SPECIFICATION

Duplex Conversion Project

NORWAY HOUSE
MANITOBA
PROJECT NO. 16 – 016-01-15

TENDER

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Part 1 General

1.1 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises the renovation of an existing duplex house located in Norway House, Manitoba. This work includes; labour, materials and shipping of materials, in accordance with the contract documents and as further described herein.

1.2 SCOPE OF WORK

.1 Existing duplex to be renovated and converted into four plex unit all work to be duplicated in two locations in basement of existing duplex. The work will involve the following but not be limited to:

- .1 Demolition
  - .1 Remove existing stairs to basement including landing and all walls.
  - .2 Remove half wall on second floor
- .2 Construction
  - .1 New fire separation at ceiling along with bulkheads
  - .2 New basement sub-floor
  - .3 New interior walls
  - .4 New windows
  - .5 New kitchen and bathroom
  - .6 New raised entry foyer
  - .7 New second floor laundry room
  - .8 New separate mechanical system for basement HVAC
  - .9 New plumbing for basement
  - .10 New electrical for basement

1.3 WORK SEQUENCE

.1 Provide Details work schedule

1.4 PROTECTION OF REMAINING FIXTURES AND CABINETRY

.1 The contractor is to document photo the condition of the existing cabinetry and fixtures at takeover of the houses and supply a copy to the consultant.

.2 The contractor is responsible for the protection of all damage caused during the construction process and it will be the responsibility of the contractor to make good to the acceptance of the Project Manager and Consultant.

1.5 CONTRACTOR USE OF PREMISES

.1 Move stored products or equipment which **interfere** with operation of owner or other contractors.

.2 Assume responsibility for the protection and safekeeping of products under this contract.

.3 Co-ordinate use of premises under direction of Consultant, and Property.

.4 Obtain and pay for use of additional storage or work areas needed for operations under this Contract as required.

.5 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

.6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Consultant.

1.6 OWNER OCCUPANCY

.1 Owners will not occupy the building during the duration of the contract.

.2 Co-operate with project manager in scheduling operations to minimize conflict and to facilitate Planning of Alternate accommodations during construction.

1.7 EXISTING SERVICES

.1 Notify Consultant and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian, vehicular traffic and tenant operations.

.3 Provide alternative routes for personnel and vehicular traffic (if required).

.4 Establish location and extent of service lines in area of work before starting Work. Notify Consultant of findings.

.5 Submit schedule to and obtain approval from Consultant and RCMP operations for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.6 Provide temporary services when directed by Consultant or as required to maintain critical building and tenant systems.

.7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

.8 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.

.9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.10 Record locations on as built drawings maintained, re-routed and abandoned service lines.

.11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures

1.8 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Reviewed Shop Drawings.
.5 List of Outstanding Shop Drawings.
.6 Change Orders.
.7 Other Modifications to Contract.
.8 Field Test Reports.
.9 Copy of Approved Work Schedule.
.10 Health and Safety Plan and Other Safety Related Documents.
.11 Standards listed in Part 1.10 Codes and Standards.
.12 Other documents as specified.

1.9 CODES AND STANDARDS

.1 Materials shall be new and work shall conform to the minimum applicable standards of the Canadian General Standards board, the Canadian Standards Association, The National Building Code of Canada 2010, and all applicable Territorial and Municipal codes, and all standards listed below. In the case of conflict or discrepancy the most stringent requirement shall apply.

.2 Meet or exceed requirements of contract documents, specified standards, codes and referenced documents.

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 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements **with** owner to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Where security is reduced by work provide temporary means to maintain security.

.4 Closures: protect work temporarily until permanent enclosures are completed.

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to building operations occupants, public and normal use of premises. Arrange with RCMP to facilitate execution of work.

1.4 EXISTING SERVICES

.1 Notify, utility companies, Consultant, of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give owner 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures .

1.5 SPECIAL REQUIREMENTS

.1 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

.2 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.3 Keep within limits of work and avenues of ingress and egress.

1.6 SECURITY CLEARANCES

.1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will be required to enter premises.

1.7 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions. Smoking is not allowed.

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 REFERENCES

.1 Project Supplementary Conditions

1.2 CASH ALLOWANCES

.1 Include in Contract Price specified cash allowances.

.2 Cash allowances, unless otherwise specified, cover net cost to Contractor subcontractor of services, products, construction machinery and equipment, freight, handling, unloading, storage installation and other authorized expenses incurred in performing Work.

.3 Contract Price, and not cash allowance, includes Contractor's overhead and profit in connection with such cash allowance.

.4 Contract Price will be adjusted by written order to provide for excess or deficit to each cash allowance.

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

.6 Include progress payments on accounts of work authorized under cash allowances in Consultant's monthly certificate for payment.

.7 Prepare schedule jointly with Consultant and Contractor to show when items called for under cash allowances must be authorized by Consultant for ordering purposes so that progress of Work will not be delayed.

.8 Amount of each allowance, for Work specified in respective specification Sections is as follows:

.1 Lighting Fixtures $2000 per duplex – Total allowance - $4,000.00

1.1 CONTINGENCY ALLOWANCE

.1 Include in Contract Price contingency allowance of $20,000.

.2 Do not include in Contract Price, additional contingency allowances for products, installation, overhead or profit.

.3 Expenditures under contingency allowance will be authorized in accordance with procedures provided in contract documents.

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 ON-SITE DOCUMENTS

.1 Contract Documents

.2 Specifications

.3 Addenda

.4 Reviewed shop drawings

.5 Change orders

.6 Other modifications in contract

.7 Field test reports

.8 Copy of approved Work Schedule

.9 Manufacturers installation and application instructions

.10 Labour conditions and wage schedules

.11 Project Record Documents (for as-built purposes)

.12 Codes and Standards listed in 01 11 00

1.2 ADMINISTRATIVE

.1 Attend project meetings throughout the progress of the work at the call of Consultant.

.2 Provide physical space and make arrangements for meetings.

.3 Consultant will record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.4 Consultant will reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants, affected parties not in attendance, Project Manager, and Contractor.

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

1.3 PRECONSTRUCTION MEETING

.1 After award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities. Meeting will be held at the location and time designated by the departmental representative

.2 Departmental Representative, Engineer and Consultant, Contractor, major Subcontractors, will be in attendance. Others may be in attendance at the discretion of the departmental representative or the Contractor. Representatives of the local Building Manager may also be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 2 days before meeting.

.4 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 specified 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 Owner 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.

.5 Comply with Departmental Representative's allocation of mobilization areas of site; for field offices and sheds, for access, traffic and parking facilities.

.6 During construction coordinate use of site and facilities through Departmental Representatives procedures for intra-project communications: submittals, reports and records, schedules, coordination of drawings, recommendations, and resolution of ambiguities and conflicts.

.7 Comply with instruction of consultant for use of Temporary utilities and construction facilities.

.8 Coordinate field engineering and layout work with consultant.

1.4 PROGRESS MEETINGS

.1 During course of Work at the discretion of the Consultant and Departmental Representative.

.2 Representatives of the Contractor, major Subcontractors involved in the work and other as required and decided upon by the Departmental Representative or Contractor are to be in attendance. Contractor to notify all sub-contractors.

.3 Consultant will notify contractor min 5 days prior to meetings

.4 Consultant to record minutes of meetings and circulate to attending parties and affected parties not in attendance within 5 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

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.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 workweeks.

.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 RCMP 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 Construction Progress Schedule to be Completed in Microsoft Project or Similar Software.

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

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

.5 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 to Consultant within 5 working days of Award of Contract as Master Plan for planning, monitoring and reporting of project progress.

.3 Submit Project Schedule to Consultant within 5 working days of receipt of acceptance of Master Plan.

1.4 PROJECT MILESTONES

1.5 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

.2 Consultant will review and return revised schedules within 5 working days.

.3 Revise impractical schedule and resubmit within 5 working days.

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

1.6 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

.2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

.1 Award.
.2 Shop Drawings, Samples.
.3 Permits.
.4 Mobilization.
.5 Excavation.
.6 Backfill.
.7 Piling
.8 Slab on grade.
.9 Structural Steel.
.10 Siding and Roofing.
.11 Interior Architecture (Walls, Floors and Ceiling).
.12 Plumbing.
.13 Lighting.
.14 Electrical.

.15 Piping.
.16 Controls.
.17 Heating, Ventilating, and Air Conditioning.
.18 Millwork.
.19 Fire Systems.
.20 Testing and Commissioning.
.21 Supplied equipment long delivery items.
.22 Engineer supplied equipment required dates.

1.7 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on weekly basis 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.

1.8 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.

.2 Weather related delays with their remedial measures will be discussed and negotiated.

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 ADMINISTRATIVE

.1 Submit to Consultant 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 imperial units.

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

.5 Review submittals prior to submission to Consultant. 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 Consultant, 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 Engineer's, Consultant's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant 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 shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in the 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 14 days for Consultant's review of each submission.

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

.6 Make changes in shop drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant 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 Property Manager's, Engineer's, Consultant's review, distribute copies.

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

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

.12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Consultant and Engineer.

.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 electronic copies of certificates for requirements requested in specification Sections and as requested by Consultant and Engineer

.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 electronic or 6 copies of manufacturers instructions for requirements requested in specification Sections and as requested by Consultant and Engineer.

.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 6 copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Consultant and Engineer.

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

.16 Submit 6 copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Consultant and Engineer

.17 Delete information not applicable to project.

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

.19 If upon review by Consultant and Engineer, 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.

.20 The review of shop drawings by and Consultant is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that Consultant approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or

omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

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 Consultants business address.

.3 Notify Consultant 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 Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

.6 Make changes in samples which Consultant 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 NOT USED

.1 Not Used.

Part 2 Execution

2.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

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

.1 Material Safety Data Sheets (MSDS).

.3 Northwest Territories

.1 The Workers Compensation Act latest edition.

1.2 SUBMITTALS

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

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan .

.3 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Consultant or authority having jurisdiction, as required.

.4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.5 Submit copies of incident and accident reports.

1.3 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

1.4 MEETINGS

.1 Schedule and administer Health and Safety meeting with Consultant prior to commencement of Work.

1.5 REGULATORY REQUIREMENTS

.1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements .

1.6 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Consultant may respond in writing, where deficieneies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.7 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.8 COMPLIANCE REQUIREMENTS

.1 Comply with The Workers Compensation Act, Workplace Safety Regulation, Northwest Territories Regulation.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.9 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise RCMP verbally and in writing.

1.10 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Consultant.

1.11 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Consultant.

.2 Provide Consultant with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Consultant may stop Work if non-compliance of health and safety regulations is not corrected.

1.12 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

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 REFERENCES AND CODES

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

.2 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify consultant and Project Manager.

.2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Consultant and Project Manager.

.3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Consultant and Project Manager.

1.3 BUILDING SMOKING ENVIRONMENT

.1 No smoking permitted.

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 INSPECTION

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

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant, instructions, 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 Consultant will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

1.2 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by consultant for purpose of inspecting and/or testing portions of Work.

.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 Property Manager or Consultant at no cost to Property Manager or Consultant. Pay costs for retesting and reinspection.

1.3 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.

1.4 PROCEDURES

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

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in 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.

1.5 REJECTED WORK

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

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

.3 If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner 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 Consultant.

1.6 REPORTS

.1 Submit electronic copies of inspection and test reports to Consultant.

.2 Provide copies to subcontractor of work being inspected or tested.

1.7 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 Consultant.

.3 Prepare mock-ups for Consultant'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 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.8 MILL TESTS

.1 Submit mill test certificates as requested.

1.9 EQUIPMENT AND SYSTEMS

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

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 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 WATER SUPPLY

.1 Water is available on site provided by the Building Owner

1.4 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating as 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 21 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, to be used when available. Be responsible for damage to heating system if use is permitted.

.7 On completion of Work for which permanent heating system is used, replace filters, clean furnaces and power vacuum all ductwork inform Consultant of completion.

.8 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 Consultant.

.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.

1.5 TEMPORARY POWER AND LIGHT

.1 Power is available for use by the contractor provided by the Building Owner.

.2 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of consultant 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.

1.6 TEMPORARY COMMUNICATION FACILITIES

.1 Contractor to furnish own Temporary phone, Fax and e-mail.

1.7 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.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 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.

.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.

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 used, avenues of ingress/egress to fenced are and details of fence installation

.2 Indicate use of supplemental or other staging area.

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

.4 Remove from site all such work after use.

1.4 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.

.3 Co-ordinate location of staging with consultant or owners representative on site.

1.5 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work or impede the operation of the owners.

.2 Adequate parking must be maintained for site access.

.3 Provide and maintain adequate access to project site.

1.6 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.

1.7 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.8 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 Remove materials resulting from demolition as soon as possible from site.

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

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 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 DUST TIGHT SCREENS

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

.2 Dust tight screens are to be located upon the second floor around the area of work and to be from floor to ceiling to protect the remainder of the second floor unit not under renovation.

.3 All furnace supply and return grills on second floor to be sealed dust tight for the duration of construction.

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

1.4 ACCESS TO SITE

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

1.5 FIRE ROUTES

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

1.6 PROTECTION OF BUILDING FINISHES

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

.2 Provide covering on second floor flooring to protect during construction.

.3 Provide necessary screens, covers, and hoardings.

.4 Confirm with property manager and detachment commander locations and installation schedule 3 days prior to installation.

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

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 REFERENCES

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

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

.3 If there is question as to whether products or systems are in conformance with applicable standards, Project Manager and/or Consultant reserves right to have such products or systems tested to prove or disprove conformance.

.4 Cost for such testing will be born by Departmental Representative 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 Project Manager 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 Consultant 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 Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant 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 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 Consultant.

.9 Touch-up damaged factory finished surfaces to Consultants 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.

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 Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Project Manager will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Consultant 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 Consultant if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Consultant reserves the 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 the Consultant, 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 Consultant if there is interference. Install as directed by Consultant.

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 Engineer 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 commereial 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 Engineer.

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.

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

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 REFERENCES

.1 Identification of existing survey control points and property limits.

1.2 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 Consultant 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 Consultant.

1.3 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.

1.4 SUBMITTALS

.1 On request of Departmental Representative or Consultant, submit documentation to verify accuracy of field engineering work.

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 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. Note: Fire panel will alarm when hot cutting is done. Owner and building tenants requires notice when shutting down fire alarm system to do work. When alarm is off, contractor will provide fire watch.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner 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 Owner 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 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

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

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

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

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

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

.11 At penetration of fire rated wall, ceiling or floor construction, completely seal voids with firestopping material in accordance with Section 07 8400 – Firestopping, full thickness of the construction element

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

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

END OF SECTION

Part 1 General

1.1 PROJECT CLEANLINESS

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

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

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

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

.5 Dispose of waste materials and debris off site.

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

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

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

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

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

1.2 FINAL CLEANING

.1 Entire four-plex (Main and Second Floor) to be fully cleaned prior to substantial performance inspection.

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

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

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

.5 Remove waste products and debris including that caused by Owner or other Contractors.

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

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

.8 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.

.9 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.

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

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

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

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

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

.15 Remove dirt and other disfiguration from exterior surfaces.

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

.17 Sweep and wash clean paved areas.

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

.19 Clean roofs, downspouts, and drainage systems.

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

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Dispose of waste and separate waste materials for recycling as per requirements of local authorities.

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 INSPECTION AND DECLARATION

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

.1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.

.2 Request Inspection.

.2 Consultant and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Equipment and systems have been tested, adjusted and balanced and are fully operational.

.4 Certificates required by Fire Commissioner, Utility companies HRDC Labour Programs-Fire Protection, Engineering Services and Local Authorities have been submitted.

.5 Operation of systems have been demonstrated to Owner's personnel.

.6 Work is complete and ready for final inspection.

.4 Final Inspection: when items noted above are completed, request final inspection of Work by Consultant and Contractor. If Work is deemed incomplete by Consultant, complete outstanding items and request reinspection.

1.2 CLEANING

.1 In accordance with Section 01 74 11 – Cleaning.

.2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with local authorities.

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 SUBMITTALS

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

.2 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.3 Copy will be returned after final inspection, with Consultant comments.

.4 Revise content of documents as required prior to final submittal.

.5 Two weeks prior to Substantial Performance of the Work, submit to the Consultant, four final copies of operating and maintenance manuals in English.

.6 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

.7 Furnish evidence, if requested, for type, source and quality of products provided.

.8 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.9 Pay costs of transportation.

.10 Supply one electronic and 5 copies of equipment manuals for all new items installed under this project

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

.9 Provide scaled CAD files in dwg format on CD.

1.3 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project;

- .1 Date of submission; names.
- .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
- .3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

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

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

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

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

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

1.4 AS-BUILTS AND SAMPLES

.1 Maintain, at site for Consultant 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. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.5 All copies of the documents must be turned over to consultant, **NO** copies may be maintained by the General Contractor or Trades.

1.5 EQUIPMENT AND SYSTEMS

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

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

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

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

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

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

.8 Include sequence of operation by controls manufacturer.

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

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's 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.

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

1.6 MATERIALS AND FINISHES

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.

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

.3 Moisture-Protection and Weather-Exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

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

1.7 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. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.8 SPECIAL TOOLS

.1 Provide special tools, in quantities specified in individual specification sections.

.2 Provide items with tags identifying their associated faction and equipment.

.3 Deliver to site; place and store

.4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listing in Maintenance Manual

1.9 MAINTENANCE 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. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.10 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. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

1.11 STORAGE, HANDLING AND PROTECTION

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

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

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

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

.5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

1.12 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 Property Manager and Consultant for approval.

.3 Warranty management plan to include required actions and documents to assure that Property Manager 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 Property Manager for approval prior to each monthly pay estimate.

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

.1 Separate each warranty or bond with index tab sheets keycd 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 Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.8 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.

.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 10 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.

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

.10 Written verification will follow oral instructions. Failure to respond will be cause for the property manager to proceed with action against Contractor.

1.13 PRE-WARRANTY CONFERENCE

.1 Meet with Consultant, to develop understanding of requirements of this section. Schedule meeting prior to contract completion, and at time designated by Consultant.

.2 Consultant will establish communication procedures for:

.1 Notification of construction warranty defects.

.2 Determine priorities for type of defect.

.3 Determine reasonable time for response.

.3 Provide name, telephone number and address of licensed and bonded company that is authorized to initiate and pursue 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.

1.14 WARRANTY TAGS

.1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Property Manager or Consultant.

.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

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Equipment and systems.

.2 Materials and finishes.

.3 Spare parts.

.4 Maintenance manuals.

.5 Special tools.

.6 Storage, handling and protection.

1.2 RELATED SECTIONS

.1 Section 017800 - Closeout Submittals.

.2 Section 014500 - Quality Control.

1.3 EQUIPMENT AND SYSTEMS

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

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

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

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

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

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

.8 Include sequence of operation by controls manufacturer.

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

□

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.

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

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

.14 Include test and balancing reports.

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

1.4 MATERIALS AND FINISHES

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.

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

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

.4 Building Envelope: include copies of drawings of building envelope components, illustrating the interface with similar or dissimilar items to provide an effective air, vapour and thermal barrier between indoor and outdoor environments. Include an outline of requirements for regular inspections and for regular maintenance to ensure that on-going performance of the building envelope will meet the initial building envelope criteria.

.5 Additional Requirements: as specified in individual specifications sections.

1.5 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 all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.6 MAINTENANCE 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 all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.7 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 all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

1.8 STORAGE, HANDLING AND PROTECTION

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

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

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

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

.5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Demonstrate operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of final inspection.

.2 Owner will provide list of personnel to receive instructions, and will co-ordinate their attendance at agreed-upon times.

1.2 QUALITY CONTROL

.1 When specified in individual Sections require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

1.3 SUBMITTALS

.1 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 Consultant 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.

1.4 CONDITIONS FOR DEMONSTRATIONS

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

1.5 PREPARATION

.1 Verify that conditions for demonstration and instructions comply with requirements.

.2 Verify that designated personnel are present.

1.6 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 need for additional data becomes apparent during instructions.

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 SUMMARY

.1 Section Includes:

.1 This section is limited to portions of the Building Management Manual (BMM) provided to Departmental Representative by Contractor.

.2 Acronyms:

.1 BMM - Building Management Manual.
.2 HVAC - Heating, Ventilation and Air Conditioning.
.3 PI - Product Information.
.4 PV - Performance Verification.
.5 TAB - Testing, Adjusting and Balancing.
.6 WHMIS - Workplace Hazardous Materials Information System.

1.2 GENERAL REQUIREMENTS

.1 Standard letter size paper 216 mm x 279mm.

.2 Binders: vinyl hard covered, 3" "D" ring,(not "O" ring) loose leaf sized, with spine pocket. Identify contents of each binder on spine

.3 Methodology used to facilitate updating.

.4 Drawings, diagrams and schematics to be professionally developed.

.5 Electronic copy of data to be in a format accepted and approved by Property Manger (PDF).

1.3 APPROVALS

.1 Prior to commencement, co-ordinate requirements for preparation, submission and approval with Property Manager.

1.4 GENERAL INFORMATION

.1 Provide Consultant the following for insertion into appropriate Part and Section of BMM:

.1 Complete list of names, addresses, telephone and fax numbers of contractor, sub-contractors that participated in delivery of project - as indicated in Section 1.2 of BMM.

.2 Summary of architectural, structural, fire protection, mechanical and electrical systems installed and commissioned - as indicated in Section 1.4 of BMM.

.1 Including sequence of operation as finalized after commissioning is complete as indicated in Section 2.0 of BMM.

.3 Description of building operation under conditions of heightened security and emergencies as indicated in Section 2.0 of BMM.

.4 System, equipment and components Maintenance Management System (MMS) identification - Section 2.1 of BMM..

.5 Information on operation and maintenance of architectural systems and equipment installed and commissioned - Section 2.0 of BMM.

.6 Information on operation and maintenance of fire protection and life safety systems and equipment installed and commissioned - Section 2.0 of BMM.

.7 Information on operation and maintenance of mechanical systems and equipment installed and commissioned - Section 2.0 of BMM.

.8 Operating and maintenance manual - Section 3.2 of BMM.

.9 Final commissioning plan as actually implemented.

.10 Completed commissioning checklists.

.11 Commissioning test procedures employed.

.12 Completed Product Information (PI) and Performance Verification (PV) report forms, approved and accepted by Property Manager.

.13 Commissioning reports.

1.5 CONTENTS OF OPERATING AND MAINTENANCE MANUAL

.1 For detailed requirements refer to Section 01 78 00 - Closeout Submittals.

.2 Consultant to review and approve format and organization within 2 weeks of award of contract.

.3 Include original manufactures brochures and written information on products and equipment installed on this project.

.4 Record and organize for easy access and retrieval of information contained in BMM.

.5 Include completed PI report forms, data and information from other sources as required.

.6 Inventory directory relating to information on installed systems, equipment and components.

.7 Approved project shop-drawings, product and maintenance data.

.8 Manufacturer's data and recommendations relating: manufacturing process, installation, commissioning, start-up, O&M, shutdown and training materials.

.9 Inventory and location of spare parts, special tools and maintenance materials.

.10 Warranty information.

.11 Inspection certificates with expiration dates, which require on-going re-certification inspections.

.12 Maintenance program supporting information including:

.1 Recommended maintenance procedures and schedule.

.2 Information to removal and replacement of equipment including, required equipment, points of lift and means of entry and egress.

1.6 SUPPORTING DOCUMENTATION FOR INSERTION INTO SUPPORTING APPENDICES

.1 Provide RCMP supporting documentation relating to installed equipment and system, including:

- .1 General:
  - .1 Finalized commissioning plan.
  - .2 WHMIS information manual.
  - .3 Approved "as-built" drawings and specifications.
  - .4 Procedures used during commissioning.
  - .5 Cross-Reference to specification sections.
- .2 Architectural and structural:
  - .1 Inspection certificates, construction permits.
- .3 Mechanical:
  - .1 Installation permits, inspection certificates.
  - .2 Piping pressure test certificates.
  - .3 Ducting leakage test reports.
  - .4 TAB and PV reports.
  - .5 Copies of posted instructions.
- .4 Electrical:
  - .1 Installation permits, inspection certificates.
  - .2 Charts and schedules.
  - .3 Locations of cables and components.
  - .4 Copies of posted instructions.

1.7 IDENTIFICATION OF FACILITY

.1 When submitting information to Departmental Representative for incorporation into BMM, use following system for identification of documentation:

- .1 To be supplied to successful contractor.

1.8 USE OF CURRENT TECHNOLOGY

.1 Use current technology for production of documentation. Emphasis on ease of accessibility at all times, maintain in up-to-date state, compatibility with user's requirements.

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 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M1980(R1998), Code of Practice for Safety in Demolition of Structures.

1.2 SUBMITTALS

.1 Submit shop drawings in accordance with Sections 01 33 00 - Submittal Procedures 01 00 10 - General Instructions.

1.3 SITE CONDITIONS

.1 Should material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Consultant immediately.

.1 Do not proceed until written instructions have been received from Consultant.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 PREPARATION

.1 Inspect site with Consultant 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.

3.2 PROTECTION

.1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of building to remain in place. Provide bracing and shoring required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

3.3 SALVAGE

.1 Refer to demolition drawings and specifications for items to be salvaged for reuse.

.2 Items to be stored in weather tight enclosure to ensure that no damaged is caused prior to re-installation

3.4 SITE REMOVALS

.1 Remove items as indicated.

3.5 DEMOLITION

.1 Remove parts of existing building to permit new construction.

.2 Trim edges of partially demolished building elements to tolerances as defined by Consultant to suit future use.

3.6 DISPOSAL

.1 Dispose of removed materials, except where specified otherwise, in accordance with authority having jurisdiction.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.2 Section 06 05 73 - Treated Wood.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)

- .1 ANSI A208.1-1999, Particleboard, Mat Formed Wood.

.2 American Society for Testing and Materials (ASTM)

- .1 ASTM A653/A653M-01a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealled) by the Hot-Dip Process.
- .2 ASTM C36/C36M-01, Specification for Gypsum Wallboard.
- .3 ASTM C578-01, Specification for Rigid, Cellular Polystrene Thermal Insulation.
- .4 ASTM C1289-01, Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- .5 ASTM D1761-00, Standard Test Methods for Mechanical Fasteners in Wood.
- .6 ASTM D5055-00, Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.
- .7 ASTM D5456-01ael, Specification for Evaluation of Structural Composite Lumber Products.

.3 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.

.4 Canadian Standards Association (CSA)

- .1 CSA A123.2-M1979(R1999), Asphalt Coated Roofing Sheets.
- .2 CAN/CSA-A247-M86, Insulating Fiberboard.
- .3 CSA B111-1974, Wire Nails, Spikes and Staples.
- .4 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .5 CSA O112 Series-M1977, CSA Standards for Wood Adhesives.
- .6 CSA O121-M1978, Douglas Fir Plywood.
- .7 CAN/CSA-O122-M89, Structural Glued-Laminated Timber.
- .8 CAN/CSA-O141-91, Softwood Lumber.
- .9 CSA O151-M1978, Canadian Softwood Plywood.

.10 CSA O153-M1980, Poplar Plywood.

.11 CAN/CSA-O325.0-92(R1988), Construction Sheathing.

.12 CAN3-O437 Series-93, Standards on OSB and Waferboard.

.5 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber 2000.

.6 Truss Design and Procedures for Light Metal Connected Wood Trusses, Truss Plate Institute of Canada.

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.

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 to the maximum extent economically possible.

.2 Set aside damaged wood and dimensional lumber off-cuts for approved alternative uses (e.g. bracing, blocking, cripples, bridging). Store this separated reusable wood waste convenient to cutting station and area of work.

.3 Separate metal, plastic, wood and corrugated cardboard-packaging in accordance with the Waste Management Plan and place in designated areas for recycling.

.4 Do not burn scrap at the project site.

.5 Fold up metal banding, flatten, and place in designated area for recycling.

Part 2 Products

2.1 FRAMING AND STRUCTURAL MATERIALS

.1 Lumber: unless specified otherwise, softwood, S4S, moisture content not greater than 19% at time of installation (S-dry) or less in accordance with following standards:

.1 CAN/CSA-O141.

.2 NLGA Standard Grading Rules for Canadian Lumber.

.2 Glulam in accordance with Structural Glued-Laminated Timber CAN/CSA-O122.

.3 Wood I-joists in accordance with Prefabricated Wood I-Joists ASTM D5055.

.4 Light-frame trusses in accordance with "Truss Design and Procedures for Light Metal Connected Wood Trusses", Truss Plate Institute of Canada.

□

.5 Structural Composite Lumber (SCL) in accordance with ASTM D5456.

.1 Framing and board lumber: in accordance with NBC.

.6 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:

.1 S2S, S4Sm or NLGA species, SPF No.2 grade is acceptable.

.2 Board sizes: "Standard" or better grade.

.3 Dimension sizes: "Standard" light framing or better grade.

.4 Post and timbers sizes: "Standard" or better grade.

2.2 PANEL MATERIALS

.1 Plywood, OSB and wood based composite panels: to CAN/CSA-O325.0.

.2 Douglas fir plywood (DFP): to CSA O121, standard construction.

.3 Canadian softwood plywood (CSP): to CSA O151, standard construction.

.4 Poplar plywood (PP): to CSA O153, standard construction.

.5 Interior mat-formed wood particleboard: to ANSI 208.1.

.6 Mat-formed structural panelboards (OSB wafer): to CAN3-O437.0.

.7 Insulating fiberboard sheathing: to CAN/CSA-A247.

.8 Glass fibre board sheathing: non-structural, rigid, faced, fiberglass, insulating exterior sheathing board.

.9 Isocyanurate & Urethane sheathing: to ASTM C1289, unfaced faced .

.10 Expanded polystyrene sheathing: to ASTM C578.

.11 Gypsum sheathing: to ASTM C36/C36M.

2.3 ACCESSORIES

.1 Exterior wall sheathing paper: to CAN/CGSB-51.32.

.2 Polyethylene film: to CAN/CGSB-51.34, Type 1, 0.15 mm thick.

.3 Air seal: closed cell polyurethane or polyethylene.

.4 Subflooring adhesive: to CGSB-71.26, cartridge loaded.

.5 General purpose adhesive: to CSA O112 Series.

.6 Nails, spikes and staples: to CSA B111 except:

.1 Use hot-dipped galvanized spiral nails and hot-dipped galvanized spiral spikes throughout.

□

.2 Use hot dip galvanized steel common nails for exterior work, interior highly humid areas and for pressure-preservative and fire-retardant treated lumber and in all other areas.

.7 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers. Hot-dip galvanized finish to CAN/CSA G164 for all work

.8 Use surface fastenings of following types, except where specified otherwise

.1 To concrete, use expansion shield with lag screws.

.2 In masonry, set bolts at joints in full bed of mortar.

.3 To structural steel, use bolts through drilled hole, or welded stud-bolts or power driven self-drilling screws, or welded stud-bolts.

.9 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.

.10 Joist hangers: minimum 1 mm thick sheet steel, galvanized ZF001 coating designation.

.11 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, sheet metal, fibre, formed to prevent dishing. Bell or cup shapes not acceptable.

.12 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, extruded 6063-T6 aluminum alloy type approved by Consultant.

2.4 FASTENER FINISHES

.1 Galvanizing: Bolt, nut, washer, screw, and pin type fasteners, hot-dip galvanize finish to CAN/CSA-G164 for all work.

Part 3 Execution

3.1 PREPARATION

.1 Store wood products.

3.2 INSTALLATION

.1 Comply with requirements of NBC 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 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.

□

.6 Install subflooring or combined subfloor and underlay with panel end-joints located on solid bearing, staggered at least 800 mm.

.1 In addition to mechanical fasteners, floor panels secure floor subflooring to floor joists using glue and screws. Place continuous adhesive bead in accordance with manufacturer's instructions, single-bead on each joist and double-bead on joists where panel ends butt.

.7 Install wall sheathing in accordance with manufacturer's printed instructions.

.8 Install roof sheathing in accordance with requirements of NBC.

.9 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding electrical equipment mounting boards, and other work as required.

.10 Install furring to support siding applied vertically where there is no blocking and where sheathing is not suitable for direct nailing.

.1 Align and plumb faces of furring and blocking to tolerance of 1:600.

.11 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.1 Except where indicated otherwise use material at least 38mm thick, secured with 9 mm bolts located within 300 mm from ends of members and uniformly spaced at 1200 mm o.c.

.2 Countersink bolts where necessary to provide clearance for other work.

.12 Install wood cants, fascia backing, nailers, curbs and other wood supports for roofing and sheet metal work, and roof mounted equipment and/or access hatches as indicated:

.1 Secure using galvanized 9 mm bolts where indicated. Located bolts within 300 mm from ends and at 1200 mm centres except where indicated otherwise.

.2 Secure to Steel Deck with No. 9 self tapping metal screws at 300 mm centres.

.3 At roof perimeter, leave loose minimum 200 mm to be sealed to wall vapour barrier membrane (liner panel) and the remainder left to be sealed to roof vapour barrier by roofing contractor.

.13 Install sleepers as indicated.

.14 Use dust collectors and high quality respirator masks when cutting or sanding wood panels.

.15 Surface-applied wood preservative applied as follows:

.1 Apply preservative by dipping, or by brush or spray to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.

.2 Treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

.3 Treat all material as follows:

.1 Wood cants, fascia backing, curbs, nailers, sleepers on roof deck.

.2 Wood furring on outside surface of exterior concrete walls.

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 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

3.4 SCHEDULES

.1 Exterior wall sheathing:

.1 Plywood, standard sheathing grade, size as indicated.

.2 Electrical equipment mounting boards:

.1 Provide backboards for mounting electrical equipment as indicated. Use 19 mm thick, CSP/S1S or DFP/G1S on 19 x 38 mm at 300 mm o.c. intermediate spacing.

.2 Paint as per Section 09 91 23 – Interior Painting.

.3 Backboards shall be painted before installation of equipment

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI)

- .1 ANSI A208.1-99, Particleboard.
- .2 ANSI A208.2-02, Medium Density Fibreboard (MDF).
- .3 ANSI/HPVA HP-1-2004, Standard for Hardwood and Decorative Plywood.

.2 American Society for Testing and Materials International (ASTM)

- .1 ASTM E1333-96(2002), Standard Test Method for Determining Formaldehyde Concentrations in Air and Emissions Rates from Wood Products Using a Large Chamber.

.3 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)

- .1 Architectural Woodwork Quality Standards Illustrated, 8th edition, Version 1.0 2003.

.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.

.6 Canadian Plywood Association (CanPly)

- .1 The Plywood Handbook 2005.

.7 Canadian Standards Association (CSA International)

- .1 CSA B111-74(R2003), Wire Nails, Spikes and Staples.
- .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CSA O121-M89(R2003), Douglas Fir Plywood.
- .4 CAN/CSA O141-91(R1999), Softwood Lumber.
- .5 CSA O151-04, Canadian Softwood Plywood.
- .6 CSA O153-M1980(R2003), Poplar Plywood.
- .7 CSA Z760-94, Life Cycle Assessment.

.8 Forest Stewardship Council (FSC)

- .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.9 National Hardwood Lumber Association (NHLA)

- .1 Rules for the Measurement and Inspection of Hardwood and Cypress 1998.

.10 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber 2005.

.11 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.

.12 Underwriters Laboratories of Canada (ULC)

.1 CAN4-S104-80(R1985), Standard Method for Fire Tests of Door Assemblies.

.2 CAN4-S105-85(R1992), Standard Specification for Fire Door Frames, meeting the Performance Required by CAN4-S104.

1.2 SUBMITTALS

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

.2 Shop Drawings Submittals: in accordance with Section 01 33 00 - Submittal Procedures .

.1 Indicate details of construction, profiles, jointing, fastening and other related details.

.2 Indicate materials, thicknesses, finishes and hardware.

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

.1 Submit duplicate samples: sample size 150 x 150 mm or 150 mm long unless specified otherwise of panel materials.

1.3 QUALITY ASSURANCE

.1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.1 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements .

.1 Protect materials against dampness during and after delivery.

.2 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

Part 2 Products

2.1 LUMBER MATERIAL

.1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:

.1 CAN/CSA-O141.

.2 NLGA Standard Grading Rules for Canadian Lumber.

.3 AWMAC custom grade, moisture content as specified.

.4 Forest Stewardship Council (FSC) certified.

.2 Machine stress-rated lumber is acceptable.

.3 Hardwood lumber: moisture content 8% or less in accordance with following standards:

.1 National Hardwood Lumber Association (NHLA).

.2 AWMAC custom grade, moisture content as specified.

2.2 PANEL MATERIAL

.1 Douglas fir plywood (DFP): to CSA O121 , standard construction.

.1 Forestry Stewardship Council (FSC) certified.

.2 Canadian softwood plywood (CSP): to CSA O151 , standard construction.

.3 Hardwood plywood: to ANSI/HPVA HP-1 .

.1 Urea-formaldehyde free.

.4 Poplar plywood (PP): to CSA O153 , standard construction.

.5 Particleboard: to ANSI A208.1 .

.6 Hardboard: to CAN/CGSB-11.3 .

.7 Medium density fibreboard (MDF): to ANSI A208.2 , density 640-800 kg/m^3.

.1 Medium density fibreboard .

.8 Low density fibreboard: to CSA-A247M .

.9 Decorative overlaid composite panels.

.1 Decorative overlay, heat and pressure laminated with suitable resin to thickness indicated 12.7 mm thick particleboard MDF core.

.2 Overlay bonded to both faces where exposed two sides, and when panel material require surface on one side only, reverse side to be overlaid with a plain (buff) balancing sheet.

.3 Furniture finish: selected by RCMP Project Manager .

.4 Edge finishing: matching melamine and polyester overlay edge strip with self-adhesive edge filler to provide a smooth surface for paint finish.

2.3 ACCESSORIES

.1 Nails and staples: to CSA B111; galvanized to CAN/CSA-G164 for exterior work, interior humid areas and for treated lumber; plain finish elsewhere.

.2 Wood screws: plain, type and size to suit application.

.3 Splines: wood.

.4 Adhesive: recommended by manufacturer .

.1 Adhesives: maximum VOC limit 30 g/L SCAQMD Rule 1168 - Adhesives and Sealants Applications.

Part 3 Execution

3.1 INSTALLATION

.1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.

.2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.

.3 Form joints to conceal shrinkage.

3.2 CONSTRUCTION

.1 Fastening:

.1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.

.2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.

.3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and plug with wood plug to match material being secured.

.4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

.2 Standing and running trim:

.1 Butt and cope internal joints of baseboards to make snug, tight, joint. Cut right angle joints of casing and base with mitred joints.

.2 Fit backs of baseboards and casing snugly to wall surfaces to eliminate cracks at junction of base and casing with walls.

.3 Make joints in baseboard, where necessary using a 45 degrees scarf type joint.

.4 Install door and window trim in single lengths without splicing.

.3 Interior and exterior frames:

.1 Set frames with plumb sides and level heads and sills and secure.

.4 Panelling:

.1 Secure panelling and perimeter trim using adhesive recommended for purpose by manufacturer. Fill nail holes caused by temporary fixing with filler matching wood in colour.

.2 Secure panelling and perimeter trim using concealed fasteners.

.3 Secure panelling and perimeter trim using counter sunk screws plugged with matching wood plugs.

.5 Handrails, wall rails and bumper rails.

.1 Make joints hair line, dowelled and glued.

.2 Install brackets at ends and at 1500 mm on centre maximum at intermediate spacings.

.3 Install metal backing plates between studs at bracket locations to ensure proper support for brackets and bolts or self-tapping screws.

.4 Secure using counter sunk screws plugged with matching wood plugs.

.6 Shelving:

.1 Install shelving on shelf brackets.

3.3 SCHEDULES

.1 Standard of Acceptance

.1 Manufacturer: Moulding and Millworks

.2 Material: Finger Joint Pine - Primed

.3 Schedule

.1 Window Casing: Model: MP356 7 /16"x2 ¼"

.2 Base Board: Model: MP3140 – 3/8"x3 ¼"

.2 Shelving:

.1 Construction: Birch Plywood, 19mm thickness, G1S

.2 Shelves: 19MM Melamine surfaced MDF or Particle Board

.3 Shelves with Pilaster strips and strips

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:

.1 Submit manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

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

.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.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements .

Part 2 Products

2.1 INSULATION

.1 Batt and blanket mineral fibre: to ASTM C553 ASTM C665 CAN/ULC S702.

.1 Type: Standard of Acceptance

.1 Roxul Safe and Sound

.2 Thickness: Fill entire cavity

2.2 ACCESSORIES

.1 Insulation clips:

.1 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.

.2 Nails: galvanized steel, length to suit insulation plus 25 mm, to CSA B111.

.3 Staples: 12 mm minimum leg.

.4 Tape: as recommended by manufacturer.

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 Install insulation to maintain continuity of thermal protection to building elements and spaces and to ASTM C1320 .

.2 Install insulation with factory applied vapour barrier facing warm side of building spaces and vapour permeable membrane facing cold side . Lap ends and side flanges of membrane over framing members. Retain in position with insulation clips installed as recommended by manufacturer. Tape seal butt ends and lapped side flanges. Do not tear or cut vapour barrier.

.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 consultant.

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 General Standards Board (CGSB)

.1 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

.2 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.

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:

.1 Product characteristics.

.2 Performance criteria.

.3 Limitations.

.3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).

1.3 DELIVERY, STORAGE AND HANDLING

.1 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 SHEET VAPOUR BARRIER

.1 Polyethylene film: to CAN/CGSB-51.34, 6 mil thick.

2.2 ACCESSORIES

.1 Joint sealing tape: air resistant pressure sensitive adhesive tape, cloth fabric duct tape type recommended by vapour barrier manufacturer, 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere.

.2 Sealant: compatible with vapour retarder materials, recommended by vapour retarder manufacturer. To Section 07 92 00 - Joint Sealing .

.3 Staples: minimum 6 mm leg.

.4 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

Part 3 Execution

3.1 INSTALLATION

.1 Ensure services are installed and inspected prior to installation of retarder.

.2 Install sheet vapour retarder on warm side of exterior wall ceiling assemblies prior to installation of gypsum board to form continuous retarder.

.3 Use sheets of largest practical size to minimize joints.

.4 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

3.2 EXTERIOR SURFACE OPENINGS

.1 Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to frame.

3.3 PERIMETER SEALS

.1 Seal perimeter of sheet vapour barrier as follows:

.1 Apply continuous bead of sealant to substrate at perimeter of sheets.

.2 Lap sheet over sealant and press into sealant bead.

.3 Install staples through lapped sheets at sealant bead into wood substrate.

.4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.4 LAP JOINT SEALS

.1 Seal lap joints of sheet vapour barrier as follows:

.1 Attach first sheet to substrate.

.2 Apply continuous bead of sealant over solid backing at joint.

.3 Lap adjoining sheet minimum 150 mm and press into sealant bead.

.4 Install staples through lapped sheets at sealant bead into wood substrate.

.5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 ELECTRICAL BOXES

.1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:

.1 Install moulded box vapour barrier Wrap boxes with film sheet providing minimum 300 mm perimeter lap flange.

.2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

3.6 CLEANING

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

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM International)

- .1 ASTM A167-99, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .2 ASTM A240/A240M-02, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- .3 ASTM A591/A591M-98, Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications.
- .4 ASTM A606-01, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
- .5 ASTM A653/A653M-01a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .6 ASTM A792/A792M-02, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .7 ASTM B32-00, Standard Specification for Solder Metal.
- .8 ASTM B370-98, Standard Specification for Copper Sheet and Strip for Building Construction.
- .9 ASTM D523-89(1999), Standard Test Method for Specular Gloss.
- .10 ASTM D822-01, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.2 Canadian Roofing Contractors Association (CRCA)

- .1 Roofing Specifications Manual 1997.

.3 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
- .2 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .3 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

.4 Canadian Standards Association (CSA International)

- .1 CSA A123.3-98, Asphalt Saturated Organic Roofing Felt.
- .2 CSA-A440-00/A440.1-00 - A440-00, Windows / Special Publication A440.1-00, User Selection Guide to CSA Standard A440-00, Windows.

.3 CSA B111-1974(R1998), Wire Nails, Spikes and Staples.

1.3 SAMPLES

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

.2 Submit 50 x 50 mm samples of each type of sheet metal material, colour and finish.

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 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

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

.5 Ensure emptied containers are sealed and stored safely for disposal away from children.

.6 Divert unused metal materials from landfill to metal recycling facility as approved by Engineer Consultant.

.7 Unused paint and sealant material must be disposed of at an official hazardous material collections site as approved by Engineer Consultant.

.8 Unused paint and sealant material 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.

.9 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 SHEET METAL MATERIALS

.1 Zinc coated steel sheet: commercial quality to ASTM A653/A653M, with Z275 designation zinc coating.

.2 Aluminum-zinc alloy coated steel sheet: to ASTM A792/A792M, commercial quality, grade 33 with AZ150 AZ180 coating, regular spangle extra smooth surface, chemically treated for unpainted finish not chemically treated for paint finish, mm base metal thickness.

.3 Electrolytic zinc coated, chromate treated, steel sheet: to ASTM A591/A591M, commercial quality, , copper bearing with proprietary coating comprised of 31.1 kg/m^2 zinc total mass both sides, painted unpainted finish.

.4 Textured stainless steel sheet: proprietary flat rolled stainless steel sheet product, random pebble pattern, standard mill product number .

.5 Weathering steel sheet: to ASTM A606 high strength low alloy hot cold rolled architectural use grade, 1.2 mm minimum thickness.

.6 Aluminum sheet: proprietary utility sheet plain embossed pattern, mm minimum thickness.

2.2 PREFINISHED ALUMINUM SOFFIT

.1 Manutacturer: Gentek Product: High Tensile 0515036 600, Color to match existing

.2 Or approved equal.

2.3 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Plastic cement: to CAN/CGSB 37.5.

.3 Underlay for metal flashing: No. 15 perforated asphalt felt to CSA A123.3.

.4 Sealants: As Per Manufacturers Recommendations.

.5 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

.6 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.

.7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

.8 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details as indicated.

.2 Fabricate aluminum flashings and other sheet aluminum work in accordance with AA-Aluminum Sheet Metal Work in Building Construction.

.3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.

.4 Hem exposed edges on underside 12 mm. Mitre and seal corners with sealant.

.5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.6 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS

.1 Form flashings, copings and fascias to profiles indicated of .96mm thick prefinished weathering steel color to match vertical steel siding.

2.6 EAVES TROUGHS AND DOWNPIPES

.1 Form eaves troughs and downpipes from prefinished steel sheet metal.

.2 Sizes and profiles as indicated.

.3 Provide goosenecks, outlets, strainer baskets and necessary fastenings.

Part 3 Execution

3.1 INSTALLATION

.1 Install sheet metal work in accordance with CRCA FL series details, FL Aluminum Sheet Metal Work in Building Construction.

.2 Use concealed fastenings except where approved before installation.

.3 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.

.4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using standing seams forming tight fit over hook strips, as detailed.

.5 Lock end joints and caulk with sealant.

.6 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.

.7 Caulk flashing at reglet cap flashing with sealant.

.8 Install pans, where shown around items projecting through roof membrane.

3.2 EAVES TROUGHS AND DOWNPIPES

.1 Install eaves troughs and secure to building at 750 mm on centre with eaves trough spikes through spacer ferrules. Slope eaves troughs to downpipes as indicated. Solder joints watertight.

.2 Install downpipes and provide goosenecks back to wall. Secure downpipes to wall with straps at 1800 mm on centre; minimum two straps per downpipe.

.3 Install splash pans as indicated.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials, preparation and application for caulking and sealants.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.3 Section 01 45 00 - Quality Control.

.4 Section 01 61 00 - Common Product Requirements.

1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM C919-02, Standard Practice for Use of Sealants in Acoustical Applications.

.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).

1.4 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.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.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.

Part 2 Products

2.1 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 When low toxicity caulks are not possible, confine usage to areas which offgas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize offgas time.

.3 Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Sealant manufacturers to provide product catalogue. Subject to Consultants approval.

.2 Urethanes One Part.

.1 Self-Leveling to CAN/CGSB-19.13, Type 1, colour as selected.

.3 Urethanes One Part.

.1 Non-Sag to CAN/CGSB-19.13, Type 2, MCG-2-25 MCG-2-40, colour as selected.

.4 Silicones One Part.

.1 To CAN/CGSB-19.13.

.1 Selant type: one part, acetoxy silicone sealant, cures to a flexible rubber when exposed to moisture present in the air, containin a fungicide, suitable for use in bathrooms, spas, and similar applications where joints need protection against fungi and bacteria. .

.5 Acoustical Sealant.

.1 To ASTM C919.

.2 Acceptable material:single component, non-skinning, non-hardening synthetic rubber, dark gray color, designed for use in drywall partitions to inhibit air movement and buffer vibration

.6 Acrylic Latex One Part

.1 To CAN/CGSB-19.17

.7 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 to 50 %.

.2 Neoprene or Butyl Rubber.

.1 Round solid rod, Shore A hardness 70.

.3 High Density Foam.

.1 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.

2.3 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

.2 Primer: as recommended by manufacturer.

Part 3 Execution

3.1 PROTECTION

.1 Protect installed Work of other trades from staining or contamination.

3.2 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.

3.3 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.

3.4 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.

3.5 MIXING

.1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 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 SECTION INCLUDES

.1 Flush wood doors; flush configuration; non-rated.

1.2 RELATED SECTIONS

.1 Section 06200: Wood door frames.

.2 Section 08265 - Closet Doors.

.3 Section 08710 - Door Hardware.

.4 Section 08800 - Glazing.

.5 Section 09910 - Paints and Coatings: Site finishing doors.

1.3 SUBMITTALS

.1 Submit under provisions of Section 01005.

.2 Product Data: Indicate door core materials and construction; veneer species, type and characteristics; factory machining criteria, factory finishing criteria.

1.4 QUALITY ASSURANCE

.1 Perform work in accordance with AWMAC Quality Standard, Custom Grade.

.2 Finish doors in accordance with AWMAC Quality Standard, to grades identified in schedule.

1.5 WARRANTY

.1 Provide warranty under provisions of Section 01005 to the following term:

.1 Exterior Doors: five (5) years.

.2 Interior Doors: Two (2) years.

.2 Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, telegraphing core construction.

Part 2 Products

2.1 MANUFACTURERS

.1 Exterior Doors

.1 All Weather Windows: Strong Arm steel entry Doors.

.2 Or approved equal.

.2 Interior Doors

.1 Masonite: Molded 6 Panel Door

.2 Premdoor: Molded 6 Panel Door.

.3 Storm Door

.1 Storm - Tite 724 2 lite.

.2 Window Factory Model 1000 MH

.3 Or Approved Equal

2.2 DOOR TYPES

.1 Flush Exterior Doors: Insulated aluminium 6 panel doors.

2.3 STORM DOORS

.1 Storm doors: to CGSB 82-GP-3M (Doors Aluminum, Combination Storm and Screen)

.1 Outward swinging, extruded aluminum with one fixed and one operable glazed inset panel, and one 0.8mm thick sheet aluminum kick plate

.2 Thickness: 51mm

.3 Weather stripping: shash stiles and top rail with two rows of 4mm height pile, height adjustable sweep with two 11mm high flexible PVC Fins.

.4 Frames: extruded aluminum secured to brick mould on primary door frame; weather stripped with one row of 4mm high flexible PVC double fin at head and jamb.

.5 Glass: safety glass to CAN/CGSB -12.1, tempered

.6 Latch set and closer: manufacturer standard pushbutton latch set with a grip handle and key, min. four extruded aluminum half-surface hinges fastened with three screws, and a pneumatic closer and safety chain.

.7 Finish: Enameled White color.

2.4 DOOR CONSTRUCTION

.1 Core Hollow: to CAN/DSA-0132.2.2.

2.5 FLUSH DOOR FACING

.1 Veneer Facing (Flush Interior Doors): AWMAC Custom quality species wood, , with book matched grain, transparent finish.

2.6 FABRICATION

.1 Fabricate non-rated doors in accordance with AWMAC Quality Standards requirements.

.2 Provide lock blocks at lock edge for hardware reinforcement.

.3 Factory pre-fit doors for frame opening dimensions identified on shop drawings.

2.7 FINISH

.1 Factory finish doors in accordance with approved sample.

Part 3 Execution

3.1 INSTALLATION

.1 Install doors in accordance with manufacturer's instructions.

3.2 INSTALLATION TOLERANCES

.1 Conform to NWWDA requirements for fit and clearance tolerances and maximum diagonal distortion.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

1.2 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.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.

.2 Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.

.3 Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged.

1.4 SITE ENVIRONMENTAL REQUIREMENTS

.1 Maintain temperature minimum 10 degrees C, maximum 21 degrees C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost free surfaces.

.3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.5 SAMPLES

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

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.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.

Part 2 Products

2.1 MATERIALS

.1 Standard board: to ASTM C36/C36M regular, 13 mm thick and Type X, 16 mm thick, 1200 mm wide x maximum practical length, ends square cut, edges bevelled.

.2 Gypsum sheathing board: to ASTM C79/C79M, regular, 13 mm thick and Type X, 16mm thick , 1200 mm wide x maximum practical length.

.3 Backing board and coreboard: to ASTM C442/C442M regular, mm thick and Type X, mm thick, rounded squared bevelled T&G edges.

.4 Water-resistant board: to ASTM C630/C630M regular, 13 mm thick and Type X, 16 mm thick, 1200 mm wide x maximum practical length.

.5 Metal furring runners, hangers, tie wires, inserts, anchors: to manufacturers standard.

.6 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.

.7 Resilient clips : 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.

.8 Steel drill screws: to ASTM C1002.

.9 Stud adhesive: to CAN/CGSB-71.25 ASTM C557.

.10 Laminating compound: as recommended by manufacturer, asbestos-free.

.11 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, zinc-coated by hot-dip process , 0.5 mm base thickness, perforated flanges, one piece length per location.

.12 Sealants: in accordance with Section 07 92 00 - Joint Sealing.

.13 Polyethylene: to CAN/CGSB-51.34, Type 2.

.14 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.

.15 Joint compound: to ASTM C475, asbestos-free.

2.2 FINISHES

.1 Texture finish: asbestos-free standard white texture coating and primer-sealer, recommended by gypsum board manufacturer.

Part 3 Execution

3.1 ERECTION

.1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.

.2 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 38 mm common nail 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 layer gypsum board to 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 Exterior Soffits and Ceilings: Install exterior gypsum board perpendicular to supports; stagger end joints over supports. Install with 6 mm gap where boards abut other work.

.5 Apply water-resistant gypsum board in washroomsand adjacent to slop sinks janitors closets . Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.

.6 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.

.7 Arrange vinyl-faced gypsum board symmetrical about openings and wall areas, with butt joints aluminum/vinyl mouldings between joints.

.8 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.

.9 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.

.10 Install gypsum board with face side out.

.11 Do not install damaged or damp boards.

.12 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 using contact adhesive for full length.

.2 Install casing beads around perimeter of suspended ceilings.

.3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.

.4 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 preformed units 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 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 as detailed, 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 tapping, finishing or accessories required.

.2 Level 1: Embed tape for joints and interior angles in joint compound. Surfaces to be free of excess joint compound; tool marks and ridges are acceptable.

.3 Level 2: Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.

.4 Level 3: Embed tape for joints and interior angles in joint compound and apply two separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.

.5 Level 4: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.

.6 Level 5: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges.

.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 broadknife 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 Canadian Environmental Protection Act (CEPA) 1999

.2 Canadian Lumbermen's Association (CLA)

.1 CLA Grading Rules for Canadian Hardwood Strip Flooring. The Long Standing Choice 1997.

.3 Canadian General Standards Board (CGSB)

.1 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.

.2 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

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

.1 Material Safety Data Sheets (MSDS).

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

.4 Closeout Submittals:

.1 Provide maintenance data for floor finish and care 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 .

.2 Ensure concrete, masonry, sheetrock, paint and framing members are thoroughly dry before flooring is delivered.

.3 Do not truck or unload flooring in rain, snow or other excessively humid conditions.

.4 Cover flooring with tarpaulin or vinyl if atmosphere is foggy or damp.

.5 Store in fully enclosed, well-ventilated, clean, dry building with weatherproof windows.

.6 Leave adequate room for air circulation around stacks of flooring.

.7 Maintain heat near occupancy levels for five days prior to delivery and until sanding and finishing are complete during winter months.

.8 Deliver flooring and divide into small lots in installation locations.

.9 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling

1.4 ENVIRONMENTAL REQUIREMENTS

.1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of materials.

.2 Ventilation:

.1 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities .

.3 Temperature:

.1 Maintain ambient temperature of not less than 18 degrees C nor more than 21 degrees C from 72 hours before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40 % during same period.

.2 Maintain minimum temperature 10 degrees C within area of installation until final acceptance of building .

.3 Ensure substrate is within moisture limits prescribed by flooring manufacturer.

.4 Install flooring after masonry, plastering work is completed and overhead mechanical and electrical work is finished in wood floor areas.

1.5 MAINTENANCE

.1 Extra Materials:

.1 Deliver 4 boxes of each type and pattern of wood flooring required for this project for maintenance use. Include sufficient amount of adhesive, underlayment and finishing materials and installation and application instructions. Store as directed.

Part 2 Products

2.1 MATERIALS

.1 High vinyl tile (VT) : to ASTM F1066, Composition 1 - non asbestos

.1 Armstrong Lux Plank

.1 Color to be chosen from one of the following collections

.1 Exotic Fruitwood

.2 Timber Bay Hickory

.3 Amendoim

.4 English Walnut

.5 Kingston Walnut

.2 Wear Layer Min 0.51mm

.3 Finish Urethane Plus

.4 Warrantee Residential: Lifetime

.5 Tile Dimensions:6” x 48” or 4 ½” x 48”.

.2 Underlayment:

.1 As per manufacturers instructions

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: CUSHIONED SUBFLOOR SYSTEM

.1 Cover concrete slab on grade with membrane damp proofing:

.1 Polyethylene membrane, lap joints 100 mm and seal with mastic.

.2 Asphalt saturated felt membrane, two plies of No.15 felt, set each layer in mastic, butt edges, offset joints.

.2 Attach resilient pads to underside of sheathing at 300 mm on centre and at corners.

.3 Cover floor with sheathing parallel to short dimension of room.

.4 Nail second layer of sheathing to first layer at 600 mm on centre and with 45 or 90 degree offset from first layer.

.5 Stagger and offset sheathing joints over first layer.

.6 Maintain minimum 6 mm expansion space at joints between sheathing panels.

3.3 CONSTRUCTION

.1 Install finish flooring parallel to long dimension of room.

.2 Install as per manufacturers instructions

.3 Maintain 2” expansion space at perimeter of floor surface .

.4 Install thresholds at openings and where indicated. Attach threshold to adjacent rigid floor surface. Threshold to act as ramp between floor surfaces over expansion space.

3.4 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 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.

3.5 CLEANING

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

.2 Clean flooring and base surfaces to flooring manufacturer's printed instructions.

3.6 PROTECTION

.1 Protect new floors from until final waxing.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM F1303-04, Standard Specification for Sheet Vinyl Floor Covering with Backing.

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

.1 Material Safety Data Sheets (MSDS).

.3 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.

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

.1 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base, nosing, feature strips, treads, edge strips.

.4 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 .

.2 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 .

1.4 AMBIENT CONDITIONS

.1 Maintain air temperature and structural base temperature at flooring installation area above 20 degrees for 48 hours before, during and 48 hours after installation.

1.5 MAINTENANCE

.1 Extra Materials:

.1 Provide extra materials of resilient sheet flooring and adhesives in accordance with Section 01 78 00 - Closeout Submittals .

.2 Provide 10 m^2 of each colour, pattern and type flooring material required for project for maintenance use.

.3 Extra materials one piece and from same production run as installed materials.

.4 Identify each roll of sheet flooring and each container of adhesive.

.5 Deliver to owner, upon completion of the work of this section.

Part 2 Products

2.1 MATERIALS

.1 Standard of Acceptance

.1 Tarkett Infinity Collection

.2 Warranty: 20 years

.3 Pattern and Color: To be chosen from manufacturers full collection

.2 Sheet vinyl with backing : to ASTM F1303, commercial.

.1 Type I - PVC binder content 90%.

.2 Backing: B-non-foam plastic.

.3 Pattern: smooth.

.3 Primers and adhesives: of types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade.

.4 Sub-floor filler and leveller: 2 part latex-type filler requiring no water as recommended by flooring manufacturer for use with their product.

.5 Metal edge strips: Aluminum extruded, smooth, mill finish polished stainless steel with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.

.6 External corner protectors: stainless steel , type recommended by flooring manufacturer.

.7 Edging to floor penetrations: stainless steel aluminum, type recommended by flooring manufacturer.

.8 Sealer and wax: type recommended by resilient flooring material manufacturer for material type and location.

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 SITE VERIFICATION OF CONDITIONS

.1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.

3.3 PREPARATION

.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 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.

.4 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

.5 Prime Seal concrete slab plywood sub-floor to resilient flooring manufacturer's printed instructions.

3.4 APPLICATION: FLOORING

.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. Do not spread more adhesive than can be covered by flooring before initial set takes place.

.3 Lay flooring with seams parallel to building lines to produce a minimum number of seams. Border widths minimum 1/3 width of full material.

.4 Run sheets in direction of traffic. Double cut sheet joints and continuously seal heat weld according to manufacturer's printed instructions.

.5 Heat weld seams of linoleum sheet flooring in accordance with manufacturer's printed instructions.

.6 As installation progresses, and after installation roll flooring with 45 kg minimum roller to ensure full adhesion or as per manufacturers recommended roller.

.7 Cut flooring around fixed objects.

.8 Install feature strips and floor markings where indicated. Fit joints tightly.

.9 Install flooring in pan type floor access covers. Maintain floor pattern.

.10 Continue flooring over areas which will be under built-in furniture.

.11 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.

.12 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.

.13 Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.5 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 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.

3.6 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 printed instructions.

3.7 PROTECTION

.1 Protect new floors from time of final set of adhesive until final inspection.

.2 Prohibit traffic on floor for 48 hours after installation.

.3 Use only water-based coating for linoleum.

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 Master Painters Institute (MPI)

.1 MPI Architectural Painting Specifications Manual, 2004.

.2 MPI - Maintenance Repainting Manual, 1998.

1.2 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures 01 00 10 - General Instructions.

.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 01 00 10 - General Instructions.

.4 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.5 Submit manufacturer's installation and application instructions.

1.3 STORAGE AND HANDLING

.1 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 within temperature as recommended by manufacturer.

.2 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.

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 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Place materials defined as hazardous or toxic waste, including tubes and containers, in containers or areas designated for hazardous waste.

.4 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.

1.5 SITE CONDITIONS

.1 Heating, Ventilation and Lighting:

.1 Ventilate enclosed spaces continuously during and after painting process. Run ventilation system 24 hours per day during installation, and provide continous ventilation for 7 days after completion of application of paint.

.2 Co-ordinate use of existing ventilation system with RCMP Property Manager and ensure its operation during and after application of paint as required.

.3 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Apply paint finishes when ambient air and substrate temperatures at location of installation can be satisfactorily maintained during application and drying process, within MPI and paint manufacturer's prescribed limits.

.2 Test concrete, masonry and plaster surfaces for alkalinity as required.

.3 Apply paint to adequately prepared surfaces, when moisture content is below paint manufacturer's prescribed limits.

.3 Additional application requirements:

.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 in occupied facilities during silent hours only. Schedule operations to approval of RCMP Property Manager such that painted surfaces will have dried and cured sufficiently before occupants are affected.

Part 2 Products

2.1 MATERIALS

.1 Provide paint materials for paint systems from single manufacturer.

.1 Acceptable Manufacturers: Sherwin Williams, Benjamin Moore, Pittsburgh Paints.

.2 Conform to latest MPI requirements for all painting work including preparation and priming.

.3 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI - Architectural Painting Specification Manual and MPI - Maintenance Repainting Manual "Approved Product" listing.

.4 Use MPI listed materials having minimum E2 rating where indoor air quality (odour) requirements exist.

2.2 COLOURS

.1 Colour schedule will be based upon selection of five base colours and three accent colours.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site, in accordance with manufacturer's written instructions. Obtain written approval from Consultant for tinting of painting materials.

.2 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.

.3 Thin paint for spraying in accordance with paint manufacturer's instructions.

.4 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 EXTERIOR PAINTING

.1 Concrete Vertical Surfaces: (including horizontal soffits)

.1 EXT 3.1A - Latex semi gloss finish.

.2 Concrete Masonry Units: smooth and split face block and brickEXT 4.2A - Latex semi gloss finish.

.3 Structural Steel and Metal Fabrications: columns, beams, joists and miscellaneous metal.

.1 EXT 5.1D - Alkyd semi gloss finish.

.4 Galvanized Metal: high contact/high traffic areas (doors, frames, railings and handrails, etc.).

.1 EXT 5.3B - Alkyd semi gloss finish.

.5 Dimension Lumber: columns, beams, exposed joists, underside of decking, siding, fencing, etc.

.1 EXT 6.2B - Waterborne solid colour stain finish.

.2 EXT 6.2C - Alkyd semi gloss finish.

.3 EXT 6.2L - Semi-transparent stain finish.

.6 Dressed Lumber: doors, door and window frames, casings, battens, smooth facias, etc.

.1 EXT 6.3B - Alkyd semi gloss finish do not use flat finish on doors.

.2 EXT 6.3C - Solid colour stain finish do not use in high contact areas or on doors.

.3 EXT 6.3D - Semi-transparent stain finish do not use on doors.

2.6 EXTERIOR RE-PAINTING

.1 Structural Steel and Metal Fabrications: columns, beams, joists and miscellaneous metal.

.1 REX 5.1D - Alkyd semi gloss.

.2 Galvanized Metal: high contact/high traffic areas (doors, frames, railings and handrails, etc.).

.1 REX 5.3B - Alkyd semi gloss.

.3 Dressed Lumber: doors, door and window frames, casings, battens, smooth fascias, etc.

.1 REX 6.3B - Alkyd semi gloss.

.2 REX 6.3D - Semi-Transparent Stain.

2.7 INTERIOR PAINTING

.1 Structural Steel and Metal Fabrications: columns, beams, joists and miscellaneous metal.

.1 INT 5.1E Alkyd - semi gloss finish.

.2 Galvanized Metal: high contact/high traffic areas (doors, frames, railings and handrails, etc.).

.1 INT 5.3C - Alkyd semi gloss finish (over cementitious primer).

.3 Plaster and gypsum board: gypsum wallboard, drywall, "sheet rock" type material, etc.

.1 INT 9.2A - Latex semi gloss finish (over latex sealer).

.2 INT 9.2C - Alkyd semi gloss finish (over latex sealer).

.3 INT 9.2M - Institutional low odour/low VOC semi gloss finish.

2.8 INTERIOR RE-PAINTING

.1 Galvanized Metal: high contact/high traffic areas (doors, frames, railings and handrails, etc.).

.1 RIN 5.3C - Alkyd semi gloss.

.2 Plaster and Gypsum Board: gypsum wallboard, drywall, "sheet rock" type material, etc.

.1 RIN 9.2A - Latex semi gloss.

.2 RIN 9.2C - Alkyd semi gloss finish.

Part 3 Execution

3.1 GENERAL

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

.2 Perform preparation and operations for interior painting in accordance with MPI - Architectural Painting Specifications Manual and MPI - Maintenance Repainting Manual except where specified otherwise.

3.2 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to RCMP Property Manager and General Contractor 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.

3.3 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 RCMP Property Manager or Consultant.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.2 Surface Preparation:

.1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.

.2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of RCMP Property Manager.

.3 Clean and prepare surfaces in accordance with MPI - Architectural Painting Specification Manual and MPI - Maintenance Repainting Manual specific requirements and coating manufacturer's recommendations.

.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.

.8 Touch up of shop primers with primer as specified.

.9 Do not apply paint until prepared surfaces have been accepted by Consultant

3.4 APPLICATION

.1 Method of application to be as approved by Consultant. Conform to manufacturer's application instructions unless specified otherwise.

.2 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.3 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.4 Sand and dust between coats to remove visible defects.

.5 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.

3.5 MECHANICAL/ELECTRICAL EQUIPMENT

.1 Paint conduits, piping, hangers, ductwork and other mechanical and electrical equipment exposed in finished areas, to match adjacent surfaces, except as indicated.

.2 Do not paint over nameplates.

.3 Keep sprinkler heads free of paint.

.4 Paint fire protection piping red.

.5 Paint disconnect switches for fire alarm system and exit light systems in red enamel.

.6 Paint natural gas piping yellow.

.7 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.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

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

.2 Shop drawings; submit drawings stamped and signed by professional engineer registered or licensed in the Northwest Territories, Canada.

.3 Shop drawings to show:

- .1 Mounting arrangements.
- .2 Operating and maintenance clearances.

.4 Shop drawings and product data accompanied by:

- .1 Detailed drawings of bases, supports, and anchor bolts.
- .2 Acoustical sound power data, where applicable.
- .3 Points of operation on performance curves.
- .4 Manufacturer to certify current model production.
- .5 Certification of compliance to applicable codes.

.5 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures : use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.

.6 Closeout Submittals:

- .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals .
- .2 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
- .3 Operation data to include:
  - .1 Control schematics for systems including environmental controls.
  - .2 Description of systems and their controls.
  - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
  - .4 Operation instruction for systems and component.
  - .5 Description of actions to be taken in event of equipment failure.
  - .6 Valves schedule and flow diagram.
  - .7 Colour coding chart.
- .4 Maintenance data to include:
  - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
  - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .5 Performance data to include:

.1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.

.2 Equipment performance verification test results.

.3 Special performance data as specified.

.4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC .

.6 Approvals:

.1 Submit 2 copies of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.

.2 Make changes as required and re-submit as directed by Departmental Representative.

.7 Additional data:

.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.

.8 Site records:

.1 Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring .

.2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.

.3 Use different colour waterproof ink for each service.

.4 Make available for reference purposes and inspection.

.9 As-built drawings:

.1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.

.2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).

.3 Submit to Departmental Representative for approval and make corrections as directed.

.4 Perform testing, adjusting and balancing for HVAC using as-built drawings.

.5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

.10 Submit copies of as-built drawings for inclusion in final TAB report.

1.2 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control .

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements .

1.3 MAINTENANCE

.1 Furnish spare parts in accordance with Section 01 78 00 - Closeout Submittals as follows:

.1 One set of packing for each pump.

.2 One casing joint gasket for each size pump.

.3 One head gasket set for each heat exchanger.

.4 One glass for each gauge glass.

.5 One filter cartridge or set of filter media for each filter or filter bank in addition to final operating set.

.2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 78 00 - Closeout Submittals .

.3 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

Part 2 Products

2.1 MATERIALS

Part 3 Execution

3.1 PAINTING REPAIRS AND RESTORATION

.1 Do painting in accordance with Section 09 19 99 – Painting for Minor works .

.2 Prime and touch up marred finished paintwork to match original.

.3 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

.1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

3.3 DEMONSTRATION

.1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

.2 Trial usage to apply to following equipment and systems:

.1 Fan control system

.3 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.

.4 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

.5 Instruction duration time requirements as specified in appropriate sections.

3.4 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Pipe, pipe fittings, valves, and connections for piping systems.

- .1 Sanitary sewer.
- .2 Domestic water.

1.2 RELATED SECTIONS

.1 Section 01 45 00 - Quality Control.

.2 Section 01 61 00 - Common Product Requirements.

.3 Section 01 73 00 - Execution Requirements..

.4 Section 01 71 00 – Examination and Preparation

.5 Section 08 31 00 - Access Doors And Frames.

.6 Section 09 91 99 – Painting for Minor Works.

.7 Section 23 05 53 - Mechanical Identification.

.8 Section 23 07 19 - Piping Insulation.

1.3 REFERENCES

.1 AGA Z21.22 - Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems.

.2 ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.

.3 ASME B16.3 - Malleable Iron Threaded Fittings.

.4 ASME B16.4 - Grey Iron Threaded Fittings.

.5 ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.

.6 ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

.7 ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV.

.8 ASME B16.26 - Copper Alloy Bronze Fittings for Flared Copper Tubes.

.9 ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.

.10 ASME B16.32 - Cast Copper Alloy Solder Joint Fittings for Solvent Drainage Systems.

.11 ASME B31.9 - Building Services Piping.

.12 ASME SEC IV - Construction of Heating Boilers.

.13 ASME SEC IX - Welding and Brazing Qualifications.

.14 ASTM A47/A47M - Ferritic Malleable Iron Castings.

.15 ASTM A53/A53M - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

.16 ASTM A74 - Cast Iron Soil Pipe and Fittings.

.17 ASTM A234/A234M - Piping Fittings of Wrought-Carbon Steel and Alloy Steel for Moderate and High Temperature Service.

.18 ASTM B32 - Solder Metal.

.19 ASTM B42 - Seamless Copper Pipe, Standard Sizes.

.20 ASTM B43 - Seamless Red Brass Pipe, Standard Sizes.

.21 ASTM B68 - Seamless Copper Tube, Bright Annealed.

.22 ASTM B75 - Seamless Copper Tube.

.23 ASTM B88 - Seamless Copper Water Tube.

.24 ASTM B251 - General Requirements for Wrought Seamless Copper and Copper-Alloy Tube.

.25 ASTM B280 - Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.

.26 ASTM B302 - Threadless Copper Pipe, Standard Sizes.

.27 ASTM B306 - Copper Drainage Tube (DWV).

.28 ASTM C4 - Clay Drain Tile and Perforated Clay Drain Tile.

.29 ASTM C14/C14M - Concrete Sewer, Storm Drain, and Culvert Pipe.

.30 ASTM C425 - Compression Joints for Vitrified Clay Pipe and Fittings.

.31 ASTM C443 - Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.

.32 ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

.33 ASTM C700 - Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.

.34 ASTM C1053 - Borosilicate Glass Pipe and Fittings for Drain, Waste, and Vent (DWV) Applications.

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.35 ASTM D1785 - Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

.36 ASTM D2235 - Solvent Cement for Acrylonitrile - Butadiene - Styrene (ABS) Plastic Pipe and Fittings.

.37 ASTM D2239 - Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.

.38 ASTM D2241 - Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

.39 ASTM D2447 - Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter.

.40 ASTM D2466 - Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

.41 ASTM D2513 - Thermoplastic Gas Pressure Pipe, Tubing, and Fittings.

.42 ASTM D2564 - Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.

.43 ASTM D2609 - Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe.

.44 ASTM D2661 - Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings.

.45 ASTM D2662 - Polybutylene (PB) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.

.46 ASTM D2665 - Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.

.47 ASTM D2666 - Polybutylene (PB) Plastic Tubing.

.48 ASTM D2683 - Socket-Type Polyethylene Fillings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.

.49 ASTM D2729 - Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

.50 ASTM D2751 - Acrylonitrile-Butadiene-Styrene (ABS) Sewer, Pipe, and Fittings.

.51 ASTM D2846 - Chlorinated Polyvinyl Chloride (CPVC) Pipe, Fittings, Solvent Cements and Adhesives for Potable Hot Water Systems.

.52 ASTM D2855 - Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.

.53 ASTM D2996 - Filament-Wound 'Fibreglass' (Glass-Fibre-Reinforced Thermosetting-Resin) Pipe.

.54 ASTM D2997 - Centrifugally-Cast 'Fibreglass' (Glass-Fibre-Reinforced Thermosetting-Resin) Pipe.

.55 ASTM D3000 - Polybutylene (PB) Plastic Pipe (SDR-PR) Based on Outside Diameter.

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.56 ASTM D3034 - Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

.57 ASTM D3262 - 'Fibreglass' (Glass-Fibre-Reinforced Thermosetting-Resin) Sewer Pipe.

.58 ASTM D3309 - Polybutylene (PB) Plastic Hot- and Cold-Water Distribution System.

.59 ASTM D3517 - 'Fibreglass' (Glass-Fibre-Reinforced Thermosetting-Resin) Pressure Pipe.

.60 ASTM D3754 - 'Fibreglass' (Glass-Fibre-Reinforced Thermosetting-Resin) Sewer and Industrial Pressure Pipe.

.61 ASTM D3840 - 'Fibreglass' (Glass-Fibre-Reinforced Thermosetting-Resin) Pipe Fittings for Non-Pressure Applications.

.62 ASTM E814 - Fire Tests of Through-Penetration Fire Stops.

.63 ASTM F437 - Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.

.64 ASTM F438 - Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40.

.65 ASTM F439 - Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.

.66 ASTM F441 - Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.

.67 ASTM F442 - Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe(SDR-PR).

.68 ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

.69 ASTM F493 - Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.

.70 ASTM F628 - Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe with a Cellular Core.

.71 ASTM F679 - Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.

.72 ASTM F708 - Design and Installation of Rigid Pipe Hangers.

.73 ASTM F1281 - Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Pressure Pipe.

.74 ASTM F1282 - Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure Pipe.

.75 AWS A5.8 - Filler Metals for Brazing and Braze Welding.

.76 AWWA C105 - Polyethylene Encasement for Ductile-Iron Piping Systems.

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.77 AWWA C110 - Ductile - Iron and Gray - Iron Fittings, 3 In. - 48 In. (76 mm - 1219 mm), for Water.

.78 AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

.79 AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast, for Water.

.80 AWWA C651 - Disinfecting Water Mains.

.81 AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe (and Fabricated Fittings), 4 inch - 12 inch (100 mm - 300 mm), for Water Distribution.

.82 AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 inch - 3 inch (13 mm - 76 mm) for Water Service.

.83 AWWA C902 - Polybutylene (PB) Pressure Pipe and Tubing, 1/2 inch - 3 inch (13 mm - 76 mm) for Water.

.84 AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 inch - 48 inch (350 mm - 1200mm).

.85 CAN-3 B281 - Aluminum Drain, Waste, and Vent Pipe and Components.

.86 CISPI 301 - Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications.

.87 CISPI 310 - Joints with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applictions.

.88 MSS SP58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.

.89 MSS SP-67 - Butterfly Valves.

.90 MSS SP69 - Pipe Hangers and Supports - Selection and Application.

.91 MSS SP-70 - Cast Iron Gate Valves, Flanged and Threaded Ends.

.92 MSS SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.

.93 MSS SP-78 - Cast Iron Plug Valves, Flanged and Threaded Ends.

.94 MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves.

.95 MSS SP-85 - Cast Iron Globe & Angle Valves, Flanged and Threaded Ends.

.96 MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

.97 MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

.98 NCPWB - Procedure Specifications for Pipe Welding.

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.99 NFPA 54 - National Fuel Gas Code.

.100 UL 1479 - Fire Tests of Through-Penetration Firestops.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Procedures for submittals.

.2 Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalogue information. Indicate valve data and ratings.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

.1 Section 01 77 00: Procedures for submittals.

.2 Project Record Documents: Record actual locations of valves .

1.6 QUALITY ASSURANCE

.1 Perform Work to Manitoba standards. Maintain one copy on site.

.2 Valves: Manufacturer's name and pressure rating marked on valve body.

.3 Welding Materials and Procedures: Conform to ASME SEC IX and applicable provincial labour regulations.

.4 Welders Certification: To ASME SEC IX NCPWB Standard Procedure Specifications .

.5 Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

1.7 REGULATORY REQUIREMENTS

.1 Perform Work to latest version of National Plumbing Code and Manitoba plumbing code.

.2 Conform to applicable code for installation of backflow prevention devices.

.3 Provide certificate of compliance from authority having jurisdiction indicating approval of installation of backflow prevention devices.

1.8 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Accept valves on site in shipping containers with labelling in place. Inspect for damage.

.3 Provide temporary protective coating on cast iron and steel valves.

.4 Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

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.5 Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.9 EXTRA MATERIALS

.1 Section 01 78 00: Operation and maintenance data.

.2 Provide two repacking kits for each size valve.

Part 2 Products

2.1 SANITARY SEWER PIPING, ABOVE GRADE

.1 ABS Pipe: ASTM D2661 or ASTM D2751.

.1 Fittings: ABS.

.2 Joints: ASTM D2235, solvent weld.

.2 PVC Pipe: ASTM D1785 Schedule 40, or ASTM D2241 SDR-26 for not less than 1 034 kPa pressure rating.

.1 Fittings: ASTM D2466, PVC.

.2 Joints: ASTM D2855, solvent weld with ASTM D2564 Solvent cement.

2.2 WATER PIPING, ABOVE GRADE

.1 Copper Tubing: ASTM B88M, Type L, K, hard drawn.

.1 Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.

.2 Joints: ASTM B32, solder, Grade 95TA.

.2 Pex Tubing:

.1 Manufacturers: Upnor, Rehau

2.3 PIPE HANGERS AND SUPPORTS

.1 Plumbing Piping - Drain, Waste, and Vent:

.1 Conform to ASME B31.9 ASTM F708 MSS SP58 MSS SP69 MSS SP89.

.2 Hangers for Pipe Sizes 15 to 40 mm: Carbon steel, adjustable swivel, split ring.

.3 Hangers for Pipe Sizes 50 mm and Over: Carbon steel, adjustable, clevis.

.4 Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

.5 Wall Support for Pipe Sizes to 80 mm: Cast iron hook.

.6 Wall Support for Pipe Sizes 100 mm and Over: Welded steel bracket and wrought steel clamp.

.7 Vertical Support: Steel riser clamp.

.8 Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

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.9 Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

.2 Plumbing Piping - Water:

.1 Conform to ASME B31.9 ASTM F708 MSS SP58 MSS SP69 MSS SP89.

.2 Hangers for Pipe Sizes 15 to 40 mm: Malleable iron Carbon steel, adjustable swivel, split ring.

.3 Hangers for Cold Pipe Sizes 50 mm and Over: Carbon steel, adjustable, clevis.

.4 Hangers for Hot Pipe Sizes 50 to 100 mm: Carbon steel, adjustable, clevis.

.5 Hangers for Hot Pipe Sizes 150 mm and Over: Adjustable steel yoke, cast iron pipe roll, double hanger.

.6 Multiple or Trapeze Hangers: Steel channels with welded supports or spacers and hanger rods.

.7 Multiple or Trapeze Hangers for Hot Pipe Sizes 150 mm and Over: Steel channels with welded supports or spacers and hanger rods, cast iron roll.

.8 Wall Support for Pipe Sizes to 80 mm: Cast iron hook.

.9 Wall Support for Pipe Sizes 100 mm and Over: Welded steel bracket and wrought steel clamp.

.10 Wall Support for Hot Pipe Sizes 150 mm and Over: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron pipe roll.

.11 Vertical Support: Steel riser clamp.

.12 Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

.13 Floor Support for Hot Pipe Sizes to 100 mm: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.

.14 Floor Support for Hot Pipe Sizes 150 mm and Over: Adjustable cast iron pipe roll and stand, steel screws, and concrete pier or steel support.

.15 Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

2.4 GATE VALVES

.1 Up To and Including 80 mm:

.1 Manufacturers:

.1 Crane #1334

.2 Toyo #299

.3 Kitz #44

.4 Substitutions: Refer to Section 01 62 00.

.2 MSS SP-80, Class 125 , bronze body, bronze trim, rising stem, handwheel, inside screw, solid wedge disc, solder or threaded ends.

.2 50 mm and Larger:

.1 Manufacturers:

.1 Crane #465

.2 Toyo #421A

.3 Kitz #72

.4 Substitutions: Refer to Section 01 62 00.

□

.2 MSS SP-70, Class 125 , iron body, bronze trim, outside screw and yoke, handwheel, solid wedge disc, flanged ends. Provide chain-wheel operators for valves 150 mm and larger mounted over 2400 mm above floor.

2.5 BALL VALVES

.1 Manufacturer: Crane #F9202.

.2 Other acceptable manufacturers offering equivalent products.

.1 Toyo

.2 Kitz

.3 Substitutions: Refer to Section 01 62 00.

Construction, 100 mm and Smaller: MSS SP-110, Class 150, 2760 kPa CWP , bronze, two piece body, chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder or threaded ends with union.

Part 3 Execution

3.1 EXAMINATION

.1 Section 01 71 00 Examination and Preparation: Verification of existing conditions before starting work.

.2 Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

.1 Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

.2 Remove scale and dirt, on inside and outside, before assembly.

.3 Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

.1 Install to manufacturer's instructions.

.2 Provide non-conducting dielectric connections wherever jointing dissimilar metals.

.3 Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

.4 Install piping to maintain headroom, conserve space, and not interfere with use of space.

.5 Group piping whenever practical at common elevations.

.6 Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

□

.7 Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

.8 Provide access where valves and fittings are not exposed. .

.9 Install vent piping penetrating roofed areas to maintain integrity of roof assembly.

.10 Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

.11 Provide support for utility meters to requirements of utility companies.

.12 Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Section 09 91 99.

.13 Install bell and spigot pipe with bell end upstream.

.14 Install valves with stems upright or horizontal, not inverted.

.15 Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.

.16 Install water piping to ASME B31.9.

.17 Sleeve pipes passing through partitions, walls and floors.

.18 Inserts:

- .1 Provide inserts for placement in concrete formwork.
- .2 Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- .3 Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 100 mm.
- .4 Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- .5 Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above flush with top of recessed into and grouted flush with slab.

.19 Pipe Hangers and Supports:

- .1 Install to ASTM B31.9 ASTM F708 and MSS SP89.
- .2 Support horizontal piping as scheduled.
- .3 Install hangers to provide minimum 15 mm space between finished covering and adjacent work.
- .4 Place hangers within 300 mm of each horizontal elbow.
- .5 Use hangers with 40 mm minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
- .6 Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.

□

.7 Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

.8 Provide copper plated hangers and supports for copper piping.

.9 Prime coat exposed steel hangers and supports.

.10 Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

.11 Provide hangers adjacent to motor driven equipment with vibration isolation.

.12 Support cast iron drainage piping at every joint.

3.4 APPLICATION

.1 Use grooved mechanical couplings and fasteners only in accessible locations.

.2 Install unions downstream of valves and at equipment or apparatus connections.

.3 Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

.4 Install gate or butterfly valves for shut-off and to isolate equipment, part of systems, or vertical risers.

.5 Install ball or butterfly valves for throttling, bypass, or manual flow control services.

.6 Provide lug end butterfly valves adjacent to equipment when provided to isolate equipment.

.7 Provide spring loaded check valves on discharge of water pumps.

.8 Provide flow controls in water recirculating systems where indicated.

3.5 ERECTION TOLERANCES

.1 Establish invert elevations, slopes for drainage to one percent minimum. Maintain gradients.

.2 Slope water piping minimum 0.25 percent and arrange to drain at low points.

3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

.1 Disinfect water distribution system to Section 22 05 81

3.7 SCHEDULES

.1 Pipe Hanger Schedule:

.1 Metal Piping:

.1 Pipe size: 15 to 32 mm:

.1 Maximum hanger spacing: 2 m.

.2 Hanger rod diameter: 9 mm.

.2 Pipe size: 40 to 50 mm:

.1 Maximum hanger spacing: 3 m.

.2 Hanger rod diameter: 9 mm.

.3 Pipe size: 65 to 75 mm:

.1 Maximum hanger spacing: 3 m.

.2 Hanger rod diameter: 13 mm.

.4 Pipe size: 100 to 150 mm:

.1 Maximum hanger spacing: 3 m.

.2 Hanger rod diameter: 15 mm.

.5 Pipe size: 200 to 300 mm:

.1 Maximum hanger spacing: 4.25 m.

.2 Hanger rod diameter: 22 mm.

.6 Pipe size: 350 mm and Over:

.1 Maximum hanger spacing: 6 m.

.2 Hanger rod diameter: 25 mm.

.2 Plastic Piping:

.1 All Sizes:

.1 Maximum hanger spacing: 1.8 m.

.2 Hanger rod diameter: 9 mm.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Cleanouts.

.2 Hose bibs.

1.2 RELATED SECTIONS

.1 Section 01 61 00 - Common Product Requirements.

.2 Section 01 73 00 - Execution Requirements.

.3 Section 22 10 00 - Plumbing Piping.

.4 Section 22 42 02 - Plumbing Fixtures.

.5 Section 22 47 00 - Plumbing Equipment.

.6 Section 26 05 80 - Equipment Wiring: Electrical characteristics and wiring connections.

1.3 REFERENCES

.1 ASSE 1011 - Hose Connection Vacuum Breakers.

.2 ASSE 1019 - Wall Hydrants, Frost Proof Automatic Draining Anti-Backflow Types.

.3 PDI WH-201 - Water Hammer Arrestors.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Procedures for submittals.

.2 Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.

.3 Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.

1.5 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Procedures for submittals.

.2 Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.

1.6 SUBMITTALS AT PROJECT CLOSEOUT

.1 Section 01 78 00: Procedures for submittals.

□

.2 Project Record Documents: Record actual locations of equipment, cleanouts, backflow preventers, water hammer arrestors.

.3 Operation Data: Indicate frequency of treatment required for interceptors.

.4 Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

1.7 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.8 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Accept specialties on site in original factory packaging. Inspect for damage.

1.9 MAINTENANCE PRODUCTS

.1 Section 01 78 40.

1.10 EXTRA MATERIALS

.1 Section 01 78 40.

.2 Supply two loose keys for outside hose bibs.

Part 2 Products

2.1 CLEANOUTS

.1 Interior Finished Floor Areas (CO):

.1 Manufacturers:

.1 Zurn Model ZN-1400-HD-BP-NH

.2 Substitutions: Refer to Section 01 62 00.

.2 Galvanized cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.

.2 Interior Finished Wall Areas (CO):

.1 Manufacturers:

.1 Zurn Model ZANB-1460

.2 Substitutions: Refer to Section 01 62 00.

.2 Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

□

.3 Interior Unfinished Accessible Areas (CO-5): Caulked or threaded type. Provide bolted stack cleanouts on vertical rainwater leaders.

Part 3 Execution

3.1 INSTALLATION

.1 Install to manufacturer's instructions.

.2 Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.

.3 Encase exterior cleanouts in concrete flush with grade.

.4 Install floor cleanouts at elevation to accommodate finished floor.

.5 Install approved potable water protection devices on plumbing lines where contamination of domestic water may occur; on boiler feed water lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibs.

.6 i) Pipe relief from backflow preventer to nearest drain.

.7 Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to washing machine outlets .

.8 Install air chambers on hot and cold water supply piping to each fixture or group of fixtures (each washroom). Fabricate same size as supply pipe or20 mm minimum, and minimum450 mm long.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Water closets.

.2 Lavatories.

.3 Sinks.

.4 Bathtubs.

.5 Showers.

1.2 REFERENCES

.1 ANSI Z124.1 - Gel-Coated Glass-Fibre Reinforced Polyester Resin Bathtub Units.

.2 ANSI Z124.2 - Gel-Coated Glass-Fibre Reinforced Polyester Resin Shower Receptor and Shower Stall Units.

.3 ASME A112.18.1 - Plumbing Fixture Fittings.

.4 ASME A112.19.1 - Enamelled Cast Iron Plumbing Fixtures.

.5 ASME A112.19.2 - Vitreous China Plumbing Fixtures.

.6 ASME A112.19.3 - Stainless Steel Plumbing Fixtures (Designed for Residential Use).

.7 ASME A112.19.4 - Porcelain Enamelled Formed Steel Plumbing Fixtures.

.8 ASME A112.19.5 - Trim for Water-Closet Bowls, Tanks, and Urinals.

.9 NFPA 70 - National Electrical Code.

1.3 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Procedures for submittals.

.2 Product Data: Provide catalogue illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

.3 Samples: Submit two sets of colour chips for each standard colour .

1.4 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Procedures for submittals.

.2 Manufacturer's Instructions: Indicate installation methods and procedures.

□

1.5 SUBMITTALS AT PROJECT CLOSEOUT

.1 Section 01 78 10: Procedures for submittals.

.2 Maintenance Data: Include fixture trim exploded view and replacement parts lists.

.3 Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS

.1 Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.8 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Accept fixtures on site in factory packaging. Inspect for damage.

.3 Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

Part 2 Products

2.1 TANK TYPE WATER CLOSETS WC-1

.1 Bowl:

.1 Manufacturer: Crane Sureflush 31362/31363 .

.2 Other acceptable manufacturers offering equivalent products.

.1 American Standard

.2 Substitutions: Refer to Section 01 62 00.

.3 ASME A112.19.2; floor mounted, siphon jet, vitreous china,420 mm high 450 mm high mm high close-coupled closet combination with elongated rim, insulated vitreous china closet tank with fittings and lever flushing valve, bolt caps vandalproof cover locking device. Minimum MaP testing number of 800.

.2 Seat:

.1 Manufacturer: Crane

.2 Other acceptable manufacturers offering equivalent products.

.1 Substitutions: Refer to Section 01 62

.3 Solid white plastic, open front, brass bolts, without cover.

□

2.2 LAVATORIES LAV-1

.1 Vitreous China Counter Top Basin:

.1 Manufacturer: Crane Model Sonnet 1341.

.2 Other acceptable manufacturers offering equivalent products.

.1 American Standard.

.2 Kohler.

.3 Substitutions: Refer to Section 01600 - Material and Equipment .

.3 ASME A112.19.2; vitreous china self-rimming counter top lavatory, 610 x 457 mm with drillings on 100 mm centres, front overflow, seal of putty, caulking, or concealed vinyl gasket.

.2 Supply Fitting:

.1 Manufacturer: Delta Model 520 - HDF.

.2 Other acceptable manufacturers offering equivalent products.

.1 American Standard.

.2 Kohler.

.3 ASME A112.18.1; chrome plated combination supply fitting with pop-up waste, water economy aerator with maximum 7.5 L/m flow, single lever handle lavatory faucet.

2.3 SINKS

.1 Double Compartment Bowl: S-1

.1 Manufacturer: Kindred LBD7508P-1

.2 Substitutions: Refer to Section 01 62 00.

.2 ASME A112.19.3; Double bowl sink with faucet ledge 18 GA SS. Self rimming. Exposed surfaces are satin finished. Spillway between bowls. Underside is fully sound dampened and undercoated. Complete with factory installed rim seal, installation kit and 3 ½" waste assembly. O.D. 56X84X20 cm outside dimensions. Faucet drilled for 3 hole 1 ½" diameter on 4" centers, 8" widespread.

.2 Trim:

.1 Manufacturer: DELTA 29C2801.

.1 Substitutions: Refer to Section 01 62 00.

.2 ASME A112.18.1; chrome plated brass supply with long swing spout, vandal proof water economy aerator with maximum 0.14 L/s flow, single lever handle and retractable spray.

.3 Accessories: 1.3 mm brass P-trap with clean-out plug and arm with escutcheon, wheel handle stop, flexible supplies.

□

2.4 BATHTUBS AND SHOWERS

.1 Bathtub:

.1 Manufacturer: Fiat Model: Enova MTS6300M-3

3-piece bath shower unit

.2 Other acceptable manufacturers offering equivalent products:

.1 American Standard

.2 Substitutions: Refer to Section 01600 – Material and Equipment.

Bath and Shower Trim:

.1 Manufacturer: Delta T17 Series.

.2 Tub and Shower trim and Tub trim only.

.3 Other acceptable manufacturers offering equivalent products.

.1 Moen.

.2 Substitutions: Refer to Section 01600 - Material and Equipment .

.4 ASME A112.18.1; concealed shower and over rim supply with diverter spout, pressure balanced mixing valve, bent shower arm with flow control and adjustable spray ball joint showerhead with maximum 0.16 L/s flow and escutcheon, lever operated pop-up waste and overflow.

2.5 WASHER ACCESSORY

.1 Waltec Deluxe Washer Fitting hot/cold water – recessed.

Part 3 Execution

3.1 EXAMINATION AND PREPARATION

.1 Section 01 70 00: Verification of existing conditions before starting work.

.2 Verify that walls and floor finishes are prepared and ready for installation of fixtures.

.3 Verify that electric power is available and of the correct characteristics.

.4 Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.2 PREPARATION

.1 Rough-in fixture piping connections to minimum sizes indicated in fixture rough-in schedule for particular fixtures.

□

3.3 INSTALLATION

.1 Install each fixture with trap, easily removable for servicing and cleaning.

.2 Provide chrome plated rigid or flexible supplies to fixtures with wheel stops, reducers, and escutcheons.

.3 Install components level and plumb.

.4 Install and secure fixtures in place with wall supports and bolts.

.5 Seal fixtures to wall and floor surfaces with sealant as specified in Section 07 92 00, colour to match fixture.

.6 Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

3.4 INTERFACE WITH OTHER PRODUCTS

.1 Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.5 ADJUSTING

.1 Section 01 78 10 - Execution Requirements: Adjusting installed work.

.2 Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

.1 Section 01 78 10 - Execution Requirements: Cleaning installed work.

.2 Clean plumbing fixtures and equipment.

3.7 PROTECTION OF FINISHED WORK

.1 Section 01 78 10 - Execution Requirements: Protecting installed work.

.2 Do not permit use of fixtures.

3.8 SCHEDULES

.1 Fixture Heights: Install fixtures to heights above finished floor as indicated.

.1 Water Closet:

.1 Standard: 380 mm min to top of bowl rim.

.2 Accessible: 455 mm min to top of seat.

.2 Lavatory:

.1 Standard: 785 mm min to top of basin rim.

.2 Accessible: 865 mm min to top of basin rim.

□

.3 Shower Heads:

.1 Adult Male: 1830 mm min to bottom of head.

.2 Fixture Rough-In

	Water Closet: (Tank Type)	15 mm	100 mm	50 mm	
	Lavatory:	15 mm	15 mm	40 mm	32 mm
	Sink:	15 mm	15 mm	40 mm	32 mm
	Bathtub:	15 mm	15 mm	40 mm	32 mm
	Shower:	15 mm	15 mm	40 mm	32 mm

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Water heaters.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Administrative Requirements.

.2 Section 01 61 00 - Common Product Requirements.

.3 Section 01 78 10 - Execution Requirements.

1.3 REFERENCES

.1 ASME Section 8D - Boilers and Pressure Vessel Codes - Rules for Construction of Pressure Vessels.

.2 NFPA 30 - Flammable and Combustible Liquids Code.

.3 NFPA 54 - National Fuel Gas Code.

.4 UL 1453 - Electric Booster and Commercial Storage Tank Water Heaters.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Procedures for submittals.

.2 Product Data:

- .1 Provide dimension drawings of water heaters indicating components and connections to other equipment and piping.
- .2 Indicate pump type, capacity, power requirements.
- .3 Provide certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.
- .4 Provide electrical characteristics and connection requirements.

.3 Shop Drawings:

- .1 Indicate dimensions of tanks, tank lining methods, anchors, attachments, lifting points, tappings, and drains.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

.1 Section 01 78 10: Procedures for submittals.

.2 Project Record Documents: Record actual locations of equipment.

□

.3 Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.

.4 Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

.2 Provide pumps with manufacturer's name, model number, and rating/capacity identified.

.3 Ensure products and installation of specified products are to recommendations and requirements of the following organizations:

.1 Canadian Standards Association (CSA).

.2 American Society of Mechanical Engineers (ASME).

.3 National Electrical Manufacturers' Association (NEMA).

.4 Underwriters Laboratories Canada (ULC).

.4 Ensure pumps operate at specified system fluid temperatures without vapour binding and cavitation, are non-overloading in parallel or individual operation, operate within 25 percent of midpoint of published maximum efficiency curve.

1.7 REGULATORY REQUIREMENTS

.1 Conform to ASME Section 8D NFPA 30 NFPA 31 for pressure tanks.

.2 Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Canada and CSA as suitable for the purpose specified and indicated.

1.8 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.9 WARRANTY

.1 Section 01 78 10.

.2 Provide five year manufacturer warranty for water storage tanks and pumps. (New Equipment only)

1.10 EXTRA MATERIALS

.1 Section 01 78 10.

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Part 2 Products

2.1 RESIDENTIAL ELECTRIC WATER HEATERS

.1 Manufacturer: Giant Cascade Model 152B-3F7M.

.2 Other acceptable manufacturers offering equivalent products.

.1 Substitutions: Refer to Section 01 62 00. Not permitted.

.3 Type: Automatic, electric, vertical storage.

.4 Performance:

.1 Storage capacity: 40 gal.

.2 Heating element size: 3000 kW.

.3 Number of heating elements: 2.

.4 Maximum working pressure: 150 psig .

.5 Electrical Characteristics:

.1 240 volts, single phase.

.6 Tank: Glass-lined inner tank, magnesium anode..

.7 Controls: Automatic water thermostat with externally adjustable temperature range from 110 to 170 degrees F, flanged or screw-in nichrome elements, enclosed controls and electrical junction box.

.8 Accessories: Brass water connections and polysulfone dip tube, drain valve, and ASME temperature and pressure relief valve.

.9 Warranty: 6 year limited warranty against tank leakage, 5 year limited warranty on heating elements, 1 year limited warranty on thermostats.

Part 3 Execution

3.1 INSTALLATION

3.2 INSTALLATION

.1 Install water heaters to manufacturer's instructions and to AGA NSF NFPA 54 UL requirements.

.2 Coordinate with plumbing piping and related fuel piping gas venting and electrical work to achieve operating system.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Testing, adjustment, and balancing of air systems.

.2 Measurement of final operating condition of HVAC systems.

.3 Sound measurement of equipment operating conditions.

.4 Vibration measurement of equipment operating conditions.

1.2 RELATED SECTIONS

.1 Section 01 20 13 - Price and Payment Procedures.

.2 Section 01 33 00 - Administrative Requirements.

.3 Section 01 44 00 - Quality Assurance:

- .1 Testing laboratory services.
- .2 Employment of testing agency and payment for services.
- .3 Inspection and testing allowances.

.4 Section 01 61 00 - Common Product Requirements.

.5 Section 01 78 10 - Execution Requirements:

- .1 Starting of Systems.
- .2 Testing, Adjusting, and Balancing of Systems.

1.3 REFERENCES

.1 AABC - National Standards for Total System Balance.

.2 ADC - Test Code for Grilles, Registers, and Diffusers.

.3 ASHRAE 111 - Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air-conditioning, and Refrigeration Systems.

.4 NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.

.5 SMACNA - HVAC Systems Testing, Adjusting, and Balancing.

1.4 SUBMITTALS

.1 Section 01 33 00: Procedures for submittals.

.2 Submit name of adjusting and balancing agency for approval within 30 days after award of Contract.

□

.3 Section 01 44 00: Procedures for submitting Field Reports.

.4 Field Reports: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

.5 Prior to commencing work, submit report forms or outlines indicating adjusting, balancing, and equipment data required.

.6 Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Consultant and for inclusion in operating and maintenance manuals.

.7 Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.

.8 Include detailed procedures, agenda, sample report forms and copy of AABC National Project Performance Guaranty prior to commencing system balance.

.9 Test Reports: Indicate data on AABC National Standards for Total System Balance forms. Submit data in S.I. Metric units.

1.5 PROJECT RECORD DOCUMENTS

.1 Section 01 78 00: Submittals for project closeout.

.2 Record actual locations of flow measuring stations balancing valves and rough setting.

1.6 QUALITY ASSURANCE

.1 Perform total system balance to AABC National Standards for Field Measurement and Instrumentation, Total System Balance.

.2 Maintain one copy of each document on site.

1.7 QUALIFICATIONS

.1 Agency: Company specializing in the testing, adjusting, and balancing of systems specified in this Section with minimum three years documented experience certified by AABC.

.2 Perform Work under supervision of AABC Certified Test and Balance Engineer.

Part 2 Products

.1 Not used

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Part 3 Execution

3.1 AGENCIES

.1 Air Movement

.2 AirDronics Inc.

3.2 EXAMINATION

.1 Verify that systems are complete and operable before commencing work. Ensure the following conditions:

- .1 Systems are started and operating in a safe and normal condition.
- .2 Temperature control systems are installed complete and operable.
- .3 Proper thermal overload protection is in place for electrical equipment.
- .4 Final filters are clean and in place. If required, install temporary media in addition to final filters.
- .5 Duct systems are clean of debris.
- .6 Fans are rotating correctly.
- .7 Fire and volume dampers are in place and open.
- .8 Air coil fins are cleaned and combed.
- .9 Access doors are closed and duct end caps are in place.
- .10 Air outlets are installed and connected.
- .11 Duct system leakage is minimized.
- .12 Pumps are rotating correctly.
- .13 Proper strainer baskets are clean and in place.
- .14 Service and balance valves are open.

.2 Submit field reports. Report defects and deficiencies noted during performance of services which prevent system balance.

.3 Beginning of work means acceptance of existing conditions.

3.3 PREPARATION

.1 Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Consultant to facilitate spot checks during testing.

.2 Provide additional balancing devices as required.

3.4 INSTALLATION TOLERANCES

.1 Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

.2 Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

□

3.5 ADJUSTING

.1 Ensure recorded data represents actual measured or observed conditions.

.2 Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

.3 After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

.4 Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

.5 At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

3.6 AIR SYSTEM PROCEDURE

.1 Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

.2 Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

.3 Measure air quantities at air inlets and outlets.

.4 Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

.5 Use volume control devices to regulate air quantities only to extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

.6 Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

.7 Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

.8 Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

.9 Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

.10 Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

.11 Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.

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.12 Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 12.5 Pa positive static pressure near the building entries.

.13 Check multi-zone units for motorized damper leakage. Adjust air quantities with mixing dampers set first for cooling, then heating, then modulating.

3.7 SCHEDULES

.1 Equipment requiring testing, adjusting and balancing:

- .1 Forced Air Furnaces
- .2 HRV
- .3 Air Cooled Refrigerant Condensers
- .4 Air Coils
- .5 Steam Humidifier
- .6 Air Handling Units
- .7 Fans
- .8 Air Filters
- .9 Air Inlets and Outlets

.2 Report Forms

- .1 Title Page:
  - .1 Name of Testing, Adjusting, and Balancing Agency
  - .2 Address of Testing, Adjusting, and Balancing Agency
  - .3 Telephone number of Testing, Adjusting, and Balancing Agency
  - .4 Project name
  - .5 Project location
  - .6 Project Architect
  - .7 Project Engineer
  - .8 Project Contractor
  - .9 Project altitude
  - .10 Report date
- .2 Summary Comments:
  - .1 Design versus final performance
  - .2 Notable characteristics of system
  - .3 Description of systems operation sequence
  - .4 Summary of outdoor and exhaust flows to indicate amount of building pressurization
  - .5 Nomenclature used throughout report
  - .6 Test conditions
- .3 Instrument List:
  - .1 Instrument
  - .2 Manufacturer
  - .3 Model number

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.4 Serial number
.5 Range
.6 Calibration date

.4 Electric Motors:
.1 Manufacturer
.2 Model/Frame
.3 HP/BHP
.4 Phase, voltage, amperage; nameplate, actual, no load
.5 RPM
.6 Service factor
.7 Starter size, rating, heater elements
.8 Sheave Make/Size/Bore

.5 V-Belt Drive:
.1 Identification/location
.2 Required driven RPM
.3 Driven sheave, diameter and RPM
.4 Belt, size and quantity
.5 Motor sheave diameter and RPM
.6 Centre to centre distance, maximum, minimum, and actual

.6 Electric Duct Heater:
.1 Manufacturer
.2 Identification/number
.3 Location
.4 Model number
.5 Design kW
.6 Number of stages
.7 Phase, voltage, amperage
.8 Test voltage (each phase)
.9 Test amperage (each phase)
.10 Air flow, specified and actual
.11 Temperature rise, specified and actual

.7 Air Moving Equipment
.1 Location
.2 Manufacturer
.3 Model number
.4 Serial number
.5 Arrangement/Class/Discharge
.6 Air flow, specified and actual
.7 Return air flow, specified and actual
.8 Outside air flow, specified and actual
.9 Total static pressure (total external), specified and actual

□

.10 Inlet pressure
.11 Discharge pressure
.12 Sheave Make/Size/Bore
.13 Number of Belts/Make/Size
.14 Fan RPM

.8 Return Air/Outside Air Data:
.1 Identification/location
.2 Design air flow
.3 Actual air flow
.4 Design return air flow
.5 Actual return air flow
.6 Design outside air flow
.7 Actual outside air flow
.8 Return air temperature
.9 Outside air temperature
.10 Required mixed air temperature
.11 Actual mixed air temperature
.12 Design outside/return air ratio
.13 Actual outside/return air ratio

.9 Exhaust Fan Data:
.1 Location
.2 Manufacturer
.3 Model number
.4 Serial number
.5 Air flow, specified and actual
.6 Total static pressure (total external), specified and actual
.7 Inlet pressure
.8 Discharge pressure
.9 Sheave Make/Size/Bore
.10 Number of Belts/Make/Size
.11 Fan RPM

.10 Duct Traverse:
.1 System zone/branch
.2 Duct size
.3 Area
.4 Design velocity
.5 Design air flow
.6 Test velocity
.7 Test air flow
.8 Duct static pressure
.9 Air temperature

□

.10 Air correction factor

.11 Duct Leak Test:

.1 Description of ductwork under test

.2 Duct design operating pressure

.3 Duct design test static pressure

.4 Duct capacity, air flow

.5 Maximum allowable leakage duct capacity times leak factor

.6 Test apparatus

.1 Blower

.2 Orifice, tube size

.3 Orifice size

.4 Calibrated

.7 Test static pressure

.8 Test orifice differential pressure

.9 Leakage

.12 Air Monitoring Station Data:

.1 Identification/location

.2 System

.3 Size

.4 Area

.5 Design velocity

.6 Design air flow

.7 Test velocity

.8 Test air flow

END OF SECTION

□

Part 1 General

1.1 SECTION INCLUDES

.1 Duct work insulation.

.2 Duct Liner.

.3 Insulation jackets.

1.2 RELATED SECTIONS

.1 Section 01 45 00 - Quality Assurance.

.2 Section 01 61 00 - Common Product Requirements.

.3 Section 09 91 99 - Painting: Painting insulation jackets.

.4 Section 23 05 53 - Mechanical Identification.

.5 Section 23 31 00 - Duct Work: Glass fibre duct work.

.6 Section 23 31 00 - Duct Work: Duct liner.

1.3 REFERENCES

.1 ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

.2 ASTM C518 - Steady-State Thermal Transmission Properties by Means of the Heat Flow Metre Apparatus.

.3 ASTM C553 - Standard Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.

.4 ASTM C612 - Standard Specification for Mineral Fibre Block and Board Thermal Insulation.

.5 ASTM C921 - Properties of Jacketing Materials for Thermal Insulation.

.6 ASTM C1071 - Fibrous Glass Duct Lining Insulation(Thermal Sound Absorbing Material).

.7 ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

.8 ASTM E96 - Water Vapour Transmission of Materials.

.9 ASTM E162 - Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.

□

.10 ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

.11 NAIMA National Insulation Standards.

.12 NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.

.13 SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

.14 UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

.15 TIAC – Thermal Insulation Assocication of Canada

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Procedures for submittals.

.2 Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.5 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Procedures for submittals.

.2 Manufacturer's Instructions: Indicate installation procedures which ensure acceptable workmanship and installation standards will be achieved.

1.6 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

.2 Applicator Qualifications: Company specializing in performing the work of this section with minimum 3 years documented experience approved by manufacturer.

1.7 DEFINITIONS

.1 For purposes of this section

.1 CONCEALED - insulated mechanical services and equipment in suspended ceilings and non-accessible chases and furred-in spaces

.2 EXPOSED – will mean “not concealed” as divined herein.

.3 Insulation systems – Insulation material, fasteners, jackets and other accessories

.2 TIAC Codes

.1 CRD: Code Round Ductwork

.2 CRF: Code Rectangular finish

□

1.8 REGULATORY REQUIREMENTS

.1 Materials: Flame spread/smoke developed rating of 25/50 to ASTM E84 NFPA 255 UL 723.

1.9 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.

.3 Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.10 ENVIRONMENTAL REQUIREMENTS

.1 Section 01 61 00: Environmental conditions affecting products on site.

.2 Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

.3 Maintain temperature during and after installation for minimum period of 24 hours.

Part 2 Products

2.1 INSULATION

.1 Mineral fibre: as specified includes glass fibre, rock wool, slag wool.

.2 Thermal conductivity (“k” factor) not to exceed specified values at 24 deg C mean temperature when tested in accordance with ASTM C 335

.3 TIAC Code C-1; Rigid mineral fibre board to ASTM C 612, with or without factory applied vapour retarder jacket to CBSB 51-GP-52Ma

.4 TIAC Code C-2: Mineral fibre blanket to ASTM C 553 faced with or without factory applied vapour retarder jacket to CGSB 51-GP-52Ma

.1 Mineral Fibre to ASTM c 553

.2 Jacket: to CGSB 51-gp-52MA

.3 Maximum “k” Factor to ASTM C 553

2.2 JACKETS

.1 Canvas:

.1 220 gm/m2 cotton. Plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921

2.3 ACCESSORIES

.1 Vapour retarder lap adhesive

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.1 Water based, fire retardant type, compatible with insulation

.2 Indoor Vapour Retarder Finish

.1 Vinyl emulsion type acrylic, compatible with insulation

.3 Insulating Cement: hydraulic setting on mineral wool, to ASTM C 449

.4 ULC Listed Canvas Jacket

.5 Tape self-adhesive, aluminum reinforced 75mm wide

.6 Contact adhesive: quick setting

.7 Canvas adhesive: washable

.8 Tie wire: 1.5mm stainless steel

.9 Banding: 12mm wide, 0.5mm thick stainless steel

.10 Facing: 25mm galvanized steel hexagonal wire mesh stitched on one face of insulation

.11 Fasteners: 4mm dia pins with 35mm dia clips, length to suit insulation thickness.

Part 3 Execution

3.1 EXAMINATION

.1 Section 01 70 00 - Examination and Preparation: Verification of existing conditions before starting work.

.2 Verify that duct work has been tested before applying insulation materials.

.3 Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

.1 Quality Assurance: Manufacturer's instructions.

.2 Install to NAIMA National Insulation Standards.

.3 Insulated duct work conveying air below ambient temperature:

.1 Provide insulation with vapour barrier jackets.

.2 Finish with tape and vapour barrier jacket.

.3 Continue insulation through walls, sleeves, hangers, and other duct penetrations.

.4 Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

.4 Insulated duct work conveying air above ambient temperature:

.1 Provide with or without standard vapour barrier jacket.

□

.2 Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

.5 Duct Work Exposed in Mechanical Equipment Rooms or Finished Spaces below 3 metres above finished floor: Finish with canvas jacket sized for finish painting.

.6 Exterior Applications: Provide insulation with vapour barrier jacket with caulked aluminium jacket with seams located on bottom side of horizontal duct section.

.7 Duct and Plenum Liner Application:

.1 Adhere insulation with adhesive for 100 percent coverage.

.2 Secure insulation with mechanical liner fasteners. Refer to SMACNA Standards for spacing.

.3 Seal and smooth joints. Seal and coat transverse joints.

.4 Seal liner surface penetrations with adhesive.

.5 Duct dimensions indicated are net inside dimensions required for air flow. Increase duct size to allow for insulation thickness.

END OF SECTION

□

Part 1 General

1.1 SECTION INCLUDES

.1 Metal duct work.

.2 Casing and plenums.

.3 Duct cleaning.

1.2 REFERENCES

.1 ASTM A36/A36M - Carbon Structural Steel.

.2 ASTM A90/A90M - Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.

.3 ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.4 ASTM A480/A480M - General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.

.5 ASTM A568/A568M - General Requirements for Steel Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled.

.6 ASTM A653/A653M - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.7 ASTM A1008/A1008M - Steel, Sheet, Cold-Rolled Carbon, Structural, High-Strength Low-Alloy and High Strength Low-Alloy with Improved Formability.

.8 ASTM A1011/A1011M - Standard Specification for Steel, Sheet, and Strip Hot-Rolled, Carbon, Structural, High-Strength, Low-Alloy with Improved Formability.

.9 ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

.10 ASTM C14/C14M - Concrete Sewer, Storm Drain, and Culvert Pipe.

.11 ASTM C443 - Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.

.12 AWS D9.1 - Sheet Metal Welding Code.

.13 NBS PS 15 - Voluntary Product Standard for Custom Contact-Moulded Reinforced-Polyestor Chemical Resistant Process Equipment.

.14 NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

.15 NFPA 90B - Installation of Warm Air Heating and Air-Conditioning Systems.

.16 NFPA 91 - Exhaust Systems for Air Conveying of Vapours, Gases, Mists, and Noncombustible Particulate Solids.

.17 NFPA 96 - Ventilation Control and Fire Protection of Commercial Cooking Operations.

.18 SMACNA - HVAC Air Duct Leakage Test Manual.

.19 SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

.20 SMACNA - Fibrous Glass Duct Construction Standards.

.21 UL 181 - Factory-Made Air Ducts and Connectors.

1.3 PERFORMANCE REQUIREMENTS

.1 No variation of duct configuration or sizes permitted except by written permission. Size round ducts installed in place of rectangular ducts to ASHRAE table of equivalent rectangular and round ducts.

1.4 SUBMITTALS

.1 Section 01 33 00: Procedures for submittals.

.2 Product Data: Provide data for duct materials, duct liner, and duct connectors .

1.5 PROJECT RECORD DOCUMENTS

.1 Section 01 78 10: Submittals for project closeout.

.2 Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.6 QUALITY ASSURANCE

.1 Perform Work to SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

.2 Maintain one copy of document on site.

1.7 QUALIFICATIONS

.1 Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

.2 Installer: Company specializing in performing the work of this section with minimum 3 years documented experience.

1.8 REGULATORY REQUIREMENTS

.1 Construct duct work to NFPA 90B standards.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

.2 Maintain temperatures during and after installation of duct sealants.

Part 2 Products

2.1 MATERIALS

.1 Galvanized Steel Ducts: ASTM A653 galvanized steel sheet, lock-forming quality, having G90 zinc coating of to ASTM A90.

.2 Fasteners: Rivets, bolts, or sheet metal screws.

.3 Sealant:

.1 Manufacturers:

.1 Duro Dyne S-2.

.2 Foster

.3 Substitutions: Not permitted.

.2 Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.

.4 Hanger Rod: ASTM A36; steel , galvanized; threaded both ends, threaded one end, or continuously threaded.

2.2 DUCT WORK FABRICATION

.1 Fabricate and support to SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.

.2 Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centreline. Where not possible and where rectangular elbows are used, provide air foil turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fibre insulation.

.3 Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

.4 Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.

2.3 MANUFACTURED DUCT WORK AND FITTINGS

.1 Manufacture to SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.

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Part 3 Execution

3.1 INSTALLATION

.1 All existing ductwork and new ductwork to be sealed with duct sealant.

.2 Install to manufacturer's instructions.

.3 Install and seal ducts to SMACNA HVAC Duct Construction Standards - Metal and Flexible.

.4 Duct Sizes are inside clear dimensions. For lined ducts, maintain sizes inside lining.

.5 Provide openings in duct work where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated duct work, install insulation material inside a metal ring.

.6 Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

.7 Use crimp joints with or without bead for joining round duct sizes 200 mm and smaller with crimp in direction of air flow.

.8 Use double nuts and lock washers on threaded rod supports.

.9 Connect diffusers or light troffer boots to low pressure ducts directly or with 1.5 m maximum length of flexible duct held in place with strap or clamp.

.10 Connect flexible ducts to metal ducts with adhesive plus sheet metal screws.

.11 Set plenum doors 150 to 300 mm above floor. Arrange door swings so that fan static pressure holds door in closed position.

.12 During construction provide temporary closures of metal or taped polyethylene on open duct work to prevent construction dust from entering duct work system.

3.2 CLEANING

.1 Clean work to 01 78 10.

.2 Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment which may be harmed by excessive dirt with temporary filters, or bypass during cleaning.

.3 Clean duct systems with high power vacuum machines. Protect equipment which may be harmed by excessive dirt with filters, or bypass during cleaning. Provide adequate access into duct work for cleaning purposes.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Backdraft dampers.

.2 Combination fire and smoke dampers.

.3 Duct access doors.

.4 Duct test holes.

.5 Fire dampers.

.6 Flexible duct connections.

.7 Volume control dampers.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Administrative Requirements.

.2 Section 01 61 00 - Common Product Requirements.

.3 Section 01 78 10 - Execution Requirements.

.4 Section 23 05 48 - Vibration Isolation.

.5 Section 23 31 00 - Duct Work.

.6 Section 23 36 00 - Air Terminal Units: Pressure regulating damper assemblies.

.7 Section 26 05 80 - Equipment Wiring: Electrical characteristics and wiring connections.

1.3 REFERENCES

.1 NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

.2 NFPA 92A - Smoke-Control Systems.

.3 SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

.4 UL 33 - Heat Responsive Links for Fire-Protection Service.

.5 UL 555 - Fire Dampers.

.6 UL 555S - Smoke Dampers.

1.4 SUBMITTALS

.1 Section 01 33 00: Procedures for submittals.

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.2 Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers duct access doors and duct test holes.

.3 Product Data: Provide for shop fabricated assemblies including volume control dampers duct access doors duct test holes and hardware used. Include electrical characteristics and connection requirements.

.4 Manufacturer's Installation Instructions: Indicate for fire dampers and combination fire and smoke dampers.

1.5 PROJECT RECORD DOCUMENTS

.1 Section 01 78 10: Submittals for project closeout.

.2 Record actual locations of access doors test holes on As-Built.

1.6 QUALIFICATIONS

.1 Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS

.1 Products Requiring Electrical Connection: Listed and classified by ULC and CSA as suitable for the purpose specified and indicated.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Protect dampers from damage to operating linkages and blades.

1.9 EXTRA MATERIALS

.1 Section 01 78 10: Submittals for project closeout.

.2 Provide two of each size and type of fusible link.

Part 2 Products

2.1 BACKDRAFT DAMPERS.

.1 Manufacturers:

.1 Naylor

.2 Substitutions: Refer to Section 01 62 00.

.2 Gravity Backdraft Dampers, Size 450 x 450 mm or Smaller, Provided with Air Moving Equipment: Air moving equipment manufacturers standard construction.

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.3 Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: 1.5 mm thick galvanized steel, or extruded aluminum, with centre pivoted blades of maximum 150 mm width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.2 COMBINATION FIRE AND SMOKE DAMPERS

.1 Manufacturers:

.1 Accudoor.

.2 Substitutions: Refer to Section 01 62 00.

.2 Fabricate to NFPA 90A, ULC S.112, ULC S.112.1, and as indicated.

.3 Provide factory sleeve and collar for each damper.

.4 Multiple Blade Dampers: Fabricate with 1.5 mm galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, stainless steel jamb seals, 3.2 x 12.7 mm plated steel concealed linkage, stainless steel closure spring, blade stops, and lock, and 12.7 mm actuator shaft.

.5 Operators: UL listed and labelled spring-return pneumatic type snitable for operation on 0-140 kPa instrument air. electric type suitable for 120 volts, single phase, 60 Hz. Provide end switches to indicate damper position. Locate damper operator on interior exterior of duct and link to damper operating shaft.

.6 Normally Closed Smoke Responsive Fire Dampers: Curtain type, opening by gravity upon actuation of electro thermal link, flexible stainless steel blade edge seals to provide constant sealing pressure.

.7 Normally Open Smoke Responsive Fire Dampers: Curtain type, closing upon actuation of electro thermal link, flexible stainless steel blade edge seals to provide constant sealing pressure, stainless steel springs with locking devices to ensure positive closure for units mounted horizontally.

.8 Electro Thermal Link: Fusible link melting at 74 degrees C; 120 volts, single phase, 60 Hz; UL listed and labeled.

2.3 DUCT ACCESS DOORS

.1 Manufacturers:

.1 Naylor

.2 Substitutions: Refer to Section 01 62 00.

.2 Fabricate to SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

.3 Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated duct work, install minimum 25 mm thick insulation with sheet metal cover.

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.1 Less Than 300 mm Square: Secure with sash locks.

.2 Up to 450 mm Square: Provide two hinges and two sash locks.

.3 Up to 600 x 1200 mm: Three hinges and two compression latches with outside and inside handles.

.4 Larger Sizes: Provide an additional hinge.

.4 Access doors with sheet metal screw fasteners are not acceptable.

2.4 DUCT TEST HOLES

.1 Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

2.5 FIRE DAMPERS

.1 Manufacturers:

.1 Naylor Model Type A or B

.2 Substitutions: Refer to Section 01 62 00.

.2 Fabricate to NFPA 90A and ULC S.112, and as indicated.

.3 Ceiling Dampers: Galvanized steel, 0.76 mm frame and 1.5 mm flap, two layers 3.2 mm ceramic fibre on top side , and one layer on bottom side for round flaps, with locking clip.

.4 Horizontal Dampers: Galvanized steel, 0.76 mm frame, stainless steel closure spring, and lightweight, heat retardant non-asbestos fabric blanket.

.5 Curtain Type Dampers: Galvanized steel with interlocking blades. Provide stainless steel closure springs and latches for horizontal installations closure under air flow conditions. Configure with blades out of air stream except for 250 Pa pressure class ducts up to 300 mm in height.

.6 Multiple Blade Dampers: 1.5 mm galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, 3.2 x 12.7 mm plated steel concealed linkage, stainless steel closure spring, blade stops, and lock.

.7 Fusible Links: UL 33, separate at 71 degrees C with adjustable link straps for combination fire/balancing dampers.

2.6 FLEXIBLE DUCT CONNECTIONS

.1 Manufacturers:

.1 Flexmaster

.2 Substitutions: Refer to Section 01 62 00.

.2 Fabricate to SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

.3 Connector: Fabric crimped into metal edging strip.

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.1 Fabric: UL listed fire-retardant neoprene coated woven glass fibre fabric to NFPA 90A, minimum density 1.0 kg/sq m.

.2 Net Fabric Width: Approximately 50 75 150 mm wide.

.3 Metal: 75 mm wide, 0.6 mm thick galvanized steel .

.4 Leaded Vinyl Sheet: Minimum 14 mm thick, 4.2 kg/sq m, 10 dB attenuation in 10 to 10,000 Hz range.

Part 3 Execution

3.1 PREPARATION

.1 Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

.1 Install accessories to manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 23 31 00 for duct construction and pressure class.

.2 Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

.3 Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide minimum 200 x 200 mm size for hand access, 450 x 450 mm size for shoulder access, and as indicated. Provide 100 x 100 mm for balancing dampers only. Review locations prior to fabrication.

.4 Provide duct test holes where indicated and required for testing and balancing purposes.

.5 Provide fire dampers , combination fire and smoke dampers and smoke dampers at locations indicated, where ducts and outlets pass through fire rated components , and where required by authorities having jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.

.6 Install smoke dampers and combination smoke and fire dampers to NFPA 92A.

.7 Demonstrate re-setting of fire dampers to Owner's representative.

.8 Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment , and supported by vibration isolators. Add to all new and existing equipement.

.9 Use splitter dampers only where indicated.

.10 For new ductwork, provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Diffusers.

.2 Registers/grilles.

.3 Door grilles.

.4 Louvres.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Administrative Requirements.

.2 Section 01 44 00 - Quality Assurance.

.3 Section 01 61 00 - Common Product Requirements.

.4 Section 01 78 10 - Execution Requirements.

1.3 REFERENCES

.1 ADC 1062 - Air Distribution and Control Device Test Code.

.2 AMCA 500 - Method of Testing Louvres for Ratings.

.3 AMCA 5000 - Method of Testing Dampers for Ratings.

.4 ARI 650 - Air Outlets and Inlets.

.5 ASHRAE 70 - Method of Testing for Rating the Performance of Outlets and Inlets.

.6 SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

.7 NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

1.4 SUBMITTALS

.1 Section 01 33 00: Procedures for submittals.

.2 Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.5 PROJECT RECORD DOCUMENTS

.1 Section 01 78 10: Submittals for project closeout.

.2 Record actual locations of air outlets and inlets.

□

1.6 QUALITY ASSURANCE

.1 Test and rate air outlet and inlet performance to ADC Equipment Test Code 1062 and ASHRAE 70.

.2 Test and rate louvre performance to AMCA 500.

1.7 QUALIFICATIONS

.1 Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years [documented] experience.

Part 2 Products

2.1 MANUFACTURERS

.1 EH Price.

.2 Substitutions: Refer to Section 01 62 00.

.1 Type: As shown on Diffuser Schedule.

.2 Frame: As per location in plan

.3 Fabrication: As per Schedule.

.4 Accessories: As per Schedule.

Part 3 Execution

3.1 INSTALLATION

.1 Install to manufacturer's instructions.

.2 Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

.3 Install diffusers to duct work with air tight connection.

.4 Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

.5 Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09 91 10.

3.2 SCHEDULES

.1 See Mechanical Drawings for Diffuser Schedule

END OF SECTION

□

Part 1 General

1.1 SECTION INCLUDES

.1 Heat Recovery Ventilators

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Administrative Requirements.

.2 Section 01 61 00 - Common Product Requirements.

.3 Section 01 78 10 - Execution Requirements.

.4 Section 23 07 13 - Duct Insulation: Duct Liner.

1.3 REFERENCES

.1 ARI 270 - Sound Rating of Outdoor Unitary Equipment.

.2 ASHRAE 90A - Energy Conservation in New Building Design.

.3 NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

.4 NFPA 90B - Installation of Warm Air Heating and Air-Conditioning Systems.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Procedures for submittals.

.2 Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

.3 Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

.1 Section 01 78 10: Submittals for project closeout.

.2 Project Record Documents: Record actual locations of components and connections.

.3 Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

.4 Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owners name and registered with manufacturer.

1.6 QUALITY ASSURANCE

.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 three years documented experience approved by manufacturer.

1.7 REGULATORY REQUIREMENTS

.1 Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Canada and Canadian Standards Association, testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

1.8 WARRANTY

.1 Section 01 78 10: Submittals for project closeout.

.2 Provide five year manufacturers warranty for heat exchangers.

.3 Provide three year manufacturers warranty for solid state ignition modules.

.4 Provide five year manufacturers warranty for heat exchangers, condensing units, compressors.

1.9 EXTRA MATERIALS

.1 Section 01 78 10: Submittals for project closeout.

.2 Substitutions: Refer to Section 01 62 00. Not permitted.

Part 2 Products

2.1 HEAT RECOVERY VENTILATORS

.1 Manufacturer: Venmar. Model: See Schedule

.1 Substitutions: [Refer to Section 01 62 00.]

.2 Electric Operating Controls:

.1 HRV to be balanced to operate at two airflows, see schedule.
.2 HRV operation to be interlocked to furnace fan operation. (I.e. when HRV is on, furnace fan must also be on.)
.3 HRV Control to be dehumidistat Constructo Model 40350.
.4 HRV auxiliary controls to be 20 min lighted push button. Model 12030.

.2 Duct Heaters

.1 Duct heater with SCR, 3kW, to be installed on cold air intake side to prevent heat exchanger frost up. Thermostat to be set to maintain incoming air at 25 F.

.2 Duct heater with SCR, 1.5kW, to be installed on fresh air supply to rooms. Thermostat to be set to maintain incoming air at 72F.

2.2 EXAMINATION

.1 Verification of existing conditions before starting work.

.2 Verify that floors are ready for installation of units and openings are as indicated on shop drawings.

.3 Verify that proper power supply is available for HRV.

2.3 INSTALLATION

.1 Install to NFPA 90B.

2.4 SCHEDULES

.1 Heat Recovery Ventilators

Drawing Code	**HRV-1**
Manufacturer	Venmar
Model	AVS Constructo 1.5
Orientation	All ports at top
Efficiency	~70%
Airflow Capacity (cfm) High speed	157cfm
External Static Pressure (high speed)	0.4
Defrost	Recirculation defrost.
Controls	Constructo 40350 (main control) and 12030 (20 min push button timer)
Electrical Characteristics	120V/1 phase/60 Hz

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:
- .1 General requirements that are common to NMS sections found in Division 26 - Electrical and 28 - Electronic Safety and Security.

.2 The word "Provide" shall mean "Supply and Install" the products and services specified.

.3 Provide materials and equipment of specified design, performance and quality; and current models with published certified ratings for which replacement parts are readily available. Provide project management and on-site supervision to undertake administration, meet schedules, ensure timely performance, ensure coordination, establishing orderly completion and the delivery of a fully commissioned installation.

.4 The most stringent requirements of this and other electrical sections shall govern.

.5 All work shall be in accordance with the project drawings and specifications and their intents, complete with all necessary components, including those not normally shown or specified, but required for a complete installation.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
- .1 CSA C22.1-09, Canadian Electrical Code, Part 1 (21st Edition), Safety Standard for Electrical Installations.
- .2 CAN3-C235-83(R2000), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

1.3 DESIGN REQUIREMENTS

.1 Operating voltages: to CAN3-C235.

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.

.3 Language operating requirements: provide identification nameplates and labels for control items in English.

1.4 SCOPE OF WORK

.1 Contractor shall supply all labour, equipment and materials necessary and reasonably implied, and provide commissioning and warranty for the complete and fully functional installation of the electrical work as shown on the plans and specified herein.

.2 Component subsystems of the electrical system will include, but are not limited to the following:
- .1 Tie into existing service and provide distribution of electrical power.

.2 Provide receptacles or hardwired connections for all equipment.
.3 Provide lighting equipment including emergency and non-emergency lighting and exit signs.
.4 Provide power feeders to all mechanical equipment.
.5 Provide all required motor starters and control wiring associated.
.6 Provide complete raceway for power, lighting and life safety systems.

1.5 SUBMITTALS

.1 Submittals: in accordance with Division 01.

.2 Shop drawings:
.1 Data shall be specific and technical.
.2 Identify each piece of equipment.
.3 Information shall include all scheduled data.
.4 Project and equipment designations shall be identified on each document.
.5 Size shall be 216 mm x 280 mm (8-1/2" x 11") or 280 mm x 430 mm (11" x 17")
.6 Keep one copy of shop drawings and product data on site, available for reference.

.3 Quality Control: in accordance with Division 01 - Quality Control.
.1 Provide CSA certified equipment and material.
.2 Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for special approval before delivery to site, and submit such approval.
.3 Submit to Electrical Inspection Department, Local Fire Authorities and Supply Authority the necessary number of drawings and specifications for examination and approval prior to commencement of work. Obtain all required permits and pay all fees.
.4 Submit one set of correct "as-built" drawings or corrected drawings in DWG format.
.5 Arrange for inspection of all work by the authorities having jurisdiction. On completion of the work, furnish final unconditional certificates of approval by the inspecting authorities.

1.6 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Division 01 - Quality Control.

.2 Qualifications: electrical Work to be carried out by qualified, licensed electricians or apprentices in accordance with authorities having jurisdiction.
.1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electricians, to perform specific tasks.
.2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.

.3 Site Meetings:
.1 In accordance with Division 01 – Construction Schedule.

.4 Health and Safety Requirements: do construction occupational health and safety in

accordance with Division 01 – Health and Safety Requirements.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Division 01 – Construction Waste Management and Disposal

.2 Avoid using landfill waste disposal procedures when recycling facilities are available.

.3 Place materials defined as hazardous or toxic waste in designated containers.

1.8 PROJECT COORDINATION

.1 Check drawings of all trades to verify space and headroom limitations for work to be installed. Coordinate work with all trades and make changes to facilitate a satisfactory installation. Make no deviations to the design intent involving extra cost without the Departmental Representative's written approval.

.2 The drawings indicate the general location and route to be followed by the electrical services. Where details are not shown on the drawings or only shown diagrammatically, the services shall be installed in such a way as to conserve head room and interfere as little as possible with the free use of space through which they pass. All services in the ceiling shall be kept as tight as possible to beams or other limiting members at high level. All electrical services shall be coordinated in elevation to ensure that they are concealed in the ceiling or structural space provided unless detailed otherwise on drawings.

.3 Ensure that all materials and equipment fit into the allotted spaces and that all equipment can be properly serviced and replaced, if and when required. Advise the Departmental Representative of space problems before installing any material or equipment. Demonstrate to the Departmental Representative on completion of the work that all equipment installed can be properly, safely serviced and replaced, if and when required.

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

.1 Provide material and equipment in accordance with Division 01.

.2 Where equipment or materials are specified by technical description only, they are to be of the best commercial quality available for the intended purpose.

.3 Factory assemble control panels and component assemblies.

2.2 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

.1 Provide all power and electrical system related control wiring, conduit wire, fittings, disconnect switches and motor starters for all mechanical equipment unless otherwise specified.

2.3 WIRING TERMINATIONS

.1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.4 FINISHES

.1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original finish.

.2 Clean and prime paint non-galvanized exposed hanger, racks, fastenings to prevent rusting. Finish painting shall be provided by Division 09.

Part 3 Execution

3.1 INSTALLATION

.1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

.2 Do overhead and underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.

.3 Comply with CSA Electrical Bulletins and Local Authorities having jurisdiction.

3.2 NAMEPLATES AND LABELS

.1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.3 CONDUIT AND CABLE INSTALLATION

.1 All cables and conduits shall be concealed in finished areas.

3.4 LOCATION OF OUTLETS

.1 Do not install outlets back-to-back or in the same stud space in wall; allow minimum 400 mm horizontal clearance between boxes.

.2 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm (10'-0"), and information is given before installation.

.3 Locate light switches on latch side of doors unless otherwise indicated.

3.5 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

.3 Install electrical equipment at following heights unless indicated otherwise (to bottom of outlet).

.1 Local switches: 48" (1200 mm).

.2 Wall receptacles:

.1 General: 16" (400 mm).

.2 Above top of counters 6" (150 mm) or counter splash backs: 4" (100 mm).

.3 Panelboards: as required by Code or as indicated.

.4 Telephone and interphone outlets: 16" (400 mm).

.5 Wall mounted telephone and interphone outlets: 48" (1200 mm).

.6 Television outlets: 16" (400 mm).

.7 Wall mounted speakers: 88" (2200 mm)

3.6 CO-ORDINATION OF PROTECTIVE DEVICES

.1 Ensure circuit protective devices such as circuit breakers are installed to match the actual nameplate ratings of equipment.

3.7 CLEANING

.1 Do final cleaning in accordance with Division 01

.2 At time of final cleaning, clean lighting reflectors, lenses and other lighting surfaces that have been exposed to construction dust and dirt.

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.2 CSA C22.1-09

.3 National Electrical Manufacturers Association (NEMA)

1.3 PRODUCT DATA

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

Part 2 Products

2.1 BUILDING WIRES

.1 Conductors: stranded for 10 AWG and larger. Minimum size: 14 AWG.

.2 Copper conductors: size as indicated, with 1000 V insulation of chemically cross-linked thermosetting polyethylene material rated RW90.

2.2 ARMOURED CABLES

.1 Conductors: insulated, copper, size as indicated.

.2 Type: AC90.

.3 Armour: interlocking type fabricated from aluminum strip.

.4 Connectors: Approved for use with AC90

2.3 CONTROL CABLES

.1 Type LVT: 2 soft annealed copper conductors, sized as indicated, with thermoplastic insulation, outer covering of cotton braid or thermoplastic jacket.

2.4 BUILDING WIRE AND CABLE

.1 Unless otherwise directed, building wire and cable shall be copper conductors, sized as indicated.

.2 Except where otherwise directed or required by Code or other applicable regulations, building wire and cable insulation shall be Type R90, cross-linked polyethylene insulated 300V, rated for not less than 90°C.

Part 3 Execution

3.1 GENERAL INSTALLATION

.1 Before pulling wire, ensure conduit is dry and clean. To facilitate pulling, recognized specially manufactured wire pulling lubricants may be used. Do not use grease. Employ suitable techniques to prevent damage to wire when ambient temperature is below the minimum permitted for each insulation type.

.2 Conductors for lighting, receptacle and equipment branch circuits shall have ampacity not less than the rating of the over-current device protecting the branch circuit, subject to applicable codes. Branch circuit conductors shall be sized for a maximum voltage drop of 2% from panelboard to the last outlet of a circuit.

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 00 - Common Work Results - Electrical.

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 MATERIALS

.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 GROUNDING INSTALLATION

.1 Install continuous grounding system including, electrodes, conductors, connectors and accessories to conform to requirements of local authority having jurisdiction.

.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.

.5 The main public metallic water service to a building shall be utilized as the main ground electrode. Where such a service does not exist, then an artificial grounding electrode shall be provided to suit the requirements of the local inspection authorities.

.6 Install bonding wire for flexible conduit. Connect both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

.7 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

.8 Provide separate ground conductor in PVC conduit, plastic or fiberglass raceways.

3.2 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.

Part 1 **General**

1.1 **SHOP DRAWINGS AND PRODUCT DATA**

.1 Submit shop drawings and product data for cabinets in accordance with Section 01 33 00 - Submittal Procedures.

Part 2 **Products**

2.1 **JUNCTION AND PULL BOXES**

.1 Welded steel construction with screw-on flat covers for surface mounting.

.2 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.

.3 Junction boxes mounted in exterior walls shall be complete with box vapour barriers.

Part 3 **Execution**

3.1 **INSTALLATION**

.1 Install pull boxes and junction boxes in inconspicuous but accessible locations.

.2 Mount cabinets with top not higher than 2 m above finished floor.

Part 1 General

1.1 REFERENCES

.1 CSA C22.1-1998, Canadian Electrical Code, Part 1.

Part 2 Products

2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA C22.1.

.2 102 mm square or larger outlet boxes as required for special devices.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring 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 single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

.2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.

.3 102 mm square or octagonal outlet boxes for lighting fixture outlets.

.4 102 mm square outlet boxes with extension and plaster rings for flush mounting devices in finished plaster or tile walls.

2.3 OUTLET BOXES FOR NON-METALLIC SHEATHED CABLE

.1 Electro-galvanized, sectional, screw ganging steel boxes, minimum size 76 x 50 x 63 mm with two double clamps to take non-metallic sheathed cables.

2.4 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 32 mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

Part 3 Execution

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

.3 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.

Part 1 General

1.1 SECTION INCLUDES

.1 Service equipment and installation.

1.2 RELATED SECTIONS

.1 Section [01 74 19 - Construction/Demolition Waste Management And Disposal].

.2 Section [26 05 28 - Grounding - Secondary].

.3 Section [26 05 31 - Splitters, Junction, Pull Boxes and Cabinets].

.4 Section [26 24 17 - Panelboards Breaker Type].

.5 Section [26 28 20 - Ground Fault Circuit Interrupters - Class "A"].

Part 2 Products

2.1 EQUIPMENT

.1 Panelboard [breaker type: in accordance with Section [26 24 17 - Panelboards Breaker Type]]], rating [as indicated].

.2 Customer service termination enclosure with provision for metering: size [as indicated] and remote metering cabinet.

Part 3 Execution

3.1 INSTALLATION

.1 Install service equipment.

.2 Connect to incoming service.

.3 Connect to outgoing load circuits.

.4 Make grounding connections in accordance with Section [26 05 28 - Grounding].

.5 Make provision for power supply authority's metering.

Part 1 **General**

1.1 **SECTION INCLUDES**

.1 Materials and installation for standard and custom breaker type panelboards.

1.2 **RELATED SECTIONS**

.1 Section 26 05 01 - Common Work Results - Electrical.

1.3 **SHOP DRAWINGS**

.1 Submit shop drawings in accordance with Section 26 05 00.

.2 Drawings to include electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

Part 2 **Products**

2.1 **PANELBOARDS**

.1 Panelboards: product of one manufacturer.
- .1 Install circuit breakers in panelboards before shipment.
- .2 Match existing panelboards where practicable.

.2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.

.3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.

.4 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated.

.5 Copper bus with neutral of same ampere rating as mains.

.6 Trim finish: baked grey enamel.

2.2 **BREAKERS**

.1 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.

.2 Main breaker: separately mounted on top or bottom of panel to suit cable entry. When mounted vertically, down position should open breaker.

.5 Two circuit breakers shall have a common tripping mechanism and single handle. Handle ties are not acceptable.

2.3 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results - Electrical.

.2 Label each panel to indicate area that panel services.

.4 Complete circuit directory with typewritten legend showing location and load of each circuit.

Part 3 Execution

3.1 INSTALLATION

.1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.

.2 Mount panelboards to height specified in Section 26 05 00 - Common Work Results - Electrical or as indicated.

.3 Connect loads to circuits.

.4 Connect neutral conductors to common neutral bus with respective neutral identified.

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 01 - Common Work Results - Electrical.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.2 Underwriters' Laboratories of Canada (ULC)

Part 2 Products

2.1 EQUIPMENT

.1 Door bells: single tone chime, indoor, mounting surface, colour white.

.2 Class II transformers: secondary voltage to match chime. 120V, 60 Hz primary, CSA listed, thermal protected.

.3 Pushbuttons: reuse existing.

.4 Low voltage wiring: type LVT or Securex.

Part 3 Execution

3.1 INSTALLATION

.1 Attach components to wall or box where indicated with screws.

.2 Install wiring.

.3 Remove packing material and construction dirt around plunger.

3.2 FIELD QUALITY CONTROL

.1 Test system for operation.

Part 1 General

1.1 SECTION INCLUDES

.1 Switches, receptacles, wiring devices, cover plates and their installation.

1.2 RELATED SECTIONS

.1 Section 26 05 00 - Common Work Results - Electrical.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International)
- .1 CSA-C22.1-09 Canadian Electrical Code

Part 2 Products

2.1 SWITCHES

.1 Switches to match existing

.2 15 A, 120 V, single pole, double pole, or three-way, switches as indicated.

.3 Manually-operated general purpose ac switches with following features:
- .1 Silver alloy contacts.
- .2 Urea or melamine moulding for parts subject to carbon tracking.
- .3 Suitable for back and side wiring.

.4 Fully rated for tungsten filament and fluorescent lamps, and up to 80% of rated capacity of motor loads.

.5 Switches of one manufacturer throughout project.

2.2 RECEPTACLES

.1 Receptacles to match existing.

.2 Duplex receptacles, CSA type 5-15 R, 125 V, 15 A, U ground, with following features:
- .1 Urea moulded housing.
- .2 Break-off links for use as split receptacles.
- .3 Eight back wired entrances, four side wiring screws.

.3 Other receptacles with ampacity and voltage as indicated.

.4 Receptacles of one manufacturer throughout project.

2.3 COVER PLATES

.1 Cover plates to match existing and from one manufacturer throughout project.

.2 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.

.3 Stainless steel or unbreakable plastic cover plates, for wiring devices mounted in flush-mounted outlet box.

.4 Cast gasketted cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.

.5 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with gaskets for duplex receptacles as indicated.

.6 Weatherproof spring-loaded cover plates complete with gaskets for single receptacles or switches.

Part 2 Execution

3.1 INSTALLATION

.1 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 switches at height in accordance with Section 26 05 00 - Common Work Results - Electrical or as indicated.

.2 Receptacles:
- .1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.
- .2 Mount receptacles at height in accordance with Section 26 05 01 - Common Work Results - Electrical or as indicated.

.3 Cover plates:
- .1 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.
- .2 Install suitable common cover plates where wiring devices are grouped.
- .3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.
- .4 Use weatherproof cover plates in wet or damp locations and where indicated.

Part 1 General

1.1 SECTION INCLUDES

.1 Equipment and installation for ground fault circuit interrupters (GFCI).

1.2 RELATED SECTIONS

.1 Section 26 05 01 - Common Work Results - Electrical.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CAN/CSA-C22.2 No.144-M91(R2001), Ground Fault Circuit Interrupters.

.2 National Electrical Manufacturers Association (NEMA)
.1 NEMA PG 2.2-1999, Application Guide for Ground Fault Protection Devices for Equipment.

Part 2 Products

2.1 MATERIALS

.1 Equipment and components for ground fault circuit interrupters (GFCI): to CAN/CSA-C22.2 No.144.

.2 Components comprising ground fault protective system to be of same manufacturer.

2.2 GROUND FAULT PROTECTOR UNIT

.1 Self-contained with 15 A or 20 A, 120 V circuit interrupter and duplex receptacle complete with:
.1 Solid state ground sensing device.
.2 Facility for testing and reset.
.3 CSA Enclosure 1, flush mounted with face plate to match existing receptacles.

Part 3 Execution

3.1 INSTALLATION

.1 Do not ground neutral on load side of ground fault relay.

.2 Connect supply and load wiring to equipment in accordance with manufacturer's recommendations.

3.2 FIELD QUALITY CONTROL

.1 Test GFCI receptacles for proper operation.

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results - Electrical.

1.2 SHOP DRAWINGS AND PRODUCT DATA

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

.2 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for approval review by Consultant.

.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 bulbs burnt out within 3 months of takeover.
.2 Fluorescent and HID lamps burnt out within 12 months of takeover.
.3 Ballasts that fail or exceed their labeled noise level rating within 12 months of takeover.

1.4 COORDINATION

.1 Coordinate luminaire locations with work of other trades.

.2 Verify all ceiling types and finishes before ordering fixtures and provide fixtures suitable for mounting in or on ceilings being installed in each area, as specified. Where fixture types specified are not suitable for ceiling being installed, obtain written instructions from the consultant before ordering fixtures.

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 Fixture type catalogue numbers do not necessarily denote required mounting equipment or accessories. Provide all appropriate mounting accessories for all mounting conditions.

.4 Provide lenses or diffusers of glass or acrylic material as indicated. Acrylic lenses used with fluorescent luminaries shall be a minimum of 3mm thick.

.5 Include finishes to Section 26 05 00 and as indicated.

.6 Where soffits or ceilings have thermal insulation, provide fixtures which are CSA approved for such use.

.7 Conduct lamp burn in procedures as per manufacturers recommendations.

2.2 LUMINAIRE TYPES

.1 All lights to be screw in type LED light bulbs
.2 Contractor to contact a lighting designer to choose all luminaire types and supply fixture shop drawing to RCMP for approval
.3 Lighting to be Paid for out of Cash allowance.

Part 3 Execution

3.1 INSTALLATION

.1 Locate and install luminaires as indicated.

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 00 - Common Work Results - Electrical.

1.2 REFERENCES

.1 Canadian Standards Association, (CSA International)

.1 CSA-C22.2 No. 214-02, Communications Cables (Bi-national Standard, with UL 444).

.2 CAN/CSA-C22.2 No. 182.4-M90(R2001), Plugs, Receptacles, and Connectors for Communication Systems.

1.3 SYSTEM DESCRIPTION

.1 Structured system of telecommunications cables (copper and optical fibre) installed within buildings for distributing voice and data (including video) signals.

.2 Installed in physical star configuration with separate horizontal and backbone sub-systems. Horizontal cables link work areas to telecommunications closet located on same floor. Telecommunications closets linked to central equipment room by backbone cables.

Part 2 Products

2.1 TELEPHONE WIRE

.1 All telephone cables to be Cat5E.

2.2 COAXIAL CABLE (CXC)

.1 For cable television, 75 ohm impedance. Centre conductor No. 18 AWG solid copper; insulation of teflon; shield of aluminum foil plus braid; shield coverage 97%. Loss at 500 MHz not to exceed 5 dB per 30 m.

Part 3 Execution

3.1 INSTALLATION OF HORIZONTAL DISTRIBUTION CABLES

.1 Install horizontal cables, from termination at demarcation to outlets as indicated.

.2 For distribution of television signals, terminate CXC cable on type F connectors.

Part 1 **General**

1.1 **RELATED SECTIONS**

.1 Section 26 05 00 - Common Work Results - For Electrical.

.2 Section 26 05 28 - Grounding - Secondary.

.3 Section 26 05 21 - Wire and Cables 0-1000 V.

1.2 **REFERENCES**

.1 Canadian Standards Association (CSA)
.1 CAN/CSA-C83-96(R2000), Communication and Power Line Hardware.

1.3 **REGULATORY REQUIREMENTS**

.1 Co-ordinate and meet requirements of power supply authority. Ensure availability of power when required.

Part 2 **Products**

2.1 **MATERIAL**

.1 Service mast: PVC or thin wall conduit, suitable for attachment of weatherhead.

.2 Service mast support devices: suitable for service mast used.

.3 Insulator: reuse existing or as per Manitoba Hydro requirements.

.4 Weatherhead: suitable for service mast used.

.5 Service conductors: in accordance with Section 26 05 21 - Wires and Cables 0-1000 V, copper, as per single line diagram.

.6 Weatherproof metering cabinet complete with meter socket, as per Manitoba Hydro metering requirements.

Part 3 **Execution**

3.1 **INSTALLATION**

.1 Install service mast, insulator, and weatherhead.

.2 Install meter socket and conduit.

.3 Install service conductors allowing sufficient conductor length for connection to service equipment.

.4 Allow sufficient conductor length for connection to supply by power supply authority.

.5 Allow sufficient conductor length for drip loops.

.6 Make grounding connections in accordance with Section 26 05 28 - Grounding - Secondary.

3.2 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results - For Electrical.

.2 Perform additional tests if required by authority having jurisdiction.