lamp.

3.4 TESTS

.1 Perform tests in accordance with Section 26 00 10.

.2 Check luminaires and replace defective lamps, ballasts, lenses and accessories.

3.5 CLEANING

.1 Prior to take-over of the project, clean the lenses and reflectors of all luminaires with a damp cloth to remove dust, smudges and fingerprints.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 26 00 10 – Basic Electrical Materials and Methods

.2 Section 26 05 34 – Conduit

.3 Section 26 05 19 – Wire and Cable

.4 Section 26 05 35 – Outlet Boxes and Fittings

1.2 SUBMITTALS

.1 Submit shop drawings in accordance with Section 26 00 10.

.2 Data shall indicate system components, mounting method, source of power and special attachments.

1.3 OPERATION AND MAINTENANCE DATA

.1 Provide data for incorporation into Maintenance Manual specified in Section 26 00 10.

.2 Operation and Maintenance Manual shall include:

.1 Operation and maintenance instruction s for complete battery system to permit effective operation and maintenance.

.2 Technical data – illustrated parts lists with parts catalogue numbers.

.3 Copy of approved shop drawings.

1.4 MAINTENANCE MANUALS

.1 Provide maintenance manuals in accordance with Section 26 00 10.

.2 Include:

.1 Five spare lamps for remote heads.

1.5 WARRANTY

.1 Provide a written guarantee. Stating that the battery for emergency lighting is guaranteed against defects in material and workmanship for a period of ten years, with a no-charge replacement during the first five years and a pro-rat charge on the second five years from the date of the Final Acceptance from the City of Winnipeg.

1.6 SYSTEM DESCRIPTION

.1 Supply voltage: 120 AC

.2 Output voltage: 24 DC

.3 Battery: long life sealed lead, maintenance-free.

.4 Charger: solid state, multi-rate, voltage/current regulated, inverse temperature compensated, short circuit protected, modular constructed.

.5 Solid state transfer.

.6 Low voltage disconnect: solid state, modular, operates at 80% battery output voltage.

.7 Signal lights: solid state, life expectancy 100,000 h minimum, for “AC Power ON” and “High Charge”.

.8 Lamp heads: integral on unit and remote as indicated. Adjustable mounting, swivel type, complete with tungsten-halogen lamp.

.9 Cabinet: suitable for shelf mounting to wall and complete with knockouts for conduit.

.10 Auxiliary equipment:

- .1 test switch
- .2 battery disconnect device
- .3 AC input and DC output terminal blocks inside cabinet
- .4 shelf
- .5 cord and plug connection for AC
- .6 RFI suppressors

Part 2 Products

2.1 REMOTE HEADS

.1 Lamp heads: 360° horizontal and 180° vertical adjustment.

.2 Lamps: 20W, MR16, 100-hour.

.3 Enclosure: square, surface mounted, frosted vandal-resistant, Lexan cube diffuser, single or double units as indicated.

.4 Enclosure: square, surface mounted, clear polycarbonate cover, single or double units as indicated, in crawlspace only.

.5 Lumens shall meet min;10 Lux average and not less than 1 Lux as per NBC 3.2.7.3.

Part 3 Execution

3.1 INSTALLATION

.1 Install unit equipment for emergency lighting in accordance with latest CSA document.

.2 Install conduit and wiring as indicated.

.3 Install unit equipment and remote mounted fixtures as indicated.

.4 Cut and re-cap cord to remove surplus.

.5 Direct heads as indicated.

.6 Mount double remote heads on outlet box such that the two heads will be horizontal with the building lines.

.7 Wire and connect in the exit lights, so equipped, to the battery system as indicated.

.8 Charge the batteries and test the system for proper operation (minimum of 35 minutes discharge time).

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFICATIONS

.1 Section 26 00 10 – Basic Electrical Material and Methods

.2 Section 26 05 29 – Fastenings and Supports

.3 Section 26 05 35 – Outlet Boxes and Fittings.

1.2 SYSTEM DESCRIPTION

.1 Exit lighting shall identify exits and means of egress.

Part 2 Products

2.1 EXIT LIGHTS

.1 To match existing.

.2 Emergency: connection for 12V DC emergency power.

.3 Mounting: suitable for recessed, wall, end-to-wall, or ceiling mounting, as indicated.

.4 Faceplates: single or double face, as indicated.

.5 Arrows: directions as indicated.

Part 3 Execution

3.1 INSTALLATION

.1 Install exit lights as indicated, in accordance with NBC-1995, NRCAN C860.

.2 Connect exit lights to exit light circuits as indicated.

.3 Connect emergency connection to emergency circuits as indicated.

.4 Ensure that exit light circuit breaker is locked in on position.

.5 Wiring for exit light circuits shall be installed in a separate conduit system.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 26 00 10 – Basic Electrical Materials and Methods

.2 Section 26 05 34 – Conduit

.3 Section 26 05 35 – Outlet Boxes and Fittings

1.2 SYSTEM DESCRIPTION

.1 Complete empty telephone raceway system consists of outlet boxes, coverplates, cable troughs, pullboxes, sleeves, fish wires, plywood backboards, and grounding conductors.

1.3 COORDINATION WITH UTILITY

.1 Coordinate complete installation with telephone utility and elevator supplier.

Part 2 Products

2.1 MATERIAL

.1 Conduits: EMT, as per Section 26 05 34 – Conduit.

.2 Outlet boxes and fittings: to Section 26 05 35 – Outlet Boxes and Fittings.

.3 Pull cord: polypropylene type.

2.2 TELEPHONE OUTLETS – GENERAL

.1 Flush wall mounted telephone outlet to consist of a 2-gang backbox with a single gang extension ring and coverplate with a plug-in telephone jack. Provide a ¾" (19 mm) conduit from each outlet stubbed into the ceiling space.

Part 3 Execution

3.1 INSTALLATION

.1 Install empty raceway system, fish wires, terminal cabinets, outlet boxes, floor boxes, pullboxes, coverplates, conduit, sleeves and caps, and miscellaneous material to constitute a complete system.

.2 Conduit bends to be 10 times the interior diameter of conduit.

.3 Ground raceways in accordance with the requirements of the telephone utility.

.4 Install pullboxes such that no conduit run is longer than 50' (15 m) or contains more than two 90° bends along its length. Conduit fittings are not acceptable as pullboxes.

.5 Conform to all requirements of the telephone utility for the installation of the raceway system.

.6 Install pull cord in all conduits.

.7 Install a conduit clip support system for telephone cables as shown on drawing. Refer to detail sheets and plans for location and method of installation.

.8 Identify raceway system components as per Section 26 00 10.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 26 00 10 – Basic Electrical Materials and Methods

.2 Section 26 05 19 – Wire and Cable

.3 Section 26 05 34 – Conduit

.4 Section 26 05 35 – Outlet Boxes and Fittings

1.2 REFERENCE STANDARDS

.1 Manitoba Building Code.

.2 ULC S524: Installation Standards.

.3 ULC S525: Audible Signal Devices.

.4 ULC S527: Control Panel.

.5 ULC S528: Manual Pullstations.

.6 ULC S533: Door Closers.

.7 ULC S530: Thermal Detectors.

.8 ULC S529: Smoke Detectors.

1.3 SUBMITTALS

.1 Submit shop drawings in accordance with Section 26 00 10.

.2 Include:

- .1 Layout of equipment.
- .2 Zoning.
- .3 Complete wiring diagram, including:
  - .1 Connection to devices.
  - .2 Connection to sprinkler system.
  - .3 Schematics of modules.

.3 Submit the following manuals:

- .1 Equipment Information Manual.
- .2 Operations Manual.
- .3 Maintenance Manual.
- .4 Each manual shall describe in a clear, concise manner the operational characteristics of all system components.

1.4 OPERATION AND MAINTENANCE DATA

.1 Provide data for incorporation into Maintenance Manual specified in Section 26 00 10.

.2 Operation and Maintenance Manual to include:

- .1 Operation and maintenance instructions for complete fire alarm system to permit effective operation and maintenance.

.2 Technical data- illustrated parts lists with parts catalogue numbers.

.3 Copy of approved shop drawings.

1.5 MAINTENANCE MATERIALS

.1 Provide maintenance materials in accordance with Section 26 00 10.

.2 Include:

.1 Ten spare plastic break rods for manual pullstations.

.2 Ten spare lamps for main control panel.

1.6 MAINTENANCE

.1 Provide one year's free maintenance with two inspections by manufacturer during the first year of service. Submit Inspection Report to City of Winnipeg and Contract Administrator.

1.7 SERVICE

.1 The supplier of the system must employ factory-trained technicians and maintain a service organization within driving distance of the jobsite.

1.8 WARRANTY

.1 The system shall carry a one year warranty from date of acceptance by City of Winnipeg.

1.9 ON-SITE INSTRUCTION

.1 The fire alarm system supplier shall provide on-site instruction to familiarize personnel with operational techniques and procedures for the system.

.2 The Contractor and the fire alarm supplier shall co-ordinate and run two 2-hour on-site instructions within two weeks of Substantial Completion once the new system is accepted.

1.10 SYSTEM DESCRIPTION

.1 The Electrical Subcontractor shall supply and install complete and operational new fire alarm system as herein specified and as shown on the drawings.

.2 The new fire alarm system shall be non-coded, zone annunciated, general evacuation-type, electrically supervised and fully approved by the Underwriters' Laboratories of Canada Inc., and the Provincial Fire Marshall.

1.11 SYSTEM OPERATION

.1 The actuation of any manual station, heat detector, or smoke detector shall cause all fire alarm signal devices in the building to sound a continuous vibrating general alarm. The fire alarm signal shall sound for a minimum of one minute before they can be manually silenced by operating the bell silence switch on the main fire alarm panel or remote annunciator. If a second comes in on another zone, the bells shall resound to indicate another alarm.

.2 An alarm shall cause the following functions to be activated automatically:

.1 Cause the auxiliary function relays to operate (fan shutdown, etc.).

.2 Cause all door hold open devices to release.

.3 Cause an alarm to be transmitted to the Fire Department via an independent central station via NFPA71 approved 2 or more independent dedicated unlisted telephone lines and dialer to fire station or 911. Failure of any telephone line shall annunciate a trouble signal.

.3 During an alarm the zone lamp correlated with the zone (building area) on which the alarm occurred shall illuminate. The zone alarm lamp shall not go out until the manual station or device that activated the alarm is reset. Each zone on the main control panel shall have a separate zone trouble lamp, as well as its alarm lamp.

.4 Every air moving system required to have duct detection (as shown on the drawings) shall shut down on a signal from its associated duct smoke detector or any general fire alarm condition. Provide all necessary changes and connections to motor starters for a complete operating system.

.5 Every moving system, except for the following, shall shut down on any alarm:

.1 Washroom exhaust fans serving one room only.

.2 Fans used for smoke extraction or pressurization or otherwise by the life safety system.

Provide all necessary relays and wiring for this control.

.6 Air moving system shut downs indicated in .5 and .6 shall be 'hard wired' from dry contact on the fire alarm system to a separate relay interrupting the start and run functions of the motor starter or interrupting the motor power supply for the duration of the fire alarm. Programmed or 'soft' shut downs through EMCS control or building management systems are not acceptable.

Part 2 Products

2.1 CONTROL PANEL

.1 The main control panel shall be of code gauge steel, standard finish with a hinged locked door and mounted where shown. It shall be complete with all necessary circuit modules, circuit over-current protection devices, etc., in order to provide an approved functional system. Protection against shorts and grounds shall be provided by automatic shelf restoring circuitry, fuses or breakers. The control panel shall operate on 24V DC. Each control panel shall contain the following features:

.1 Detection zones complete with L.E.D. supervised alarm indicators (red) and L.E.D. supervised trouble indicators (yellow). Number of zones to be as per the Fire Alarm Zone Schedule.

.2 Supervisory zones complete with L.E.D. indicators. Number of zones to be as per the Supervisory Zone Schedule.

.3 4 audible signal circuits, each complete with L.E.D. trouble indicator to indicate open or shorted lines.

.4 Subsequent alarm features.

.5 Remote station connection with alarm and trouble contacts, complete with disconnect switch indicator.

.6 System power lamp.

.7 System alarm lamp.

.8 System trouble lamp complete with audible signal and silence switch.

.9 Reset/lamp test switch.

.10 Alarm silence switch complete with indicator.

.11 8 sets of NO/NC auxiliary contacts.

.12 Internally mounted standby batteries complete with charger.

.13 Battery meter module complete with voltmeter and ammeter.

.14 Low battery indicator.

.15 120V AC fuse block for control power to magnetic door holders.

.16 Latching supervisory zones to monitor tamper valves.

.2 Power supply from commercial power 120V, 60Hz AC with rectifier to supply 24V DC to operate all alarm and signal circuits.

.3 Standby batteries sized to provide supervisory and trouble signal current for 24 hours, plus general alarm load for minimum of 30 minutes.

2.2 ANCILLARY DEVICES

.1 Manual fire alarm station shall be cast aluminum with red enamel finish; pull-lever, break-glass, open circuit type. Stations with plastic casings are not acceptable.

.2 Automatic thermal (heat) detectors shall be brushed aluminum finish; 57ºC (135ºF) fixed temperature element with an 8ºC (46.4ºF) per minute rate-of -rise element. Fixed temperature type heat detectors to operate at a temperature of 93ºC (199.4ºF).

.3 Smoke detectors shall be dual-chamber, ionization, 2-wire type with white finish and twist-lock mounting base; adjustable sensitivity, built-in L.E.D. alarm indicating light.

.4 Remote alarm indicating lights (for smoke detectors) shall be L.E.D. type, mounted on a stainless steel faceplate. Provide lamacoid nameplate.

.5 Duct-mounted smoke detectors shall be dual chamber ionization type with sampling tubes and surface mounting housing and cover; adjustable sensitivity, built-in L.E.D. alarm indicating light ; complete with 2-sets of Style 'C' auxiliary contacts.

.6 End-of-line resistors shall be mounted in a separate single gang recessed box at locations shown on the drawings, or adjacent to last device on zone, complete with red steel coverplate. Coverplate shall be complete with red lamacoid, size Ø, indicating specific zone, as per examples below:

FFT4	-	Firefighters' telephone	(Zone 4)
ALR10	-	Alarm zone	(Zone 10)
SPK7	-	Speaker zone	(Zone 7)
SPR2	-	Sprinkler zone	(Zone 2)
SUP9	-	Supervisory zone	(Zone 9)
SH1	-	Stair hall zone	(Zone 1)
DD5	-	Duct detector	(Zone 5)
ES3	-	Elevator shaft	(Zone 3)
BLZ1	-	Bell zone	(Zone 1)

.7 Magnetic door holders (120V AC) to be supplied and installed by Division 8. Door holders to be wired and connected by Division 28, as shown on the drawings.

.8 Fire alarm bells shall be vibrating-type, 24V DC., surface mounted, 10" (250 mm) or 6" (150 mm) as noted. Mount bells 88" (2.2 m) above floor.

.9 Where a fire alarm device is recessed in a fire rated wall, the fire rating of that wall shall be maintained.

.10 Where surface mounted conduit or wiremold is specified, the fire alarm supplier shall provide appropriate surface mounting boxes, including, but not limited to, manual pull-stations and magnetic door holders.

2.3 WIRING

.1 The fire alarm system wiring shall be installed in a separate and independent conduit system. All equipment wiring shall be in accordance with the manufacturer's specifications and connections shall be strictly as shown in the manufacturer's installation instructions.

.2 Manual stations, automatic detectors, bells, sprinkler flow switches, etc., shall be wired and connected to their respective zone monitor point terminals in the main control panel with #14 AWG conductors (R90) or multi-conductor #18 power limited fire protective 105ºC (221ºF) cable.

Each zone shall end with an E.O.L resistor. The zoning and circuiting of the devices shall be as shown on the drawings. Provide connection to all flow and tamper switches as shown on mechanical and electrical drawings.

.3 Magnetic door hold open devices (120V AC) supplied and installed by Division 8, shall be wired and connected by Division 28, to their respective control relay with #14 AWG (R90) conductors.

.4 Smoke detectors shall be mounted within 1.5 m of doors being controlled by magnetic hold-open devices/sentronic door closers.

.5 All control wiring for fan shutdowns, damper controls, etc., shall be wired with #14 AWG (R90) conductors.

.6 Remote alarm indicating lights (RAIL's) for smoke detectors shall be wired and connected with 2-c #18 power limited fire protective 105ºC (221ºF) cable installed in conduit, or with 2/c #14AWG AC-90 cable.

.7 Fire detectors shall be mounted a minimum of 900 mm from an air supply outlet or 600 mm from an air exhaust outlet.

2.4 MANUFACTURERS

.1 Approved as equal are the following manufacturers, provided that all the requirements of this specification are met:

.1 Simplex.

.2 Mirtone.

.3 Edwards.

.4 Pyrotronics.

.5 Notifier by Vipond.

Part 3 Execution

3.1 GENERAL

.1 Locate, install, wire and connect all components and devices in accordance with the requirements of the manufacturer and ULC S524.

3.2 MOUNTING OF EQUIPMENT

.1 Mount equipment at heights as described in Section 26 00 10.

.2 Mount equipment square and plumb with building lines. Install devices flush and square with finished surfaces.

3.3 TERMINATION OF CONDUCTORS

.1 Terminate conductors directly to the terminals of each device. Splices at pigtail-types of connections are not permitted.

3.4 IDENTIFICATION

.1 Identify equipment as per Section 26 00 10.

.2 Clearly identify zones on control panels, devices, etc.

.3 Identify wires and cables with wire markers to indicate box circuit numbers and terminals, signal circuit numbers and terminals, annunciator wiring. Identify wiring in each box, panel, cabinet, etc. Coding of identification to meet the approval of the Contract Administrator.

3.5 MISCELLANOUS DEVICES

.1 Wire and connect combination door closer and holder devices.

.2 Wire and connect to Fire Department interface in telephone room.

.3 Wire and connect fan shutdown interlocks as indicated.

3.6 TESTING

.1 Conduct tests as per Section 26 00 10.

.2 The complete system shall be tested and verified in accordance with CAN/ULC-S537-M86, "Standard for the Verification of Fire Alarm System Installation". The manufacturer shall conduct all testing and provide necessary technical personnel. The Electrical Subcontractor to provide necessary manpower to facilitate testing.

.3 The manufacturer shall conduct an overall examination of the system installation for the following:

.1 The type of equipment installed is that designated by the Contract Administrator's specifications.

.2 The wiring connections to all equipment components show that the installer undertook to have observed ULC and CSA requirements.

.3 Equipment has been installed in accordance with the manufacturer's recommendations and that all signalling devices are operable.

.4 The supervisory components are operating and that regulations governing such supervisory wiring have been met to the satisfaction of inspecting authorities.

.4 The complete system shall be tested in the presence of the Contract Administrator, City of Winnipeg's representative, and City of Winnipeg Electrical Inspector, on completion of the verification. Tests shall demonstrate that the fire alarm system will function in an acceptable manner. The Electrical Inspector shall be the final authority in determining the acceptable manner of operation.

.5 Include all costs for setting up and testing the fire alarm system, as directed by the Contract Administrator.

3.7 VERIFICATION CERTIFICATE

.1 On completion of the testing, submit to the Contract Administrator, a test report certified by both the manufacturer and Electrical Subcontractor including:

.1 A copy of the inspecting technician's report showing location of each device and certifying the test results of each device.

.2 A Certificate of Verification confirming that the inspection has been completed and showing the conditions upon which such inspection and certification have been rendered.

.3 Proof of Liability Insurance for the inspection.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C127-04, Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.

.2 ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.3 ASTM D1557-02e1, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3)).

.4 ASTM D4253-00, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

1.2 DEFINITIONS

.1 Corrected maximum dry density is defined as:

.1 D =D1xD2/(F1 x D2) + (F2 x D1)

.2 D = (F1 x D1) + (0.9 x D2 x F2)

.3 Where: D = corrected maximum dry density kg/m^3.

.1 F1 = fraction (decimal) of total field sample passing 19 / 4.75 mm sieve

.2 F2 = fraction (decimal) of total field sample retained on 19 / 4.75 mm sieve (equal to 1.00 - F1)

.3 D1 = maximum dry density, kg/m^{3}of material passing 19 / 4.75 mm sieve determined in accordance with Method A C of ASTM D698 ASTM D1557.

.4 D2 = bulk density, kg/m^3, of material retained on 19 / 4.75 mm sieve, equal to 1000G where G is bulk specific gravity (dry basis) of material when tested to ASTM C127.

.4 For free draining aggregates, determine D1 (maximum dry density) to ASTM D4253 dry method wet method when directed by Contract Administrator.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM D4791-99, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.2 SAMPLES

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

.2 Allow continual sampling by Contract Administrator during production.

.3 Provide Contract Administrator with access to source and processed material for sampling.

.4 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

Part 2 Products

2.1 MATERIALS

.1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.

.2 Flat and elongated particles of coarse aggregate: to ASTM D4791.

.1 Greatest dimension to exceed five times least dimension.

.3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:

.1 Natural sand.

.2 Manufactured sand.

.3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.

.4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:

.1 Crushed rock.

.2 Gravel and crushed gravel composed of naturally formed particles of stone.

.3 Light weight aggregate, including slag and expanded shale.

2.2 SOURCE QUALITY CONTROL

.1 Inform Contract Administrator of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production.

.2 If, in opinion of Contract Administrator, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.

.3 Advise Contract Administrator 4 weeks in advance of proposed change of material source.

.4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

Part 3 Execution

3.1 PREPARATION

.1 Topsoil stripping

.1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.

.2 Begin topsoil stripping of areas after area has been cleared of brush weeds and grasses and removed from site.

.3 Strip topsoil to depths required. Avoid mixing topsoil with subsoil.

.4 Stockpile height not to exceed 2 m.

.2 Aggregate source preparation

.1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by Contract Administrator .

.2 Where clearing is required, leave screen of trees between cleared area and roadways as directed.

.3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.

.4 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.

.5 Trim off and dress slopes of waste material piles and leave site in neat condition.

.3 Processing

.1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.

.2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Contract Administrator.

.3 Wash aggregates, if required to meet specifications. Use only equipment approved by Contract Administrator.

.4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.

.4 Handling and Transport:

.1 To avoid segregation, contamination and degradation.

.5 Stockpiling

.1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Contract Administrator. Do not stockpile on completed pavement surfaces.

.2 Stockpile aggregates in sufficient quantities to meet Project schedules.

.3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

.4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.

.5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.

.6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Contract Administrator within 48 h of rejection.

.7 Stockpile materials in uniform layers of thickness as follows:

.1 Max 1.5 m for coarse aggregate and base course materials.

.2 Max 1.5 m for fine aggregate and sub-base materials.

.3 Max 1.5 m for other materials.

.8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.

.9 Do not cone piles or spill material over edges of piles.

.10 Do not use conveying stackers.

.11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.2 CLEANING

.1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.

.2 Leave any unused aggregates in neat compact stockpiles as directed by Contract Administrator.

.3 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 STRIPPING OF TOPSOIL

.1 Ensure that procedures are conducted in accordance with applicable Provincial and Municipal requirements.

.2 Roto till existing sod into area to be stripped.

.3 Remove topsoil before construction procedures commence to avoid compaction of topsoil.

.4 Handle topsoil only when it is dry and warm.

.5 Remove brush from targeted area by non-chemical means and dispose of through mulching.

.6 Strip topsoil to depths required.

.1 Avoid mixing topsoil with subsoil.

.7 Pile topsoil in berms not to exceed 2 m.

.8 Protect stockpiles from contamination and compaction.

.9 Cover topsoil that has been piled for long term storage, with trefoil or grass to maintain agricultural potential of soil.

3.2 PREPARATION OF GRADE

.1 Verify that grades are correct and notify Contract Administrator if discrepancies occur.

.1 Grade area only when soil is dry to lessen soil compaction.

.2 Grade soil establishing natural contours and eliminating uneven areas and low spots, ensuring positive drainage.

3.3 PLACING OF TOPSOIL

.1 Place topsoil only after Contract Administrator has accepted subgrade.

.2 Spread topsoil during dry conditions in uniform layers not exceeding 200 mm, over unfrozen subgrade free of standing water.

.3 Establish traffic patterns for equipment to prevent driving on topsoil after it has been spread to avoid compaction.

.4 Cultivate soil following spreading procedures.

3.4 SUB-SOILING

.1 Apply sub-soil, following spreading and cultivating procedures to designated areas to improve drainage and agricultural potential of soil.

.2 Work sub-soil area following natural grade contour lines, with vibrating sub-soiler to depth of 40 cm.

.3 Cross sub-soil the area following the first pass.

.4 Cultivate the soil with a chain harrow to de-clod the soil.

3.5 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM D698-91(1998), Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m ;).

1.2 EXISTING CONDITIONS

.1 Examine subsurface investigation report which is bound into specification.

.2 Known underground and surface utility lines and buried objects are as indicated on site plan.

.3 Refer to dewatering in Section 31 23 33.01 - Excavating Trenching and Backfilling.

1.3 PROTECTION

.1 Protect and/or transplant existing fencing, trees, landscaping, natural features, buildings, pavement, surface or underground utility lines which are to remain as directed by Contract Administrator. If damaged, restore to original or better condition unless directed otherwise.

.2 Maintain access roads to prevent accumulation of construction related debris on roads.

Part 2 Products

2.1 MATERIALS

.1 Fill material: Type in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Excavated or graded material existing on site may be suitable to use as fill for grading work if approved by Contract Administrator.

Part 3 Execution

3.1 STRIPPING OF TOPSOIL

.1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected as determined by Contract Administrator.

.2 Commence topsoil stripping of areas as indicated after area has been cleared of brush, weeds, and grasses and removed from site.

.3 Strip topsoil to depths as indicated. Rototill weeds and grasses and retain as topsoil on site. Avoid mixing topsoil with subsoil.

.4 Stockpile in locations as directed by Contract Administrator. Stockpile height not to exceed 2 m.

.5 Dispose of unused topsoil as directed by Contract Administrator.

3.2 GRADING

.1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.

.2 Slope rough grade away from building as indicated.

.3 Grade ditches to depth as indicated.

.4 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

.5 Compact filled and disturbed areas to corrected maximum dry density maximum dry density to ASTM D698, as follows:

.1 85% under landscaped areas.

.2 95 % under paved and walk areas.

.6 Do not disturb soil within branch spread of trees or shrubs to remain.

3.3 SURPLUS MATERIAL

.1 Remove surplus material and material unsuitable for fill, grading or landscaping as directed by Contract Administrator.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D422-632002, Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ;) (600 kN-m/m ;).

.5 ASTM D1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ;) (2,700 kN-m/m ;).

.6 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.3 Canadian Green Building Council (CaGBC)

.1 LEED Canada-NC Version 1.0-December 2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System For New Construction and Major Renovations.

.4 Canadian Standards Association (CSA International)

.1 CAN/CSA-A3000-03, Cementitious Materials Compendium.

.1 CSA-A3001-03, Cementitious Materials for Use in Concrete.

.2 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.5 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 DEFINITIONS

.1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.

.1 Rock : solid material in excess of 0.25 m^3 ; and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m^3 bucket. Frozen material not classified as rock.

.2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

.2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.

.3 Topsoil:

.1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.

.4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.6 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

.7 Unsuitable materials:

.1 Weak, chemically unstable, and compressible materials.

.2 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136 : Sieve sizes to CAN/CGSB-8.2.

.2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45

.3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

.8 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.3 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Divert excess aggregate materials from landfill to local recycling facility for reuse.

1.5 EXISTING CONDITIONS

.1 Examine soil report attached to the Specifications.

.2 Buried services:

.1 Before commencing work verify location of buried services on and adjacent to site.

.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

.3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.

.4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.5 Prior to beginning excavation Work, notify applicable authorities having jurisdiction establish location and state of use of buried utilities and structures. And to clearly mark such locations to prevent disturbance during Work.

.6 Confirm locations of buried utilities by careful test excavations.

.7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.

.8 Where utility lines or structures exist in area of excavation, obtain direction of Contract Administrator before removing or re-routing.

.9 Record location of maintained, re-routed and abandoned underground lines.

.10 Confirm locations of recent excavations adjacent to area of excavation.

.3 Existing buildings and surface features:

.1 Conduct, with Contract Administrator, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Contract Administrator

1.6 STRUCTURAL DRAWINGS

.1 See the Structural Drawings for further information.

.2 In any situation where the specifications do not agree with the Structural Drawings:

.1 The more stringent requirements shall govern.

.2 Confirm the requirements with the Contract Administrator prior to proceeding.

Part 2 Products

2.1 MATERIALS

.1 Type 1 and Type 2 fill: properties to Section 31 05 16 - Aggregate Materials and the following requirements:

.1 Crushed, pit run or screened stone, gravel or sand.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.

.3 Table:

Sieve Designation	% Passing	
	Type 1	Type 2
75 mm	-	100
50 mm	-	-
37.5 mm	-	-
25 mm	100	-
19 mm	75-100	-
12.5 mm	-	-
9.5 mm	50-100	-
4.75 mm	30-70	22-85
2.00 mm	20-45	-
0.425 mm	10-25	5-30
0.180 mm	-	-
0.075 mm	3-8	0-10

.2 Type 3 fill: selected material from excavation or other sources, approved by Contract Administrator for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.

.3 Unshrinkable fill: proportioned and mixed to provide:

.1 Maximum compressive strength of 0.4 MPa at 28 days.

.2 Maximum cement content of 25 kg/m; with 40 % by volume fly ash replacement to CSA-A3001, Type GU.

.3 Minimum strength of 0.07 MPa at 24 h.

.4 Concrete aggregates: to CSA-A23.1/A23.2.

.5 Cement: Type GU.

.6 Slump: 160 to 200 mm.

.4 Shearmat: honeycomb type bio-degradable cardboard 200 mm thick, treated to provide sufficient structural support for poured concrete until concrete cured.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction sediment and erosion control drawings sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly in accordance with Section 02 41 13 - Selective Site Demolition.

3.3 PREPARATION/PROTECTION

.1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Contract Administrator approval.

.4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.5 Protect buried services that are required to remain undisturbed.

3.4 STRIPPING OF TOPSOIL

.1 See Section 31 14 13 – Soil Stripping and Stockpiling

3.5 STOCKPILING

.1 Stockpile fill materials in areas designated by Contract Administrator.

.1 Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

.3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.6 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

.1 Maintain sides and slopes of excavations in safe condition by appropriate methods.

.2 During backfill operation:

.1 Unless otherwise indicated or directed by Contract Administrator, remove sheeting and shoring from excavations.

.2 Do not remove bracing until backfilling has reached respective levels of such bracing.

3.7 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Avoid excavation below groundwater table if quick condition or heave is likely to occur.

.1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.3 Protect open excavations against flooding and damage due to surface run-off.

.4 Dispose of water in approved areas and in manner not detrimental to public and private property, or portion of Work completed or under construction.

.1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

3.8 EXCAVATION

.1 Excavate to lines, grades, elevations and dimensions as indicated.

.2 Remove concrete, paving, walks, demolished foundations and rubble and other obstructions encountered during excavation in accordance with Section 02 41 13 - Selective Site Demolition.

.3 Excavation must not interfere with bearing capacity of adjacent foundations.

.4 Do not disturb soil within branch spread of trees or shrubs that are to remain.

.1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

.5 For trench excavation, unless otherwise authorized by Contract Administrator in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15m at end of day's operation.

.6 Keep excavated and stockpiled materials safe distance away from edge of trench.

.7 Restrict vehicle operations directly adjacent to open trenches.

.8 Dispose of surplus and unsuitable excavated material in accordance with Waste Management Plan.

.9 Do not obstruct flow of surface drainage or natural watercourses.

.10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.11 Hand trim, make firm and remove loose material and debris from excavations.

.1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

3.9 FILL TYPES AND COMPACTION

.1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698 in accordance with Section 31 05 10 - Corrected Maximum Dry Density for Fill.

.1 New basement / foundation walls: See Structural Drawings for fill requirements.

3.10 BEDDING AND SURROUND OF UNDERGROUND SERVICES

.1 Place and compact granular material for bedding and surround of underground services as indicated and as specified.

.2 Place bedding and surround material in unfrozen condition.

3.11 BACKFILLING

.1 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.2 Do not use backfill material which is frozen or contains ice, snow or debris.

.3 Place backfill material in uniform layers not exceeding 150mm compacted thickness. Compact each layer before placing succeeding layer.

.4 Backfilling around installations:

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

.3 Place layers simultaneously on both sides of installed Work to equalize loading.

.4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:

.1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure.

.2 If approved by Contract Administrator, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Contract Administrator.

.5 Place unshrinkable fill in areas as indicated.

.6 Consolidate and level unshrinkable fill with internal vibrators.

.7 Install drainage system in backfill as indicated.

3.12 RESTORATION

.1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 21 - Construction/Demolition Waste Management and Disposal, trim slopes, and correct defects as directed by Contract Administrator.

.2 Replace topsoil as indicated.

.3 Reinstate lawns to elevation which existed before excavation.

.4 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.

.5 Clean and reinstate areas affected by Work as directed by Contract Administrator.

.6 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.

.7 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Agriculture and Agri-Food Canada

.1 The Canadian System of Soil Classification, Third Edition, 1998.

.2 Canadian Council of Ministers of the Environment

.1 PN1340-2005, Guidelines for Compost Quality.

.3 Canadian Green Building Council (CaGBC)

.1 LEED Canada-NC Version 1.0-December 2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System For New Construction and Major Renovations.

.4 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 DEFINITIONS

.1 Compost:

.1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.

.2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.

.3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below (25) (50)), and contain no toxic or growth inhibiting contaminates.

.4 Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A) (B).

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Quality control submittals :

.1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.

.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 TOPSOIL

.1 Topsoil for seeded areas planting beds : mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.

.1 All topsoil soil required shall consist of a screened clay-textured or loam-textured dark topsoil, a fertile, friable material neither of heavy clay nor of very light sandy nature containing by volume, a minimum of four (4%) percent for clay loams and two (2%) percent for sandy loams to a maximum twenty-five (25%) percent organic matter (peat, rotted manure or composted material) and capable of sustaining vigorous plant growth. Topsoil shall be free of subsoil contamination, roots, stones over 25 mm in diameter, bailer twine or subsoil clay lumps over 25 mm in diameter and other extraneous matter. Topsoil shall not contain quackgrass rhizomes, Canada thistle roots or other noxious weeds. Upon delivery or thirty (30) days following delivery, salinity rating shall be less than 4.0mm hos/cm on a saturated paste basis. The pH range shall be between 6.0 - 8.0.Contain no toxic elements or growth inhibiting materials.

.2 Topsoil may be either on-site topsoil or imported topsoil.

.3 On-site topsoil which has been stockpiled, can be reused providing that it is shredded or screened prior to being re-spread and that it meets the requirements specified above for topsoil.

.4 Topsoil shall not be blow-in dirt taken from wind erosion sites and topsoil shall not be taken from fields abandoned to corn production where such soil may contain soil incorporated herbicides, such as eradicane and atrazine with lasting residual effects.

.5 The Contractor shall inform the Contact Administrator of proposed source of topsoil to be supplied. The Contact Administrator reserves the right to reject topsoil not conforming to the requirements of this Specification.

2.2 SOIL AMENDMENTS

.1 Fertilizer:

.1 Chemical fertilizer with an N-P-K analysis of 1-2-1 ratio at a rate to provide 48 kg actual Nitrogen, 96 kg actual Phosphate and 48 kg actual Potassium per hectare.

.2 Fertilizer shall be standard commercial brands meeting the requirements of the Canada Fertilizer Act and the Canadian Fertilizer Quality Assurance Program.

.3 All fertilizers shall be granular, pelletized or pill form, and shall be dry and free flowing.

.2 Peatmoss:

.1 Derived from partially decomposed species of Sphagnum Mosses.

.2 Elastic and homogeneous, brown in colour.

.3 Free of wood and deleterious material which could prohibit growth.

.4 Shredded particle minimum size: 5 mm.

.3 Sand: washed coarse silica sand, medium to course textured.

.4 Organic matter: compost Category A, in accordance with CCME PN1340, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.

.5 Limestone:

.1 Ground agricultural limestone.

.2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.

.6 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 STRIPPING OF TOPSOIL

.1 Begin topsoil stripping of areas as indicated after area has been cleared of brush weeds and grasses and removed from site.

.2 Strip topsoil to depths as directed by Contact Administrator.

.1 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.

.3 Stockpile in locations as Contact Administrator.

.1 Stockpile height not to exceed 1.5 m.

.4 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill.

.5 Protect stockpiles from contamination and compaction.

3.3 PREPARATION OF EXISTING GRADE

.1 Verify that grades are correct.

.1 If discrepancies occur, notify Contact Administrator and do not commence work until instructed by Contact Administrator.

.2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.

.3 Remove debris, roots, branches, stones in excess of 25 mm diameter and other deleterious materials.

.1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.

.2 Remove debris which protrudes more than 50 mm above surface.

.3 Dispose of removed material off site.

.4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.

.1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.4 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

.1 Place topsoil after Contact Administrator has accepted subgrade.

.2 Spread topsoil in uniform layers not exceeding 150 mm.

.3 For sodded areas keep topsoil 15 mm below finished grade.

.4 Spread topsoil to following minimum depths after compaction and settlement.

.1 100 mm for seeded areas.

.2 75 mm for sodded areas.

.3 300 mm for shrub beds.

.5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.5 FINISH GRADING

.1 Grade to eliminate rough spots and low areas and ensure positive drainage.

.1 Prepare loose friable bed by means of cultivation and subsequent raking.

.2 Consolidate topsoil to required bulk density using equipment approved Contact Administrator.

.1 Leave surfaces smooth, uniform and firm against deep footprinting.

3.6 ACCEPTANCE

.1 Contact Administrator will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.7 SURPLUS MATERIAL

.1 Dispose of materials except topsoil not required off site.

3.8 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

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

END OF SECTION

Part 1 General

1.1 SUBMITTALS

.1 Samples.

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

.2 Submit:

.1 Sod for each type specified.

.1 Install approved samples in one square metre mock-ups and maintain in accordance with maintenance requirements during establishment period.

.3 Obtain approval of samples by Contract Administrator.

1.2 QUALITY ASSURANCE

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

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.3 SCHEDULING

.1 Schedule sod laying to coincide with preparation of soil surface.

.2 Schedule sod installation when frost is not present in ground.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.2 Divert unused fertilizer from landfill to official hazardous material collections site approved by Contract Administrator.

.3 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

.1 Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop.

.1 Turf Grass Nursery Sod types:

.1 Number One Kentucky Bluegrass Sod: Nursery Sod grown solely from seed of cultivars of Kentucky Bluegrass, containing not less than 50% Kentucky Bluegrass cultivars.

.2 The Contractor shall supply turf grass sod with a mineral soil layer containing a minimum of

.1 seventy (70%) percent inorganic soil.

.2 Upon delivery or thirty (30) days following delivery, the salinity rating shall be less than 4.0 mm hos/cm on a saturated paste basis.

.3 The pH range shall be between 6.0 - 8.0.

.4 Sod supplied shall have been sown in nursery fields with Canada

.5 Certified No. 1 or Canada Certified No. 2 grass seed and mixed by percentage (%) of weight to meet the following certified seed blends as per CW 3510 R9 for Athletic Grounds.

.2 Turf Grass Nursery Sod quality:

.1 Not more than 2 broadleaf weeds or 10 other weeds per 40 square metres.

.2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm.

.3 Mowing height limit: 35 to 65 mm.

.4 Soil portion of sod: 6 to 15 mm in thickness and contain not more than

.2 Fertilizer:

.1 To Canada "Fertilizers Act" and "Fertilizers Regulations".

2.2 QUALITY CONTROL

.1 All sod supplied under this Specification shall be subject to inspection and testing by the Contract Administrator and/or the The City of Winnipeg's designated turf inspector.

.2 There shall be no charge to the The City of Winnipeg for any materials taken by the Contract Administrator or the The City of Winnipeg's designated turf inspector for inspection purposes.

.3 Sod will be subject to tests for nitrate, phosphate, potassium, sulphate, pH, E.C. (salinity), mineral soil layer thickness and its organic matter content by a testing laboratory designated by the Contract Administrator.

.4 Tests conducted to determine the thickness of the mineral soil layer of the sod and it's percent of organic matter shall be done in accordance with standard operating procedures approved by the Contract Administrator for both receiving, and analysing sod samples.

.5 Any sod placed on the Work Site that in the opinion of the Contract Administrator does not conform to the Specification detailed herein, shall be rejected by the Contract Administrator and replaced by and at the expense of the Contractor.

Part 3 Execution

3.1 PREPARATION

.1 Verify that grades are correct and prepared in accordance with Section 32 91 19.13 - Topsoil Placement and Grading. If discrepancies occur, notify Contract Administrator and do not commence work until instructed by Contract Administrator.

.2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.

.3 Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated, to tolerance of plus or minus 8 mm, surface to drain naturally and not hold water. Direction of drainage shall be in accordance with the draining and, in all cases, away from all buildings.

.4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site environmentally appropriate locations and in accordance with all applicable regulations.

3.2 SOD PLACEMENT

.1 Lay sod within 24 hours of being lifted if air temperature exceeds 20 degrees C.

.2 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.

.3 A full row of sod, not less than 450 mm in width shall be placed along the perimeter of the sodded area, parallel to planting or walkway areas.

.4 Immediately after placement of sod, the Contractor shall water the area in sufficient quantities and frequency required to obtain root development and sod growth. All costs to provide water for sodded areas shall be borne by the Contractor. These costs may include hydrant permit and meter rental fees.

.5 After the sod and topsoil has dried sufficiently to prevent damage, the areas shall be rolled (the edges pounded if necessary) with a mechanical roller minimum weight of 220kg and minimum width of 750 mm to form a uniform even surface and level with adjoining existing grades, sidewalks and curbs.

.6 Heavy rolling to correct irregularities in grade will not be permitted. Sodded areas near existing fixtures that are unable to be rolled shall be thoroughly tamped to ensure a good bond between topsoil and sod.

.7 Where big roll sod is to be placed, the Contractor shall ensure that any reinforcement netting that may be used to assist with the harvesting and/or placement of the sod roll is removed before final placement of the sod.

.8 All visible joints, low, bare or dead spots shall be repaired to the satisfaction of the Contract Administrator prior to the commencement of the Thirty (30) Day Maintenance Period

.9 Sod shall not be placed in a frozen state, or when any other conditions unfavourable to the successful transplanting of sod exist.

.10 The Contractor shall not place sod after September 15 unless the Contract Administrator gives written approval to proceed.

.11 Should the Contract Administrator provide written approval to, or direct the Contractor to place sod after September 15, and termination of the sod maintenance period is not achieved in accordance Clause 3.5 in that same year, the Contractor will not be held responsible for sod damage over the winter due to winter-kill, ice damage, sand/salt applications on adjacent streets or from snow removal or spring clean up equipment.

.12 When the Contract Administrator provides written approval, or direction to the Contractor to place the sod after September 15, the City of Winnipeg will assume all costs related to the spring replacement of sod damaged over the winter provided that the layover was due only to the late season start and not defective sod or maintenance not conforming to this Specification.

3.3 SOD PLACEMENT ON SLOPES AND PEGGING

.1 Install and secure geotextile fabric in areas indicated, in accordance with manufacturer's instructions.

.2 Start laying sod at bottom of slopes.

.3 Peg sod on slopes steeper than 3 horizontal to 1 vertical, within 1 m of catch basins and within 1 m of drainage channels and ditches to following pattern:

- .1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes.
- .2 Not less than 6 pegs per square metre.
- .3 Not less than 6 pegs per square metre in drainage structures. Adjust pattern as directed by Contract Administrator.
- .4 Drive pegs to 20 mm above soil surface of sod sections.

3.4 MAINTENANCE PERIOD

.1 Perform following operations from time of installation until acceptance.

.2 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.

.3 Cut grass to 50 mm when or prior to it reaching height of 75 mm. Remove clippings which will smother grassed areas.

.4 Maintain sodded areas weed free 95%.

.5 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles.

3.5 ACCEPTANCE

.1 Turf Grass Nursery Sod areas will be accepted by Contract Administrator provided that:

.1 Sodded areas are properly established.

.2 Sod has been in place a minimum of 30 days between May 15 and September 15 of a single calendar year.

.3 Sod is free of bare and dead spots.

.4 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.

.5 Sodded areas have been cut minimum 2 times prior to acceptance.

.2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.6 CLEANING

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

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for foundation and underslab drainage.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM D698-00a, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-34.22-94, Asbestos-Cement Drain Pipe.

.3 Canadian Standards Association (CSA International)

.1 CSA-A23.1/A23.2-00(June 2001), Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.

.2 CSA B1800-02, Plastic Non-pressure Pipe Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).

.1 CSA B182.2-02, PVC Sewer Pipe and Fittings (PSM Type).

.3 CSA-G401-01, Corrugated Steel Pipe Products.

.4 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act, 1999 (CEPA)

.5 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992 (TDGA)

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse, donation and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

1.4 SITE CONDITIONS

.1 Examine sub-surface investigation report which is available for inspection in this Specification.

.2 Known underground utility lines and buried objects are as indicated on plans.

Part 2 Products

2.1 BEDDING AND SURROUND MATERIALS

.1 Coarse filter aggregate: to CSA-A23.1/A23.2, Group 1 20-5 mm.

.2 Fine filter aggregate: to CSA-A23.1/A23.2.

.3 Rigid plastic pipe and fittings: to CSA-B182.1, size 100mm complete with fittings, geo-sock and geotextile filter.

2.2 BACKFILL MATERIAL

.1 Type 2, in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Excavated or graded material existing on site may be suitable to use if approved by Departmental Reprentative.

Part 3 Execution

3.1 EXAMINATION

.1 Ensure graded subgrade, conforms with required drainage pattern before placing bedding material.

.2 Ensure improper slopes, unstable areas, areas requiring additional compaction or other unsatisfactory conditions are corrected to approval of Contract Administrator.

.3 Ensure foundation wall and dampproofing, waterproofing and rigid insulation have been installed and approved by Contract Administrator before placing bedding material.

3.2 BEDDING PREPARATION

.1 Cut trenches in subgrade and place bedding materials in uniform layers not exceeding 150 mm compacted thickness to depth as indicated.

.2 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.

.3 Shape transverse depressions, as required, to suit joints.

.4 Compact each layer full width of bed to at least 95% of corrected maximum dry density.

.5 Fill excavation below design elevation of bottom of specified bedding with compacted bedding material.

3.3 PIPE OR TUBING INSTALLATION

.1 Ensure pipe interior and coupling surfaces are clean before laying.

.2 Lay perforated pipe level minimum to slope of 1:100. For pipe face perforations and coupling slots downward.

.3 Lay non-perforated pipe to slope of 1:50 from perforated pipe to disposal area. Make joints watertight.

.4 Grade bedding to establish pipe slope.

.5 Install end plugs at ends of collector drains to protect pipe ends from damage and ingress of foreign material.

.6 Connect non-perforated pipe to sump pit by appropriate adapters manufactured for this purpose.

.7 Provide cleanouts on non-perforated pipe at changes of pipe direction and in runs greater than 15 m.

.8 Provide flush cleanouts where directed by Contract Administrator.

.9 Connect drainage system to building sewers, as indicated.

3.4 PIPE OR TUBING SURROUND MATERIAL

.1 Upon completion of pipe laying and after Contract Administrator has inspected Work in place, surround and cover pipe and install geotextile filter as indicated.

.2 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness, as indicated.

.3 Place layers uniformly and simultaneously on each side of pipe.

.4 Compact each layer from pipe invert to mid-height of pipe to at least 95% of corrected maximum dry density.

.5 Compact each layer from mid-height of pipe to underside of backfill to at least 90% of corrected maximum dry density.

3.5 BACKFILL MATERIAL

.1 Place backfill material above pipe surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.

.2 Under paving and walks, compact backfill to at least 95% corrected maximum dry density. In other areas, compact to at least 90% corrected maximum dry density.

3.6 SCHEDULE

.1 Place weeping tile at the following locations:

.1 The perimeter of new basement foundation walls. Connect to the existing weeping tile system on either side and create positive drainage to the new weeping tile sump pit.

.2 The perimeter of the elevator pit.

END OF SECTION