

Project Manual

City of Winnipeg

Little Mountain Park
Washroom/Change Building

64093 Klimpke Road

R.M. Rosser, Manitoba

Bid Opportunity No. 548-2019

Set No.:

Project:

**Little Mountain Park
Washroom/Change Building**
64093 Klimpke Road
R.M. of Rosser, Manitoba

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PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises the renovation of public washrooms, located at 64093 Klimpke Road, Little Mountain Park; and further identified as Little Mountain Park Washroom/Change Building Project. Work shall include connection to, and mechanization of, an existing well for non-potable water as well as a new water service from Farmer Road to the existing building.

1.2 CONTRACT METHOD

- .1 Construct Work under single stipulated price contract.

1.3 WORK BY OTHERS

- .1 Not Applicable.

1.4 CONTRACTOR USE OF PREMISES

- .1 Unrestricted use of immediate site until Substantial Performance.
- .2 Co-ordinate use of site under direction of Project Manager.

1.5 CITY OF WINNIPEG FURNISHED ITEMS

- .1 Not Applicable.

1.6 EXISTING SERVICES

- .1 Notify, Project Manager and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Contract Administrator 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 and vehicular traffic.
- .3 Establish location and extent of service lines in area of work before starting Work. Notify Contract Administrator of findings.
- .4 Submit schedule to and obtain approval from Contract Administrator 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.
- .5 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .6 Where unknown services are encountered, immediately advise Contract Administrator and confirm findings in writing.
- .7 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .8 Record locations of maintained, re-routed and abandoned service lines.
- .9 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.7 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 Other documents as specified.

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 Closures: protect work temporarily until permanent enclosures are completed.

1.3 EXISTING SERVICES

- .1 Notify Contract Administrator and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Contract Administrator 48 hours of notice for necessary interruption of mechanical or electrical service that may interfere with Tenant occupants after Interim Occupancy. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .3 Provide for personnel and vehicular traffic.
- .4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.4 SPECIAL REQUIREMENTS

- .1 Carry out noise generating Work Monday to Friday and weekends & statutory holidays within provisions of applicable municipal by-laws.
- .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.
- .4 Ingress and egress of Contractor vehicles at site is limited to existing curb cuts.

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 Contract Administrator submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in units to match construction documents.
- .4 Review submittals prior to submission to Contract Administrator. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated 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.
- .5 Notify Contract Administrator, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .6 Verify field measurements and affected adjacent Work are coordinated.
- .7 Contractor's responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.
- .8 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator review.
- .9 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 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 coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .3 Allow 10 working days for Contract Administrator's review of each submission.
- .4 Adjustments made on shop drawings by Contract Administrator are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Contract Administrator prior to proceeding with Work.
- .5 Make changes in shop drawings as Contract Administrator may require, consistent with Contract Documents. When resubmitting, notify Contract Administrator in writing of revisions other than those requested.
- .6 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.
- .7 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.
- .8 After Contract Administrator's review, distribute copies.
- .9 Submit one electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Contract Administrator where shop drawings will not be prepared due to standardized manufacture of product.
- .10 Submit one electronic copy of test reports for requirements requested in specification Sections and as requested by Contract Administrator.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
- .11 Submit one electronic copy of manufacturers instructions for requirements requested in specification Sections and as requested by Contract Administrator.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .12 Delete information not applicable to project.
- .13 Supplement standard information to provide details applicable to project.
- .14 If upon review by Contract Administrator, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.3 SAMPLES

- .1 Submit for review samples in as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Contract Administrator's business address.
- .3 Notify Contract Administrator in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Contract Administrator are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Contract Administrator prior to proceeding with Work.
- .6 Make changes in samples which Contract Administrator may require, consistent with Contract Documents.

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

1.4 MOCK-UPS

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

1.5 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after award of Contract.

1.6 PROGRESS PHOTOGRAPHS

- .1 Progress photographs taken weekly shall be provided by the General Contractor and submitted to the Project Administrator. Photos are to be submitted in high resolution digital format.

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 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Contract Administrator for purpose of inspecting and/or testing portions of Work. Cost for such services will be borne by the City.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Contract Administrator at no cost to City. Pay costs for re-testing and re-inspection.

1.2 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.

1.3 PROCEDURES

- .1 Notify appropriate agency 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.

1.4 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Contract Administrator as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other contractor's work damaged by such removals or replacements promptly.
- .3 If, in opinion of Contract Administrator, it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, City may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Contract Administrator.

1.5 REPORTS

- .1 Submit 3 copies of inspection and test reports to Contract Administrator.
- .2 Provide copies to subcontractor of work being inspected or tested.

1.6 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.

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 Contract Administrator.
- .3 Prepare mock-ups for Contract Administrator's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 If requested, Contract Administrator will assist in preparing schedule fixing dates for preparation.

- .6 Specification section identifies whether mock-up may remain as part of Work or when/if it is to be removed.

1.8 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical and electrical systems.
- .2 Refer to relevant specification sections for definitive 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 INSTALLATION AND REMOVAL

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

1.2 DEWATERING

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

1.3 WATER SUPPLY

- .1 Contractor will provide continuous supply of potable water for construction use.
- .2 Arrange for connection with appropriate utility company and pay costs for installation, maintenance and removal.
- .3 Contractor is to pay for utility charges at prevailing rates.

1.4 TEMPORARY HEATING AND VENTILATION

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
- .3 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of Work.
 - .2 Protect Work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 Maintain temperatures of minimum 10° C in areas where construction is in progress.
- .5 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .6 Permanent heating system of building, not to be used when available. Contractor is responsible for damage to heating system if use is permitted.
- .7 Ensure Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Contract Administrator.
- .8 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.

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

1.5 TEMPORARY POWER AND LIGHT

- .1 Contractor to provide and pay for temporary power during construction for temporary lighting and operating of power tools and required equipment.
- .2 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal.
- .3 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx.

1.6 TEMPORARY COMMUNICATION FACILITIES

- .1 Contractor to provide and pay for temporary telephone and fax equipment and hook up necessary for own use and use of Contract Administrator.

1.7 FIRE PROTECTION

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

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 INSTALLATION AND REMOVAL

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

1.2 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA- S269.2.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, temporary stairs as required to perform work.

1.3 HOISTING

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

1.4 SITE STORAGE/LOADING

- .1 Confine work and operations by Contract Documents. Do not unreasonably encumber premises with products and materials.
- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.5 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt public access to the park.
- .2 Provide and maintain adequate access to project site.

1.6 OFFICES

- .1 Provide office heated to 22° C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing layout table.
- .2 Provide clearly marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

1.7 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.

1.8 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.

1.9 CONSTRUCTION SIGNAGE

- .1 Provide and erect project sign, within three weeks of signing Contract, of a design and in a location acceptable to City
- .2 Install sign supplied by Contract Administrator on framing for project sign.
- .3 No other signs or advertisements, other than warning signs, are permitted on site.
- .4 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Contract Administrator.

1.10 PROTECTION AND MAINTENANCE OF TRAFFIC

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

- .2 Maintain and protect traffic on affected roads during construction period.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor responsible for repair of damage to roads caused by construction operations.
- .7 Construct access and haul roads necessary.
- .8 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

1.11 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 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 INSTALLATION AND REMOVAL

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

1.2 HOARDING

- .1 Erect temporary site enclosure using 2.4 m high metal mesh fence. Provide one lockable truck gate. Maintain fence in good repair.
- .2 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.3 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open edges of floors and roofs.
- .2 Provide as required by governing authorities.

1.4 WEATHER ENCLOSURES

- .1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
- .2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.
- .3 Design enclosures to withstand wind pressure and snow loading.

1.5 DUST TIGHT SCREENS

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

1.6 ACCESS TO SITE

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

1.7 FIRE ROUTES

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

1.8 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

1.9 PROTECTION OF BUILDING FINISHES

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

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 QUALITY

- .1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of Products provided.
- .2 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.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Contract Administrator based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacturer for any particular or like item throughout project.
- .5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.2 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Contract Administrator of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify Contract Administrator at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Contract Administrator reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

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

1.4 TRANSPORTATION

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

1.5 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Contract Administrator in writing, of conflicts between specifications and manufacturer's instructions, so that Contract Administrator will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Contract Administrator to require removal and re-installation at no increase in Contract Price or Contract Time.

1.6 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Contract Administrator if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Contract Administrator reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Contract Administrator, whose decision is final.

1.6 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.

1.7 CONCEALMENT

- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation inform Contract Administrator if there is interference. Install as directed by Contract Administrator.

1.8 REMEDIAL WORK

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate 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.

1.9 LOCATION OF FIXTURES

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Contract Administrator of conflicting installation. Install as directed.

1.10 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.

1.11 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.12 PROTECTION OF WORK IN PROGRESS

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

1.13 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.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Field engineering survey services to measure and stake site.
- .2 Survey services to establish inverts for Work.
- .3 Recording of subsurface conditions found.

1.2 REFERENCES

- .1 City's identification of existing survey control points and property limits.

1.3 QUALIFICATIONS OF SURVEYOR

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

1.4 SURVEY REFERENCE POINTS

- .1 Existing base horizontal and vertical control points are designated on drawings.
- .2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice to Contract Administrator.
- .4 Report to Contract Administrator when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5 Require surveyor to replace control points in accordance with original survey control.

1.5 SURVEY REQUIREMENTS

- .1 Establish two permanent benchmarks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.
- .2 Establish lines and levels, locate and lay out, by instrumentation.
- .3 Stake for grading, fill and topsoil placement and landscaping features.
- .4 Stake slopes, swales and berms.
- .5 Establish pipe invert elevations.
- .6 Stake batter boards for foundations.
- .7 Establish lines and levels for mechanical and electrical work.

1.6 EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Contract Administrator of findings.
- .2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by Contract Administrator.

1.7 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Contract Administrator of impending installation and obtain approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Contract Administrator.

1.8 RECORDS

- .1 Prior to engaging in any demolition or excavation, conduct a condition survey including an annotated photographic record of existing structures adjacent to project extents. Investigate foundations to determine underpinning, and related works required.
- .2 Prior to engaging in any demolition or excavation, record elevations, in relation to project geodetic, for existing structures adjacent to project extents.
- .3 Maintain a complete, accurate log of control and survey work as it progresses.
- .4 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.
- .5 Record locations of maintained, re-routed and abandoned service lines.

1.9 SUBMITTALS

- .1 Submit name and address of Surveyor to Contract Administrator.
- .2 On request of Contract Administrator, submit documentation to verify accuracy of field engineering work.
- .3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform with Contract Documents. The signed certificate will also note any elevations and locations that do not conform to Contract Documents.
- .4 Provide the City with a Building Location Certificate prepared by a legal surveyor to document the location of the building and major features on the site.

1.10 SUBSURFACE CONDITIONS

- .1 Promptly notify Contract Administrator in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.
- .2 After prompt investigation, should Contract Administrator determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders and Change Directives.

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.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of City 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 City 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 84 00 - 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.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

End of Section

PART 1 - GENERAL

1.1 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by City or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Contract Administrator. Do not burn waste materials on site.
- .3 Clear snow and ice from access to building.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site refuse containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling.
- .7 Dispose of waste materials and debris off site.
- .8 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris other than that caused by City or other General Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Contract Administrator. Do not burn waste materials on site.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.
- .9 Clean lighting reflectors, lenses, and other lighting surfaces.
- .10 Vacuum clean and dust building interiors, behind grilles, louvers and screens.
- .11 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

- .13 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .14 Remove dirt and other disfiguration from exterior surfaces.
- .15 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .16 Sweep and wash clean paved areas.
- .17 Clean equipment and fixtures to sanitary condition.
- .18 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.
- .21 Remove snow and ice from access to building.

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 Contract Administrator in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 - .2 Request Contract Administrator's Inspection.
- .2 Contract Administrator's Inspection: Contract Administrator 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 Utility companies have been submitted.
 - .5 Operation of systems have been demonstrated to City'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 Contract Administrator and Contractor. If Work is deemed incomplete by Contract Administrator, complete outstanding items and request re-inspection.
- .5 Declaration of Substantial Performance: when Contract Administrator considers deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance. Refer to City Agreement for specifics to application.
- .6 Commencement of Lien and Warranty Periods: date of City's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .7 Final Payment: when Contract Administrator considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. If Work is deemed incomplete by Contract Administrator, complete outstanding items and request re-inspection.
- .8 Payment of Holdback: after issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with City agreement.

1.2 CLEANING

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

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 Contract Administrator's 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 Contract Administrator, three 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.

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 All information within binders shall also be submitted in electronic 'PDF' format.

1.3 CONTENTS - EACH VOLUME

- .1 Table of Contents: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Contract Administrator and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. 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 Contract Administrator, 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 Keep record documents and samples available for inspection by Contract Administrator.

1.5 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of black line opaque drawings.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.

1.6 FINAL SURVEY

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

1.7 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.

1.8 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.

1.9 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 Contract Administrator. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.10 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 location as directed; place and store.
- .4 Receive and catalogue items. Submit inventory listing to Contract Administrator. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.11 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 location as directed; place and store.
- .4 Receive and catalogue items. Submit inventory listing to Contract Administrator. Include approved listings in Maintenance Manual.

1.12 STORAGE, HANDLING AND PROTECTION

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

1.13 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Contract Administrator for approval.
- .3 Warranty management plan to include required actions and documents to assure that City receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Contract Administrator for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder and submit upon acceptance of work. Organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with City'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 Contractor, subcontractors, manufacturers or suppliers involved.
 - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to

- include roofs, pumps, motors, transformers, and commissioned systems such as fire protection systems.
- .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
 - .1 Name of item.
 - .2 Model and serial numbers.
 - .3 Location where installed.
 - .4 Name and phone numbers of manufacturers or suppliers.
 - .5 Names, addresses and telephone numbers of sources of spare parts.
 - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
 - .7 Cross-reference to warranty certificates as applicable.
 - .8 Starting point and duration of warranty period.
 - .9 Summary of maintenance procedures required to continue warranty in force.
 - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
 - .11 Organization, names and phone numbers of persons to call for warranty service.
 - .12 Typical response time and repair time expected for various warranted equipment.
 - .4 Procedure and status of tagging of equipment covered by extended warranties.
 - .5 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.

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 DESCRIPTION

- .1 Demonstrate scheduled operation and maintenance of equipment and systems to City's personnel two weeks prior to date of final inspection.
- .2 City will provide list of personnel to receive instructions, and will co-ordinate their attendance at agreed-upon times.

1.2 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 City's approval.
- .3 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .4 Give time and date of each demonstration, with list of persons present.

1.3 CONDITIONS FOR DEMONSTRATIONS

- .1 Equipment has been inspected and put into operation.
- .2 Testing, adjusting, and balancing has been performed.
- .3 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.4 PREPARATION

- .1 Verify that conditions for demonstration and instructions comply with requirements.
- .2 Verify that designated personnel are present.

1.5 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 RELATED SECTIONS

- .1 Common Work Results – Mechanical.
- .2 Common Work Results - Electrical.

1.2 QUALITY ASSURANCE

- .1 Provide testing organization services under provisions specified in Section 01 45 00 – Quality Control.
- .2 Testing organization: current member in good standing certified to perform specified services.
- .3 Comply with applicable procedures and standards of the certification sponsoring association.
- .4 Perform services under discretion of supervisor qualified under certification requirements of sponsoring association.

1.3 REFERENCES

- .1 Associated Air Balance Council (AABC): National Standards for Field Measurements and Instrumentation, Total Systems Balance, Air Distribution-Hydronics Systems.

1.4 SUBMITTALS

- .1 Prior to the start of Work, submit name of organization proposed to perform services. Designate who has managerial responsibilities for coordination of entire testing, adjusting and balancing.
- .2 Submit documentation to confirm organization compliance with quality assurance provision.
- .3 Submit three (3) preliminary specimen copies of each report form proposed for use.
- .4 Fifteen (15) days prior to Substantial Performance, submit three (3) copies of final reports on applicable forms.
- .5 Submit reports of testing, adjusting and balancing postponed due to seasonal, climatic, occupancy, or other reasons beyond Contractor's control, promptly after execution of those services.

1.5 PROCEDURES - GENERAL

- .1 Comply with procedural standards of certifying association under whose standard services will be performed.
- .2 Notify Contract Administrator three (3) days prior to beginning of operations.
- .3 Accurately record data for each step.
- .4 Report to Contract Administrator any deficiencies or defects noted during performance of services.

1.6 FINAL REPORTS

- .1 Testing organization having managerial responsibility shall make reports.
- .2 Ensure each form bears signature of recorder, and that of supervisor of reporting organization.
- .3 Identify each instrument used and latest date of calibration of each.

1.7 CONTRACTOR RESPONSIBILITIES

- .1 Prepare each system for testing and balancing.
- .2 Cooperate with testing organization and provide access to equipment and systems.
- .3 Provide personnel and operate systems at designated times, and under conditions required for proper testing, adjusting and balancing.
- .4 Perform services under discretion of supervisor qualified under certification requirements of sponsoring association.

1.8 PREPARATION

- .1 Provide instruments required for testing, adjusting and balancing operations.
- .2 Make instruments available to Contract Administrator to facilitate spot checks during testing.
- .3 Retain possession of instruments and remove at completion of services.
- .4 Verify systems installation is complete and in continuous operation.
- .5 Verify lighting is turned on when lighting is included in cooling load.
- .6 Verify equipment such as computers, laboratory and electronic equipment are in full operation.

1.9 EXECUTION

- .1 Test equipment, balance distribution systems, and adjust devices for HVAC systems.
- .2 Test hydronic systems, adjust and record liquid flow at each piece of equipment.

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 Methods and procedures for demolishing, salvaging, recycling and removing sitework items designated to be removed in whole or in part, and for backfilling resulting trenches and excavations.
- .2 Related Sections.
 - .1 Section 01 33 00 - Submittal Procedures.
 - .2 Section 01 45 00 - Quality Control.
 - .3 Section 31 23 10 - Excavating, Trenching and Backfilling.
- .3 Measurement Procedures.
 - .1 Measure removal of asphaltic concrete pavement in square metres
 - .2 Measure removal of Portland cement concrete pavement in square metres
 - .3 Measure removal of base and sub-base pavement materials in cubic metres in place
 - .4 Measure removal of concrete in cubic metres.
 - .5 Measure removal of masonry foundations in cubic metres in place.
 - .6 Measure removal of fences and curbs in metres.
 - .7 Payment for disposal and restoration will be included in above removal items.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 Canadian Council of Ministers of the Environment (CCME).
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).

1.3 DEFINITIONS

- .1 Demolition: rapid destruction of building following removal of hazardous materials.
- .2 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.
- .3 Waste Audit (WA): detailed inventory of materials in building. Indicates quantities of reuse, recycling and landfill.
 - .1 Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project.
 - .2 Indicates quantities of reuse, recycling and landfill.
- .4 Waste Management Coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .5 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 61 33 - Hazardous Materials.
- .3 Shop drawings.
 - .1 Submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning, where required by authorities having jurisdiction.

- .2 Submit drawings stamped and signed by qualified professional engineer registered or licensed in Province of Manitoba, Canada.
- .4 Hazardous Materials: provide description of Hazardous Materials and Notification of Filing with proper authorities prior to beginning of Work as required.

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable Provincial/Territorial regulations.
- .2 Site Meetings.
 - .1 Convene pre-installation meeting oneweek prior to beginning work of this Section and on-site installations in accordance with Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
 - .2 Arrange for site visit with Contract Administrator to examine existing site conditions adjacent to demolition work, prior to start of Work.
 - .3 Hold project meetings every 2 weeks.
 - .4 Ensure key personnel attend.
 - .5 Contract Administrator will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.
- .3 Health and Safety.
 - .1 Do construction occupational health and safety in accordance with Section 01 35 30 - Health and Safety Requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Perform Work in accordance with Section 01 35 43 - Environmental Procedures
- .2 Storage and Protection.
 - .1 Protect in accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.
 - .2 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Contract Administrator and at no cost to Contract Administrator
 - .3 Remove and store materials to be salvaged, in manner to prevent damage.
 - .4 Store and protect in accordance with requirements for maximum preservation of material.
 - .5 Handle salvaged materials as new materials.

1.7 SITE CONDITIONS

- .1 Site Environmental Requirements.
 - .1 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .2 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
 - .1 Ensure proper disposal procedures are maintained throughout the project.
 - .3 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.
 - .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.
 - .5 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .2 Existing Conditions.
 - .1 Remove contaminated or hazardous materials listed as hazardous as defined by authorities having jurisdiction as directed by Contract Administrator from site, prior to start of demolition Work, and dispose of at designated disposal facilities in safe manner in accordance with TDGA and other applicable regulatory requirements and Section 02 61 33 - Hazardous

Materials.

1.8 SCHEDULING

- .1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.
 - .1 Notify Contract Administrator in writing when unforeseen delays occur.

PART 2 – PRODUCTS

2.1 EQUIPMENT

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

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Inspect site with Contract Administrator and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.

3.2 REMOVAL OF HAZARDOUS WASTES

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

3.3 REMOVAL OPERATIONS

- .1 Remove items as indicated.
- .2 Do not disturb items designated to remain in place.
- .3 Removal of Pavements, Curbs and Gutters:
 - .1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Contract Administrator.
 - .2 Protect adjacent joints and load transfer devices.
 - .3 Protect underlying and adjacent granular materials.
- .4 Prevent contamination with base course aggregates, when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving,
- .5 Remove designated trees during demolition.
 - .1 Obtain written approval of Contract Administrator prior to removal of trees not designated.
- .6 Stockpile topsoil for final grading and landscaping.
 - .1 Provide erosion control and seeding if not immediately used.

3.4 REMOVAL FROM SITE

- .1 Remove stockpiled material as directed by Contract Administrator, when it interferes with operations of project.
- .2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.

3.5 RESTORATION

- .1 Restore areas and existing works outside areas of demolition to conditions that existed prior to beginning of Work.
- .2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants,

and do not endanger wildlife, adjacent water courses or ground water.

3.6 CLEANING

- .1 Remove debris, trim surfaces and leave work site clean, upon completion of Work
- .2 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

End of Section

PART 1 - GENERAL

1.1 SUMMARY

- .1 Related Sections.
 - .1 Section 02 41 13 - Site Demolition
 - .2 Section 02 41 16 - Structure Demolition
- .2 Measurement Procedures.
 - .1 Measure removal of asphaltic concrete pavement in square metres
 - .2 Payment for disposal and restoration will be included in above removal items.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Assessment Act (CEAA), c. 37.
 - .2 Canadian Environmental Protection Act, (CEPA), c. 33.
- .2 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 DEFINITIONS

- .1 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.
- .2 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed, removed and salvaged, or removed and reinstalled.

1.4 QUALITY ASSURANCE

- .1 Regulatory Requirements: ensure Work is performed in compliance with applicable Provincial/Territorial regulations.
- .2 Comply with hauling and disposal regulations of Authority Having Jurisdiction.

1.5 SITE CONDITIONS

- .1 Protect existing site features to remain or identified for salvage or re use; make repairs and restore to a similar condition to existing where damage to these items occurs as directed by Contract Administrator and at no cost to The City of Winnipeg:
 - .1 Remove and store salvaged materials to prevent contamination.
 - .2 Store and protect salvaged materials as required for maximum preservation of material.
 - .3 Handle salvaged materials same as new materials.
- .2 Perform pavement removal work to prevent adverse effects to adjacent watercourses, groundwater and wildlife, and to prevent excess air and noise pollution:
 - .1 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.
 - .2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with Authorities Having Jurisdiction.
- .3 Protect existing site features and structures, trees, plants and foliage on site and adjacent properties

PART 2 – PRODUCTS

2.1 EQUIPMENT

- .1 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of pavement surface to depths or grades indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Verify extent and location of asphalt identified 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 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- .4 Prior to beginning removal operation, inspect and verify Contract Administrator areas, depths and lines of asphalt pavement to be removed.
- .5 Protection: protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Contract Administrator at no additional cost.

3.2 REMOVAL

- .1 Remove existing asphalt pavement to lines and grades as indicated.
- .2 Demolition of pavements:
 - .1 Square up adjacent surfaces to remain in place by saw cutting or other method acceptable to Contract Administrator.
 - .2 Protect adjacent joints and load transfer devices.
 - .3 Protect underlying and adjacent granular materials where they are exposed and identified to remain.
 - .4 Prevent contamination with base course aggregates, when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving.
- .3 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.
- .4 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
- .5 Suppress dust generated by removal process.

3.3 FINISH TOLERANCES

- .1 Finished surfaces in areas where asphalt pavement has been removed within +/-5 mm of grade specified but not uniformly high or low.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 56 00 - Temporary Barriers and Enclosures.

1.2 DEFINITIONS

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

1.3 QUALITY ASSURANCE

- .1 Regulatory Requirements: Ensure Work is performed in compliance with applicable Provincial/Territorial and Municipal regulations.

1.4 ENVIRONMENTAL PROTECTION

- .1 Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
 - .1 Ensure proper disposal procedures are maintained throughout project.

1.5 EXISTING CONDITIONS

- .1 Should material resembling spray or trowel applied asbestos or other substance be encountered in course of demolition, stop work, take preventative measures, and notify Consultant immediately. Do not proceed until written instructions have been received.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 PREPARATION

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

3.3 SAFETY CODE

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

3.4 REMOVAL OF HAZARDOUS WASTES

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

3.5 DEMOLITION

- .1 Demolish building components as specified.
- .2 Wipe down areas of selective demolition to minimize dusting.
- .3 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
- .4 At end of each day's work, leave Work in safe and stable condition.
- .5 Demolish to minimize dusting. Keep materials wetted as directed by Departmental Representative.
- .6 Contain fibrous materials (e.g. Insulation) to minimize release of airborne fibres while being transported within facility.

- .7 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.
- .8 Use natural lighting to do Work where possible.
 - .1 Shut off lighting except those required for security purposes at end of each day.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 07 92 10 - Joint Sealing.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
 - .2 CAN/CSA-O86.1, Engineering Design in Wood (Limit States Design).
 - .3 CSA O121, Douglas Fir Plywood.
 - .4 CSA O151, Canadian Softwood Plywood.
 - .5 CSA O437, Standards for OSB and Waferboard.
 - .6 CSA S269.1, Falsework for Construction Purposes.
 - .7 CAN/CSA-S269.3, Concrete Formwork.
- .2 Council of Forest Industries of British Columbia (COFI)
 - .1 COFI Exterior Plywood for Concrete Formwork.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Formwork materials:
 - .1 For concrete without special architectural features, use wood and wood product formwork materials to CAN/CSA-O86.1.
 - .2 For concrete with special architectural features, use formwork materials to CAN/CSA-A23.1.
- .2 Form ties:
 - .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface.
 - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.
- .3 Form release agent: non-toxic, low VOC.
- .4 Falsework materials: to CSA-S269.1.
- .5 Sealant: to Section 07 92 10 - Joint Sealing.

PART 3 - EXECUTION

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Obtain Contract Administrator's approval for use of earth forms framing openings not indicated on drawings.
- .3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- .4 Fabricate and erect falsework in accordance with CSA S269.1 and COFI Exterior Plywood for Concrete Formwork.
- .5 Refer to architectural drawings for concrete members requiring architectural exposed finishes.
- .6 Do not place shores and mud sills on frozen ground.
- .7 Provide site drainage to prevent washout of soil supporting mud sills and shores.

- .8 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CAN/CSA-A23.1.
- .9 Align form joints and make watertight. Keep form joints to minimum.
- .10 Locate horizontal form joints for exposed columns 2400 mm above finished floor elevation.
- .11 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners , joints, unless specified otherwise.
- .12 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .13 Construct forms for architectural concrete, and place ties as indicated and/or as directed. Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.
- .14 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections. Assure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .15 Clean formwork in accordance with CAN/CSA-A23.1, before placing concrete.

3.2 REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
 - .1 3 days for walls and sides of beams.
 - .2 3 days for footings and abutments.
- .2 Remove formwork when concrete has reached 75 % of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.
- .3 Provide all necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
- .4 Space reshoring in each principal direction at not more than 3000 mm apart.
- .5 Re-use formwork and falsework subject to requirements of CAN/CSA-A23.1.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 03 30 00 - Cast-in-Place Concrete.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Concrete Institute (ACI)
 - .1 ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.
- .2 American National Standards Institute/American Concrete Institute (ANSI/ACI)
 - .1 ANSI/ACI 315, Details and Detailing of Concrete Reinforcement.
- .3 Canadian Standards Association (CSA)
 - .1 CAN3-A23.3, Design of Concrete Structures for Buildings.
 - .2 CAN/CSA-G30.18, Billet-Steel Bars for Concrete Reinforcement.
 - .3 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings including placing of reinforcement in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacing's, locations of reinforcement and mechanical splices if approved by Contract Administrator, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacing's and locations of chairs, spacers and hangers. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada.
- .3 Detail lap lengths and bar development lengths to CAN3-A23.3.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Contract Administrator.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CAN/CSA-30.18.
- .4 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1.
- .5 Mechanical splices: subject to approval of Contract Administrator.
- .6 Plain round bars: to CAN/CSA-G40.21.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1, ANSI/ACI 315, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Contract Administrator 's approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Contract Administrator, weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

PART 3 - EXECUTION

3.1 FIELD BENDING

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

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CAN/CSA-A23.1.
- .2 Use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.
- .3 Prior to placing concrete, obtain Contract Administrator 's approval of reinforcing material and placement.
- .4 Ensure cover to reinforcement is maintained during concrete pour.
- .5 Protect epoxy and paint coated portions of bars with covering during transportation and handling.

3.3 FIELD TOUCH-UP

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 03 10 00 - Concrete Forming and Accessories.
- .2 Section 03 20 00 - Concrete Reinforcing.
- .3 Section 03 35 00 - Concrete Finishing.
- .4 Section 05 50 00 - Metal Fabrications.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C 109/C109M, Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 in. or 50-mm Cube Specimens).
 - .2 ASTM C 260, Specification for Air-Entraining Admixtures for Concrete.
 - .3 ASTM C 309, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .4 ASTM C 332, Specification for Lightweight Aggregates for Insulating Concrete.
 - .5 ASTM C 494, Specification for Chemical Admixtures for Concrete.
 - .6 ASTM C 827, Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures.
 - .7 ASTM C 939, Test Method for Flow of Grout for Preplaced-Aggregate Concrete.
 - .8 ASTM D 412, Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
 - .9 ASTM D 624, Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
 - .10 ASTM D 1751, Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - .11 ASTM D 1752, Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-37.2, Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
 - .2 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A5, Portland Cement.
 - .2 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
 - .3 CAN/CSA-A23.2, Methods of Test for Concrete.
 - .4 CAN/CSA-A23.5, Supplementary Cementing Materials.
 - .5 CAN/CSA A363, Cementitious Hydraulic Slag.

1.3 WASTE MANAGEMENT AND DISPOSAL

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

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Portland cement: to CAN/CSA-A5.
- .2 Supplementary cementing materials: to CAN/CSA-A23.5.
- .3 Cementitious hydraulic slag: to CAN/CSA-A363.
- .4 Water: to CAN/CSA-A23.1.
- .5 Aggregates: to CAN/CSA-A23.1.
- .6 Air entraining admixture: to ASTM C 260.
- .7 Chemical admixtures: to ASTM C 494. Contract Administrator to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .8 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents.
 - .1 Compressive strength: 35 MPa at 28 days.
 - .2 Consistency:
 - .1 Fluid: to ASTM C 827. Time of efflux through flow cone (ASTM C 939), under 30s.
 - .2 Flowable: to ASTM C 827. Flow table, 5 drops in 3s, (ASTM C 109, applicable portion) 125 to 145%.
 - .3 Plastic: to ASTM C 827. Flow table, 5 drops in 3 s, (ASTM C 109, applicable portions) 100 to 125 %.
 - .4 Dry pack to manufacturer's requirements.
 - .3 Net shrinkage at 28 days: maximum 0 %.
- .9 Non premixed dry pack grout: composition of non metallic aggregate Portland cement with sufficient water for the mixture to retain its shape when made into a ball by hand and capable of developing compressive strength of 35 MPa at 28 days.
- .10 Curing compound: to CAN/CSA-A23.1 white and to ASTM C 309, Type 1-chlorinated rubber.
- .11 Cushion pads: tough, resilient, weather, moisture, and oil resistant material that will not corrode or cause corrosion, consisting of either layers of approved cotton duck saturated and bound together by approved rubber or synthetic compounds, or made from specially compounded synthetic materials.
- .12 Premoulded joint fillers:
 - .1 Bituminous impregnated fiber board: to ASTM D 1751.
 - .2 Sponge rubber: to ASTM D 1752, Type I, flexible grade.
- .13 Polyethylene film: 0.254 mm thickness to CAN/CGSB-51.34.

2.2 MIXES

- .1 Proportion normal density concrete in accordance with CAN/CSA-A23.1, as indicated on the drawings.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Obtain Contract Administrator's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.
- .2 Pumping of concrete is permitted only after approval of equipment and mix.
- .3 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .4 Prior to placing of concrete obtain Contract Administrator's approval of proposed method for protection of concrete during placing and curing.

- .5 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .6 In locations where new concrete is dowelled to existing work, drill holes in existing concrete. Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy grout to anchor and hold dowels in positions as indicated.
- .7 Do not place load upon new concrete until authorized by Contract Administrator.

3.2 CONSTRUCTION

- .1 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1.
- .2 Sleeves and inserts.
 - .1 No sleeves, ducts, pipes or other openings shall pass through joists, beams, column capitals or columns, except where indicated or approved by Contract Administrator.
 - .2 Where approved by Contract Administrator, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100 mm not indicated, must be approved by Contract Administrator.
 - .3 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from Contract Administrator before placing of concrete.
 - .4 Check locations and sizes of sleeves and openings shown on drawings.
- .3 Anchor bolts.
 - .1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.
 - .2 With approval of Contract Administrator, grout anchor bolts in preformed holes or holes drilled after concrete has set. Formed holes to be minimum 100 mm diameter. Drilled holes to be to manufacturer's recommendations.
 - .3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
 - .4 Set bolts and fill holes with epoxy grout.
 - .5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .4 Drainage holes and weep holes:
 - .1 Form weep holes and drainage holes in accordance with Section 03 10 00 - Concrete Forming and Accessories. If wood forms are used, remove them after concrete has set.
 - .2 Install weep hole tubes and drains as indicated.
- .5 Grout under base plates using procedures in accordance with manufacturer's recommendations which result in 100% contact over grouted area.
- .6 Finishing.
 - .1 Finish concrete in accordance with CAN/CSA-A23.1.
 - .2 Use procedures acceptable to Contract Administrator to remove excess bleed water. Ensure surface is not damaged.
 - .3 Provide smooth trowel finish on interior slabs unless otherwise indicated.
 - .4 Provide broom finish on exterior slabs unless otherwise indicated.
 - .5 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.
- .7 Joint fillers.
 - .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Contract Administrator. When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
 - .2 Locate and form joints as indicated. Install joint filler.
 - .3 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

3.3 SITE TOLERANCE

- .1 Concrete tolerance in accordance with CAN/CSA-A23.1.

3.4 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Contract Administrator in accordance with CAN/CSA-A23.1 and Section 01 45 00 - Quality Control.
- .2 Inspection or testing by Contract Administrator will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.

End of Section

PART 1 – GENERAL

1.1 RELATED SECTIONS

- .1 Section 03 30 00 - Cast-in-Place Concrete.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-25.20, Surface Sealer for Floors.

1.3 PERFORMANCE REQUIREMENTS

- .1 Product quality and quality of work in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Submit written declaration that components used are compatible and will not adversely affect finished flooring products and their installation adhesives.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Place materials defined as hazardous or toxic waste in designated containers.
- .2 Dispose of surplus chemical and finishing materials in accordance with federal, provincial and municipal regulations.
- .3 Dispose of waste from stripping of floors in a manner that will not have unfavourable effects on the environment.

1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Temporary lighting: Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40 sq m of floor being treated.
- .2 Electrical power: Provide sufficient electrical power to operate equipment normally used during construction.
- .3 Work area: Make the work area water tight protected against rain and detrimental weather conditions.
- .4 Temperature: Maintain ambient temperature of not less than 10 °C from 7 days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40% during same period.
- .5 Moisture: Ensure concrete substrate is within moisture limits prescribed by manufacturer.
- .6 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.
- .7 Ventilation:
 - .1 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
 - .2 Provide continuous ventilation during and after coating application.

PART 2 - PRODUCTS

2.1 SEALING COMPOUNDS

- .1 Surface sealer: to CAN/CGSB-25.20, as recommended by polyurethane coating manufacturer.

2.2 CURING COMPOUNDS

- .1 Select water-based curing compounds.

2.3 PAINTED CONCRETE

- .1 INT 3.2D, polyurethane pigmented coating over epoxy as per MPI installation recommendations and instructions. Colour: grey.

2.4 MIXES

- .1 Mixing, ratios and application in accordance with manufacturer's instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verify that slab surfaces are ready to receive work and elevations are as instructed by manufacturer.

3.2 PREPARATION OF SLAB

- .1 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radiused edges unless otherwise indicated.
- .2 Saw cut control joints to CSA-A23.1, 24 hours maximum after placing of concrete as indicated on drawings.
- .3 Remove chlorinated rubber or existing surface coatings.
- .4 Use protective clothing, eye protection and respiratory equipment during stripping of chlorinated rubber or existing surface coatings.
- .5 Prepare existing and new areas of slab to receive new INT 3.2D polyurethane pigmented over epoxy coating as per manufacturer's installation instructions.

3.3 APPLICATION

- .1 Prepare and mix materials and apply each component of coating system in accordance with manufacturer's directions to produce a uniform monolithic surface. Minimum of 2 coats required. Total dry film thickness to be 32 mils.
 - .1 Prime Coat: Apply sealer as recommended by polyurethane coating manufacturer.
 - .2 Finish Coat: Apply INT 3.2D, polyurethane pigmented coating as per manufacturer's instructions. Allow coating to cure.
 - .3 Finished colour and texture to meet approval of Contract Administrator.

3.4 PROTECTION

- .1 Protect finished installation in accordance with manufacturer's instructions.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 07 21 13 – Board Insulation.
- .2 Section 07 27 10 – Air Barriers.
- .3 Section 07 27 13 – Self-Adhered Vapour Retarders.
- .4 Section 09 21 16 – Gypsum Board Assemblies.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
 - .2 ASTM C 36/C36M, Specification for Gypsum Wallboard.
- .2 Canadian Standards Association (CSA)
 - .1 CSA B111, Wire Nails, Spikes and Staples.
 - .2 CSA O121, Douglas Fir Plywood.
 - .3 CAN/CSA-O141, Softwood Lumber.
 - .4 CSA O151, Canadian Softwood Plywood.
- .3 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber.

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 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.
- .2 Do not burn scrap at the project site.

PART 2 - PRODUCTS

2.1 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 1x6 tongue and groove cedar planks for ceiling.

2.2 ACCESSORIES

- .1 Exterior wall sheathing paper: to CAN/CGSB-51.32 spunbonded olefin type as indicated. Standard of Acceptance: Tyvek® CommercialWrap®
- .2 Sealants: as per Section 07 92 10 - Joint Sealing.
- .3 General purpose adhesive: to CSA O112 Series.
- .4 Nails, spikes and staples: to CSA B111.
- .5 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic

fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

2.3 FASTENER FINISHES

- .1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for interior highly humid areas.
- .2 Stainless steel: use stainless steel fasteners for pressure treated lumber and exterior work.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Store wood products such that they are not exposed to rainfall and ground moisture.

3.2 INSTALLATION

- .1 Comply with requirements of Manitoba Building Code supplemented by following paragraphs.
- .2 Install members true to line, levels and elevations, square and plumb.
- .3 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.
- .4 Use dust collectors and high quality respirator masks when cutting or sanding wood panels.

3.3 ERECTION

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

3.4 SCHEDULES

- .1 Electrical equipment mounting boards:
 - .1 Plywood, DFP or CSP, G1S grade, square edge 19 mm thick, painted grey.
- .2 Ceilings
 - .1 Plywood, G1S grade, square edge 13 mm thick.
 - .2 1x6 cedar planks, tongue and groove, 13 mm thick.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 06 10 53 - Miscellaneous Rough Carpentry.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D-7032-04: Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails), ASTM International.
 - .2 ASTM D-7031-04: Standard Guide for Evaluating Mechanical and Physical Properties of Wood-Plastic Composite Products, ASTM International.
 - .3 ASTM E-84-01: Test Method for Surface Burning Characteristics of Building Materials, ASTM International.
 - .4 ASTM D 570: Water Absorption of Plastics.
 - .5 ASTM D 1761: Mechanical Fasteners in Wood.
 - .6 ASTM D -1413-99: Test method for Wood Preservatives by Laboratory Soil-block Cultures.
 - .7 ASTM C177: Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, data sheets and catalogue pages for specified products. Include product characteristics, performance criteria, dimensions and profiles, finish and limitations on use.
- .3 Shop Drawings:
 - .1 Prepare and submit shop drawings in general accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate profiles and dimensions, assembly techniques, jointing, methods of fastening, terminations and other related details.
 - .3 Indicate materials, thicknesses, finishes.
- .4 Samples:
 - .1 Submit duplicate 300 mm long representative samples of each typical item.

1.4 DESIGN/PERFORMANCE REQUIREMENTS:

- .1 Structural Performance
 - .1 Deck: Uniform Load – 100lbf/sq.ft
 - .2 Tread of Stairs: Concentrated Load: 750 lbf/sq.ft., and 1/8" max. deflection with a concentrated load of 300 lbf on area of 4 sq. in.
- .2 Fire-Test Response Characteristics per ASTM E-84.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and as follows.
 - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store Trex products on a flat and level surface. Adjust support blocks accordingly.
 - .3 Support Trex bundles on supplied dunnage.
 - .4 When stacking Trex bundles, supports should start approximately 8" from each end and be spaced approximately 2ft on center. Supports should line up vertically/perpendicular to the decking product.
 - .5 Do not stack Trex Select decking more than 14 bundles.
 - .6 Keep material covered using the provided bundle cover until time of installation.
 - .7 See www.Trex.com for detailed storage recommendations.

- .8 Store products on site as specified for minimum 72 hours prior to installation.
- .9 Store and protect finish carpentry products from moisture, nicks, scratches, and blemishes.
- .10 Replace defective or damaged materials with new.

1.6 WARRANTY

- .1 Provide manufactures warranty against rot, decay, splitting, checking, splintering, fungal damage, and termite damage for a period of 25 years for a residential installation and 10 years for a commercial installation. In addition provide the Trex Transcend and Trex Enhance Fade and Stain Warranty against food staining and fading beyond 5 Delta E (CIE units) for a period of 25 years for a residential installation and 10 years for a commercial installation. Specific terms for warranties can be found at; www.Trex.com

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- .1 Contract Documents are based on products supplied by; Trex Company, Inc., 160 Exeter Dr., Winchester, VA 22603.
- .2 Substitutions: Not permitted.

2.2 APPLICATIONS/SCOPE

- .1 Wood-Plastic Composite Lumber
 - .1 Material Description: Composite Decking consisting of recycled Linear Low Density Polyethylene (LLDPE) and recycled wood. The product is extruded into shapes and sizes as follows:
 - .1 Trex Transcend and Trex Enhance Decking Boards; 1 x 5.5".
 - .2 Lengths: 12, 16 and 20 feet.
 - .3 Colour to be specified by Contract Administrator from Manufacturer’s full range of colours.
 - .2 Physical and Mechanical Properties as follows:

Test	Test Method	Value	
Flame spread	ASTM E 84	60(Transcend) / 85(Enhance)	
Thermal Expansion	ASTM D 1037	1.9 x 10-5 inch/inch/degreeF	
Moisture Absorption	ASTM D 1037	< 1%	
Screw Withdrawal	ASTM D1761	558 lbs/in	
Fungus Resistance	ASTM D1413	Rating - no decay	
Termite Resistance	AWPAE1-72	Rating = 9.6	
		Ultimate (Typical)Values *	Design Values
Compression Parallel	ASTM D198	1588 psi	540 psi
Compression Perpendicular	ASTM D143	1437 psi	540 psi
Bending Strength	ASTM D198	3280 psi	500 psi
Shear Strength	ASTM D143	1761 psi	360 psi
Modulus of Elasticity	ASTM D4761	412,000psi	200,000 psi
Modulus of Rupture	ASTM D4761	3280 psi	500 psi

* Ultimate strength values are not meant for design analysis. Design values are for temperatures up to 130F (54C)

2.3 ACCESSORIES

- .1 Fasteners:
 - .1 Trex Universal Hideaway Hidden Fasteners.
 - .1 Screws; See - <http://s7d4.scene7.com/is/content/Trex/Installation%20Guide%202013pdf>

for the updated recommendations on fasteners.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for wood products installation in accordance with tolerances and requirements of Contract Documents.
 - .1 Visually inspect substrate.
 - .2 Inform Contract Administrator of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from Contract Administrator.

3.2 INSTALLATION

- .1 Install according to Trex installation guidelines.
<http://s7d4.scene7.com/is/content/Trex/Installation%20Guide%202013pdf>
- .2 Cut, drill, and rout using carbide tipped blades.
- .3 Do not use composite wood material for structural applications.

3.3 CLEANING

- .1 Following cleaning recommendations as found in Trex installation guide at;
<http://s7d4.scene7.com/is/content/Trex/Installation%20Guide%202013pdf>

End of Section

PART 1 - GENERAL

1.1 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C 553, Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .2 ASTM C 1320, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard] packaging material for recycling.

PART 2 - PRODUCTS

2.1 INSULATION

- .1 Batt and blanket mineral fibre: to ASTM C 665, Type 1 thickness as indicated.
 - .1 Acceptable material: Owen Corning Fiberglas Pink R13 Friction Fit Batts for 2 x 4 exterior wall thermal insulation.

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.
- .2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .3 Do not compress insulation to fit into spaces.
- .4 Keep insulation minimum 75mm from heat emitting devices such as recessed light fixtures, chimneys and vents as per manufacturer's instructions.
- .5 Do not enclose insulation until it has been inspected and approved by Contract Administrator.

3.3 CLEANING

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

End of Section

PART 1 - GENERAL

1.1 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.33, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
 - .2 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA A123.4, Bitumen for Use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing Systems.

1.2 QUALITY ASSURANCE

- .1 Mock-Ups:
 - .1 Submit mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct mock-up of sheet vapour barrier installation including one lap joint, one inside corner and at one electrical box. Mock-up may be part of finished work.
 - .3 Mock-up will be used to judge workmanship, substrate preparation, and material application.
 - .4 Locate where directed.
 - .5 Allow 48 hours for inspection of mock-up by Contract Administrator before proceeding with vapour barrier work.
- .2 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate for disposal paper and plastic, packaging material for recycling.

PART 2 - PRODUCTS

2.1 MATERIALS

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

2.2 ACCESSORIES

- .1 Joint sealing tape: air resistant pressure sensitive adhesive tape, as 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.
- .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. All boxes to be lapped on outside of vapour barrier and sealed with joint sealing tape.

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 and floor 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.
 - .2 Box to be lapped on outside of vapour barrier and sealed with joint sealing tape, seal wiring penetrations through box cover.

3.6 CLEANING

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

End of Section

PART 1 - GENERAL

1.01 REFERENCE STANDARDS

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 ASTM International
 - .1 ASTM A 653/A 653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM C 1186 Standard Specification for Flat Fiber-Cement Sheets
- .2 British Standards Institution (BSI)
 - .1 BS EN 12467: Fibre-cement flat sheets. Product specification and test methods.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-S136 - North American Specification for The Design of Cold-Formed Steel Structural Members
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 National Research Council Canada (NRC)
 - .1 National Building Code of Canada (NBC).
 - .2 Manitoba Building Code (MBC).
- .6 Underwriters Laboratories' of Canada (ULC)
 - .1 CAN/ULC-S102 Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC-S114 Standard Method of Test for determination of Non-Combustibility in Building Materials.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for cementitious materials, support system, fasteners, adhesives and accessories. Include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in The Manitoba, Canada.
 - .1 Submit partial elevations and section details indicating panel dimensions, support system layout, fastener locations, end details, typical joint detail, wall openings, head, jamb, sill and mullion detail, inside and outside corners, parapet detail, transition details, substrate, air barrier and insulation, all materials and finishes, anchor details, compliance with design criteria and requirements of related work.
 - .2 Minimum scale 1:5.

1.03 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

PART 2 – PRODUCTS

2.01 PERFORMANCE CRITERIA

- .1 Panels and support system: non-combustible when tested to CAN/ULC S114.

2.02 DESIGN REQUIREMENTS

- .1 Design cementitious panel wall cladding and support system to allow for thermal movement of component materials caused by ambient temperature range of 80 degrees C without causing buckling, undue stress on fasteners or other detrimental effects.

- .2 Include expansion joints to accommodate movement in wall system and between wall system and building structure, caused by structural movements, without permanent distortion, damage to panels, supports or anchors, or racking of joints.
- .3 Design members to withstand dead load and wind loads as calculated in accordance with National Building Code of Canada (NBC) and applicable Municipal/Territorial regulations, to maximum allowable deflection of 1/180 of span.
- .4 Provide assembled system with cavity vented and drained to exterior in accordance with NRC "Rain Screen Principles".
- .5 Design wall system to accommodate specified erection tolerances of structure.
- .6 Panels to be supported by concealed fasteners as per manufacturer's installation instructions.

2.04 CLADDING SYSTEM COMPONENTS

- .1 HardiePlank HZ5 lap siding, HardiPanel HZ5 vertical siding requirement for Materials:
 - .1 Fiber-cement Siding - complies with ASTM C 1186 Type A Grade II.
 - .2 Fiber-cement Siding - complies with ASTM E 136 as a noncombustible material.
 - .3 Fiber-cement Siding - complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.
 - .4 CAL-FIRE, Fire Engineering Division Building Materials Listing - Wildland Urban Interface (WUI) Listed Product.
 - .5 National Evaluation Report No. NER 405 (BOCA, ICBO, SBCCI, IBC, IRC).
 - .6 CCMC, Institute for Research and Construction.
- .2 Lap Siding: HardiePlank HZ5 Lap siding with a sloped top, beveled drip edge and nailing line as manufactured by James Hardie Building Products, Inc.
 - .1 Type: Horizontal cedarmill lapped siding 6 1/4" width 5" exposure 2.3 lbs. / sq. ft. length as required for project.
- .3 Vertical Siding: HardiePanel as manufactured by James Hardie Building Products, Inc.
 - .1 Type: Cedarmill vertical siding 48" width.
- .4 Hardie Trim Board:
 - .1 Type: 5/4 Hardie Trim NT3 Board Smooth 3.5" width 1" Thick length as required for project. Colour to match adjacent siding unless noted otherwise.

2.05 ACCESSORY COMPONENTS

- .1 Easytrim System.
 - .1 EZ.33 - Arrow Outside Corner LAP Trim
 - .1 Acceptable product: EZ.33, EZ33.LAP, EZ.33 - Arrow Outside Corner LAP Trim.
 - .2 Characteristics:
 - .1 Description: EZ.33 Arrow Outside Corner LAP Trim creates a rigid, straight and true, abuse resistant outside corner with exposed 1-3/4" tabs that create a right angle where they meet and cover the vertical ends of the two inset 5/16" lapped fiber cement plank siding boards.
 - .2 Materials: Extruded Aluminum (Alloy 6063-T5). Colour to match adjacent HardiePanel finish.
 - .3 Features: EZ.Bump™ under 1-3/4" tabs for inset lapped fiber cement plank siding boards to be installed on top of EZ.Bump™ to create air flow and a moisture/water drainage channel. 1-3/4" tabs with EZ.Bump™ allow inset cladding to self-drain and do not require caulk for water management. The large fluted nailing flange improves installation speed and helps create a more secure installation.
 - .2 EZ.36 - Inside Corner LAP Trim
 - .1 Acceptable product: EZ.36, EZ36.LAP, EZ.36 - Inside Corner LAP Trim.
 - .2 Characteristics:
 - .1 Description: EZ.36 - Inside Corner LAP Trim creates a rigid, straight and true, inside corner with exposed 3/4" tabs that fully cover protect the vertical ends of the inset 5/16" lapped plank siding.
 - .2 Materials: Extruded Aluminum (Alloy 6063-T5). Colour to match adjacent HardiePanel finish.
 - .3 Features: EZ.Bump™ under 3/4" tabs for inset lapped plank to be installed on top of EZ.Bump™ to create air flow and a moisture/water drainage channel. 3/4" tabs with EZ.Bump™ allow inset lapped fiber cement plank to self-drain and do not require caulk for water management. The large fluted nailing flange improves ease and speed of securely fastened install.

- .3 EZ.40 – Vertical Window Sill J LAP Trim
 - .1 Acceptable product: EZ40, EZ40.LAP, EZ-40.
 - .2 Characteristics:
 - .1 Description: EZ.40 - Vertical Window Sill J LAP Trim creates a straight and true vertical terminating point with an exposed 3/4" tab that fully covers and protects the vertical ends of inset 5/16" lapped fiber cement plank siding. Can also be used around the sides and bottoms of windows and doors and other vertical wall penetrations.
 - .2 Materials: Extruded Aluminum (Alloy 6063-T5). Colour to match adjacent HardiePanel finish.
 - .3 Features: EZ.Bump™ under 3/4" tab for inset lapped planks to be installed on top of EZ.Bump™ to create air flow and a moisture/water drainage channel. 3/4" tabs with EZ.Bump™ allow inset cladding to self-drain and do not require caulk for water management. The large fluted nailing flange improves ease of and speed of securely fastened install.
- .4 EZ.48 – Horizontal Base Z LAP Trim
 - .1 Acceptable product: EZ.48, EZ48.LAP, EZ.48 – Horizontal Base Z LAP Trim.
 - .2 Characteristics:
 - .1 Description: EZ.48 - Horizontal Base Z LAP Trim provides the kickout required to start LAP plank installation. A 1" tab covers and hides any unsightly gaps left exposed. The EZ.Guard™ blocks any moisture from getting up to the nailing flange and beyond. The EZ.Slope™ ensures the moisture properly drains.
 - .2 Materials: Extruded Aluminum (Alloy 6063-T5). Colour to match adjacent HardiePanel finish.
 - .3 Features: EZ. Slope™ is positive slope that drains moisture/water away from the building envelope. EZ.Guard™ ice and water dam blocks unwanted water from climbing further in. EZ.Line™ screw and alignment guide. EZ.Kickout™ angles the plank to the correct installation angle. The EZ.48 – Horizontal Base Z Panel Trim will tuck/slot into all EasyTrim Reveals corner and vertical profiles containing the EZ.Bump™ or one side of vertical two piece assemblies not containing the EZ.Bump™ to create smooth horizontal/vertical terminations that effectively manage water/moisture.
 - .2 Fasteners: colour matched heads, self-tapping, type and material as recommended by manufacturer for service and substrate.
 - .3 Gaskets: EPDM rubber sheet.
 - .4 Adhesive: purpose made, waterproof, type as recommended by panel manufacturer for exposure and service conditions.
 - .5 Isolation coating: bituminous paint.

2.06 FINISHES

- .1 Factory Finish:
 - .1 Factory applied finish by fiber cement manufacturer in a controlled environment within the fiber cement manufacturer's own facility utilizing a multi-coat, heat cured finish within one manufacturing process.
 - .2 Accessories: Complete finishing system includes pre-packaged touch-up kit provided by fiber cement manufacturer. Provide quantities as recommended by manufacturer.
 - .3 Colour: Colour to be selected from full range of manufacturer's panel and siding colours. Trim board colour to match adjacent siding colour, unless noted otherwise.

PART 3 – EXECUTION

3.01 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for composite metal building panel installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Project Manager of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.02 PREPARATION

- .1 Clean surfaces thoroughly prior to installation.
- .2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- .3 Install a water-resistive barrier is required in accordance with local building code requirements.
- .4 The water-resistive barrier must be appropriately installed with penetration and junction flashing in accordance with local building code requirements.
- .5 Install Engineered for Climate™ HardieWrap™ weather barrier in accordance with local building code requirements.
- .6 Use HardieWrap™ Seam Tape and joint and laps.
- .7 Install HardieWrap™ flashing, and HardieWrap™ Flex Flashing.

3.03 INSTALLATION

- .1 Install materials in strict accordance with manufacturer's installation instructions.
- .2 Block framing between studs where HardiePanel siding horizontal joints occur.
- .3 EasyTrim Reveals.
 - .1 Inside and Outside Corner Trims: Install at designated corners.
 - .2 Z Trim/B Trim: Begin at the base of the building to set your perimeter plum line. Install around perimeter of designated wall areas as starter trim. (When trimming around windows, install Z trim above windows and doors and other wall penetrations. Note: Do not use Z trims in place of primary wall/through wall metal flashings. Z trims are to be used as a decorative accessory only).
 - .3 Install Vertical Backplates where vertical architectural lines are designated. (Do not overlap Vertical Backplates over any other trim or nailing flange.)
 - .4 Install 5/16" wall panel.
 - .5 Install next level of Horizontal Trim, placing bottom 1/2" tab directly on top of the first course of horizontal panels.
 - .6 Note architectural detailed screw pattern and detailed screw type.
 - .7 Cut Vertical Top Cap longer than the Vertical Backplate so it slides under the horizontal 1/2" tab reveal at the top of the panel and over the horizontal nailing flange at the base of the panel fitting flush with the top edge of the 1/2" horizontal at the bottom edge of the panel. Apply a small amount of silicone to the Vertical Backplate track. Using a rubber mallet, tap the Vertical Top Cap into place until the SnapLock engages.
 - .8 Install the next course of Vertical Backplates, Panels, and Vertical Top Caps.
 - .9 In instances where there is a soffit line, finish off the top of the wall with the Soffit J Trim tucked into the vertical EZ – 1, 2, 3 or 8, to cap the top horizontal edge of the final course of panels.
 - .10 Install the General J trim around the sides and bottoms of windows, doors and other wall penetrations and as a mid-wall terminating point as detailed.
- .4 Special considerations and best practices:
 - .1 Never install the General J Trim horizontally or the Soffit J Trim in manner that may allow the J Trim to collect water.
 - .2 Never install any vertical trims horizontally in a manner that may allow them to collect water.
 - .3 Install cut edge of panels at door and window openings and at intersections with other materials. Seal cut edges of panels according to manufacturer's specifications. EasyTrim Reveals' are not to be used as a primary form of through wall or wall penetration flashings and are not designed to replace flashings that are required by local building codes, architects, envelope engineers or Contract Administrators.
- .5 Place fasteners no closer than 3/8 inch (9.5 mm) from panel edges and 2 inches (51 mm) from panel corners.
- .6 Allow minimum vertical clearance between the edge of siding and any other material in strict accordance with the manufacturer's installation instructions.
- .7 Maintain clearance between siding and adjacent finished grade.
- .8 Specific framing and fastener requirements refer to Tables 2 and 3 in National Evaluation Service Report No. NER-405.
- .9 Factory Finish Touch Up: Apply touch up paint to cut edges in accordance with manufacturer's printed instructions:
 - .1 Touch-up nicks, scrapes, and nail heads in pre-finished siding using the manufacturer's touch-up kit pen.
 - .2 Touch-up of nails shall be performed after application, but before plastic protection wrap is

removed to prevent spotting of touch-up finish.

- .3 Use touch-up paint sparingly. If large areas require touch-up, replace the damaged area with new pre-finished siding. Match touch up color to siding color through use of manufacturer's branded touch-up kits.

3.03 CLEANING AND WASTE MANAGEMENT

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Wash down exposed exterior surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.
 - .2 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.04 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by mineral fibre reinforced panel installation.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C 919, Standard Practice for Use of Sealants in Acoustical Applications.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 19-GP-5M, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
 - .2 CAN/CGSB-19.13, Sealing Compound, One-component, Elastomeric, Chemical Curing.
 - .3 CGSB 19-GP-14M, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
 - .4 CAN/CGSB-19.17, One-Component Acrylic Emulsion Base Sealing Compound.
 - .5 CAN/CGSB-19.24, Multi-component, Chemical Curing Sealing Compound.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.3 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.

1.4 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.

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 Urethanes Two Part.
 - .1 Self-Leveling to CAN/CGSB-19.24, Type 1, Class B, colour as selected.
 - .2 Acceptable material: Tremco THC 900, Vulkem 245
- .2 Urethanes Two Part.
 - .1 Non-Sag to CAN/CGSB-19.24, Type 2, Class B, colour as selected
 - .2 Acceptable material: Tremco Dymeric 240, Vulkem 227
- .3 Urethanes One Part.
 - .1 Self-Leveling to CAN/CGSB-19.13, Type 1, colour as selected
 - .2 Acceptable material: Vulkem 45
- .4 Urethanes One Part.
 - .1 Non-Sag to CAN/CGSB-19.13, Type 2, colour as selected
 - .2 Acceptable material: Tremco Dymonic, Vulkem 116, Vulkem 431
- .5 Silicones One Part.
 - .1 To CAN/CGSB-19.13.
 - .1 Acceptable material: Tremco Spectrum 2 or 3, GE Silpruf 2000
 - .2 To CAN/CGSB-19.22 (Mildew resistant).
 - .1 Acceptable material: Tremco Tremsil 200, GE SCS 1700 Sanitary
- .6 Acrylics One Part.
 - .1 To CGSB 19-GP-5M.
 - .2 Acceptable material: Tremco 555
- .7 Acrylic Latex One Part.
 - .1 To CAN/CGSB-19.17.
 - .2 Acceptable material: Tremflex 834
- .8 Acoustical Sealant.
 - .1 To CAN/CGSB-19.21.
 - .2 Acceptable material: Tremco Acoustic Sealant
- .9 Butyl.
 - .1 To CGSB 19-GP-14M.
 - .2 Acceptable material: Tremco Butyl
- .10 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 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 SEALANT SELECTION

- .1 Perimeters of exterior openings where frames meet exterior facade of building (ie. brick, block, precast masonry): Sealant type: 2.2.4
- .2 Cornice and wash (or horizontal surface joints): Sealant type: 2.2.4
- .3 Exterior joints in horizontal wearing surfaces: Sealant type: 2.2.4
- .4 Seal interior perimeters of exterior openings as detailed on drawings: Sealant type: 2.2.7
- .5 Perimeters of interior frames, as detailed and itemized: Sealant type: 2.2.4

- .6 Interior masonry vertical control joints (block-to-block, block-to-concrete, and intersecting masonry walls): Sealant type: 2.2.4
- .7 Perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, waterclosets, basins, vanities): Sealant type: 2.2.5.2
- .8 Exposed interior control joints in drywall: Sealant type: 2.2.4

2.4 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 RELATED SECTIONS

- .1 Section 07 92 10 - Joint Sealing
- .2 Section 08 71 10 - Door Hardware
- .3 Section 09 91 13 - Exterior Painting.
- .4 Section 09 91 23 - Interior Painting.
- .5 Section 16 Wiring for electronic hardware.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A 653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM B 29, Specification for Refined Lead.
 - .3 ASTM B 749, Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.
 - .2 CGSB 41-GP-19Ma, Rigid Vinyl Extrusions for Windows and Doors.
- .3 Canadian Standards Association (CSA International)
 - .1 G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA W59, Welded Steel Construction (Metal Arc Welding) (Metric Version).
- .4 Canadian Steel Door Manufacturers' Association, (CSDMA).
 - .1 CSDMA, Specifications for Commercial Steel Doors and Frames.
 - .2 CSDMA, Recommended Selection and Usage Guide for Commercial Steel Doors.
- .5 National Fire Protection Association (NFPA)
 - .1 NFPA 80, Standard for Fire Doors and Fire Windows.
 - .2 NFPA 252, Standard Methods of Fire Tests of Door Assemblies.
- .6 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN4-S104, Fire Tests of Door Assemblies.
 - .2 CAN4-S105, Fire Door Frames Meeting the Performance Required by CAN4-S104.

1.3 DESIGN REQUIREMENTS

- .1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35° C to 35° C.
- .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, arrangement of hardware and fire rating and finishes.
- .3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings fire rating finishes.
- .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

1.5 REQUIREMENTS

- .1 Steel fire rated doors and frames: labeled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104M NFPA 252 for ratings specified or indicated.
- .2 Provide fire labeled frame products for those openings requiring fire protection ratings, as scheduled. Test products in strict conformance with CAN4-S104, ASTM E 152 or NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.

1.6 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 If requested, submit one 300 x 300 mm top butt corner sample of each type door.
- .3 If requested, submit one 300 x 300 mm corner sample of each type of frame.
 - .1 Show butt cutout glazing stops 300 mm long removable mullion connection snap-on trim with clips.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Divert unused paint and sealant materials from landfill to official hazardous material collections site.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Hot dipped galvanized steel sheet: to ASTM A 653M, ZF75, minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts.
- .2 Reinforcement: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A 653M, ZF75.
- .3 Composites: balance of core materials used in conjunction with lead: in accordance with manufacturers' proprietary design.

2.2 DOOR CORE MATERIALS

- .1 Honeycomb construction:
 - .1 Structural small cell, 24.5 mm maximum kraft paper 'honeycomb', weight: 36.3 kg per ream minimum, density: 16.5 kg/m³ minimum sanded to required thickness.
- .2 Stiffened: face sheets, honeycomb or insulated core as indicated.
 - .1 Expanded polystyrene: CAN/ULC-S701, density 16 to 32 kg/m³.
- .3 Temperature rise rated (TRR): core composition to limit temperature rise on unexposed side of door to 250° C at 60 minutes. Core to be tested as part of a complete door assembly, in accordance with CAN4-S104, ASTM E 152 or NFPA 252, covering Standard Method of Tests of Door Assemblies and listed by nationally recognized testing agency having factory inspection service.
- .4 Thermal insulation material must:
 - .1 not require being labeled as poisonous, corrosive, flammable or explosive under the Consumer Chemical and Container Regulations of the Hazardous Products Act;
 - .2 be manufactured using a process that uses chemical compounds with the minimum ozone depletion potential (ODP) available.

2.3 ADHESIVES

- .1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
- .2 Polystyrene and polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.

- .3 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

2.4 PRIMER

- .1 Touch-up prime CAN/CGSB-1.181.

2.5 PAINT

- .1 Field paint steel doors and frames in accordance with Sections 09 91 23 - Interior Painting and 09 91 13 - Exterior Painting. Protect weatherstrips from paint. Provide final finish shall be free of scratches or other blemishes.

2.6 ACCESSORIES

- .1 Door silencers: single stud rubber/neoprene type.
- .2 Exterior and interior top and bottom caps: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.
- .3 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.
- .4 Metallic paste filler: to manufacturer's standard.
- .5 Fire labels.
- .6 Sealant: as per Section 07 92 10 - Joint Sealing.

2.7 FRAMES FABRICATION GENERAL

- .1 Fabricate frames in accordance with CSDMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Interior frames: 1.6 mm (16 gauge), construction as indicated.
- .4 Blank, reinforce, drill and tap frames for mortised, templated hardware, using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .5 Protect mortised cutouts with steel guard boxes.
- .6 Prepare frame for door silencers, 3 for single door.
- .7 Manufacturer's nameplates on frames and screens are not permitted.
- .8 Conceal fastenings except where exposed fastenings are indicated.
- .9 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.

2.8 FRAME ANCHORAGE

- .1 Provide appropriate anchorage to floor and wall construction.
- .2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.
- .3 Provide 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.
- .4 Locate anchors for frames in existing openings not more than 150 mm from top and bottom of each jambs and intermediate at 660 mm o.c. maximum.

2.9 FRAMES: KNOCKED-DOWN TYPE

- .1 Ship knocked-down type frames unassembled.
- .2 Provide frames with mechanical joints which inter-lock securely and provide functionally satisfactory performance when assembled and installed in accordance with CSDMA Recommended Installation Guide for Steel Doors and Frames.

- .3 Securely attach floor anchors to inside of each jamb profile.

2.10 DOOR FABRICATION GENERAL

- .1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.
- .2 Exterior doors: insulated construction. Interior doors: hollow steel construction.
- .3 Fabricate doors with longitudinal edges locked seam. Seams: visible.
- .4 Blank, reinforce, drill doors and tap for mortised or templated hardware.
- .5 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.
- .6 Reinforce doors where required, for surface mounted hardware. Provide flush PVC top caps to exterior doors. Provide inverted, recessed, spot welded channels to top and bottom of interior doors.
- .7 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .8 Provide fire labeled doors for those openings requiring fire protection ratings, as scheduled. Test such products in strict conformance with CAN4-S104 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.
- .9 Manufacturer's nameplates on visible faces of doors are not permitted.

2.11 DOORS: HONEYCOMB CORE CONSTRUCTION

- .1 Form each face sheet for interior doors from 1.6 mm sheet steel with honeycomb core laminated under pressure to face sheets.

2.12 HOLLOW STEEL CONSTRUCTION

- .1 Form each face sheet for interior doors from 1.6 mm sheet steel.
- .2 Reinforce doors with vertical stiffeners, securely fastened to each face sheet at 150 mm on centre maximum.
- .3 Fill voids between stiffeners of interior doors with fiberglass core.
- .4 Fill voids between stiffeners of interior doors with fiberglass honeycomb temperature rise rated core.

PART 3 - EXECUTION

3.1 INSTALLATION GENERAL

- .1 Install labeled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Install doors and frames to CSDMA Installation Guide.

3.2 FRAME INSTALLATION

- .1 Set frames plumb, square, level and at correct elevation.
- .2 Secure anchorages and connections to adjacent construction.
- .3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.
- .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .5 Caulk perimeter of frames between frame and adjacent material.

- .6 Maintain continuity of vapour retarder.

3.3 DOOR INSTALLATION

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 10 - Door Hardware.
- .2 Provide even margins between doors and jambs and doors and finished floor as follows.
 - .1 Hinge side: 1.0 mm.
 - .2 Latchside and head: 1.5 mm.
 - .3 Finished floor, top of carpet and thresholds: 13 mm.
- .3 Adjust operable parts for correct function.

3.4 FINISH REPAIRS

- .1 Touch up with primer finishes damaged during installation.
- .2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 08 11 14 – Metal Doors and Frames
- .2 Section 26 – Wiring Device

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA).
 - .1 CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction): standard hardware location dimensions.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-69.17, Bored and Preassembled Locks and Latches.
 - .2 CAN/CGSB-69.18/ANSI/BHMA A156.1, Butts and Hinges.
 - .3 CAN/CGSB-69.19/ANSI/BHMA A156.3, Exit Devices.
 - .4 CAN/CGSB-69.20/ANSI/BHMA A156.4, Door Controls (Closers).
 - .5 CAN/CGSB-69.21/ANSI/BHMA A156.5, Auxiliary Locks and Associated Products.
 - .6 CAN/CGSB-69.22/ANSI/BHMA A156.6, Architectural Door Trim.
 - .7 CAN/CGSB-69.26/ANSI/BHMA A156.10, Power-operated Pedestrian Doors.
 - .8 CAN/CGSB-69.28/ANSI/BHMA A156.12, Interconnected Locks and Latches.
 - .9 CAN/CGSB-69.29/ANSI/BHMA A156.13, Mortise Locks and Latches.
 - .10 CAN/CGSB-69.31/ANSI/BHMA A156.15, Closer/Holder Release Device.
 - .11 CAN/CGSB-69.32/ANSI/BHMA A156.16, Auxiliary Hardware.
 - .12 CAN/CGSB-69.34/ANSI/BHMA A156.18, Materials and Finishes.
 - .13 CAN/CGSB-69.35/ANSI/BHMA A156.19, Power Assist and Low Energy Power Operated Doors.

1.3 SUBMITTALS

- .1 Hardware List:
 - .1 Submit contract hardware list in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.
- .3 Closeout Submittals
 - .1 Provide operation and maintenance data for door closers, locksets, door holders and fire exit hardware for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .2 Storage and Protection:
 - .1 Store finishing hardware in locked, clean and dry area.

1.6 WASTE DISPOSAL AND MANAGEMENT

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

1.7 MAINTENANCE

- .1 Provide maintenance data and materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Data:
 - .1 Provide maintenance data, parts lists and manufacturer's instructions for each type of

- .2 door closer, lockset, door holder and fire exit hardware.
- .2 Brief maintenance staff regarding proper care, cleaning and general maintenance.
- .3 Extra Materials:
 - .1 Provide two (2) sets of special wrenches for door closers, locksets and fire exit hardware and other tools applicable to each different or special hardware component.
 - .2 Provide two (2) sets of maintenance tools and accessories supplied by hardware component manufacturer.
 - .3 Provide two (2) copies of all installation instructions, operating manuals, programming guides and product warranties.

PART 2 - PRODUCTS

2.1 HARDWARE ITEMS

- .1 Use one manufacturer's products only for similar items.

2.2 DOOR SIGNAGE

- .1 Washroom signs: Rockwood BF689, 200 x 200, metal sign, US10BL/614 finish (Satin Oxidized Bronze, Clear Coated), Grade 2 Braille translation, mechanically fastened to block wall with tamper proof fasteners or Approved Equal.

2.3 FASTENINGS

- .1 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .2 Exposed fastening devices to match finish of hardware.
- .3 Use fasteners compatible with material through which they pass.

2.4 KEYING

- .1 Provide construction cores.
- .2 City shall provide all permanent cores to be installed by Contractor.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their Work to receive hardware.
- .3 Furnish manufacturers' instructions for proper installation of each hardware component.
- .4 Install closers and stops to allow maximum door swing permitted by the hardware and adjacent construction.
- .5 Where special placement is required, consult the City.

3.2 INSTALLATION

- .1 Install hardware to meet the new Manitoba Amendments Article 3.8.3.3(3).
- .2 Where door stop contacts door pulls, mount stop to strike bottom of pull.
- .3 Use only manufacturer's supplied fasteners. Failure to comply may void manufacturer's warranties and applicable licensed labels. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .4 Remove construction cores when directed by Contract Administrator; install permanent cores and check operation of locks.

3.3 ADJUSTING

- .1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.
- .2 Lubricate hardware, operating equipment and other moving parts.
- .3 Adjust door hardware to provide tight fit at contact points with frames.
- .4 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

3.4 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacture's instructions.
- .3 Remove protective material from hardware items where present.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.5 SCHEDULE

Hardware Set#: 1

Single: D101

4	Hinge (heavy weight)	T4A3386 NRP 4-1/2" x 4-1/2"	US32D	MK
1	Classroom Deadbolt	70 8203	US32D	SA
1	Core	Supplied by City of Winnipeg		BE
2	Back to Back Pull	RM4200-18" Mtg-Type 5HD	US32D	RO
1	Conc Overhead Stop	6-X36	630	RF
1	Automatic Opener	6330	689	NO
2	Kick Plate	K1050 12"	US32D	RO
1	Threshold	272A		PE
1	Gasketing	316APK		PE
1	Sweep	18100CNB		PE
1	Monitor	LML-1		SU
2	Full Height Actuator	639		NO
1	Post	530POST		NO
1	Guide Rail	Curran CE-805-MB x Size to Suit	AL	OT

Notes: Actuators to be wired through the LML-1 monitor switch. When deadbolt is thrown actuators are to be disabled. Inside deadbolt thumbturn will retract the deadbolt only, it will not lock it.

Hardware Set#: 2

Single: D102

3	Hinge	TA2714 4-1/2" x 4"	US26D	MK
1	Dummy Trim Deadlock	LB 50 70 8228 LNL	US32D	SA
1	Core	Supplied by City of Winnipeg		BE
1	Conc Overhead Stop	6-X36	630	RF
1	Automatic Operator	5710	689	NO
2	Kick Plate	K1050 12"	US32D	RO
1	Monitor	LML-1		SU
2	Full Height Actuator	639		NO
1	Sign	BF689	Black	RO

Notes: Actuators to be wired through the LML-1 monitor switch. When deadbolt is thrown actuators are to be disabled.

Outside lever always rigid and deadbolt unlocked. Entering washroom, turning thumb turn will lock the deadbolt and turn off the actuators. To exit the washroom you must either retract the thumb turn or

Hardware Set#: 3

Single: D104

3	Hinge	TA2314 NRP 4-1/2" x 4"	US32D	MK
1	Dormitory Lock	70 8225 LNL	US32D	SA
1	Core	Supplied by City of Winnipeg		BE
1	Door Closer	1431 CPS	EN	SA
1	Kick Plate	K1050 12"	US32D	RO
1	Threshold	272A		PE
1	Gasketing	316APK		PE
1	Sweep	18100CNB		PE

Hardware Set#: 4

Single: D103

3	Hinge	TA2714 4-1/2" x 4"	US26D	MK
1	Dormitory Lock	70 8225 LNL	US32D	SA
1	Core	Supplied by City of Winnipeg		BE
1	Conc Overhead Stop	6-X36	630	RF
1	Kick Plate	K1050 12"	US32D	RO

Hardware Set#: 5

Single: D105, D106, D107

3	Hinge	TA2714 4-1/2" x 4"	US26D	MK
1	Privacy Lock	8265 LNL	US32D	SA
2	Kick Plate	K1050 12"	US32D	RO
1	Wall Stop	409	US32D	RO

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.

1.2 MAINTENANCE DATA/MATERIALS

- .1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.3 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain minimum 20°C air temperature at flooring installation area for three (3) days before, during, and for forty-eight (48) hours after installation.

1.4 EXTRA MATERIAL

- .1 Provide maintenance materials in accordance with Section 01 78 00 Closeout Submittals.
- .2 Provide adhesive and 10 lineal feet of resilient base for maintenance use.
- .3 Provide adhesive and 5 additional stair nosings of each type for maintenance use.
- .4 Extra materials to be from same production run as installed materials.
- .5 Clearly identify each container of material and corresponding adhesives.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Rubber Base:
 - .1 Standard of Acceptance: Johnsonite. Model: Perceptions, Contour. Colour as approved by City of Winnipeg from manufacturer's full range of colours.

PART 3 - EXECUTION

3.1 INSPECTION

- .1 Ensure smooth, flat, hard surface, without imperfections, which may 'telegraph' through.

3.2 BASE APPLICATION

- .1 Set base in adhesive tightly against wall and floor surfaces. Use lengths as long as practical, but not less than 450mm (18") long.
- .2 Install straight and level to maximum variation of 1:1000.
- .3 Scribe and fit to door frames and other obstructions.
- .4 Mitre internal corners, scribe and wrap around external corners.
- .5 Apply bead of clear silicone at junction of rubber base and resilient tile flooring.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 09 91 23 - Painting of Interior Surfaces.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 Architectural Painting Specifications Manual, Master Painters Institute (MPI).

1.3 QUALITY ASSURANCE

- .1 Contractor shall have a minimum of five years proven satisfactory experience. When requested, provide a list of last three comparable jobs including, job name and location, specifying authority, and project manager.
- .2 Qualified journeymen who have a "Tradesman Qualification Certificate of Proficiency" shall be engaged in painting work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with trade regulations.
- .3 Conform to latest MPI requirements for exterior painting work including preparation and priming.
- .4 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) shall be in accordance with MPI Painting Specification Manual "Approved Product" listing and shall be from a single manufacturer for each system used.
- .5 Other paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and shall be compatible with other coating materials as required.
- .6 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Contract Administrator.
- .7 Standard of Acceptance:
 - .1 Walls: No defects visible from a distance of 1000 mm at 90° to surface.
 - .2 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

1.4 SCHEDULING OF WORK

- .1 Submit work schedule for various stages of painting to Contract Administrator for approval. Submit schedule minimum of 48 hours in advance of proposed operations.
- .2 Schedule painting operations to prevent disruption of occupants in and about the building.

1.5 SUBMITTALS

- .1 Submit product data and manufacturer's installation/application instructions for paints and coating products to be used in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Upon completion, submit records of products used. List products in relation to finish system and include the following:
 - .1 Product name, type and use.
 - .2 Manufacturer's product number.
 - .3 Colour numbers.

1.6 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit 200 x 300 mm sample panels of each paint, stain, clear coating and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:
 - .1 3 mm plate steel for finishes over metal surfaces.
 - .2 13 mm birch plywood for finishes over wood surfaces.
 - .3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
 - .4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.

- .3 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.
- .4 Submit full range of available colours where colour availability is restricted.

1.7 EXTRA MATERIALS

- .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit one - four litre can of each type and colour of primer, stain and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
- .3 Deliver to Contractor and store where directed.

1.8 DELIVERY, HANDLING AND STORAGE

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver and store materials in original containers, sealed, with labels intact.
- .3 Labels shall clearly indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .4 Remove damaged, opened and rejected materials from site.
- .5 Provide and maintain dry, temperature controlled, secure storage.
- .6 Observe manufacturer's recommendations for storage and handling.
- .7 Store materials and supplies away from heat generating devices.
- .8 Store materials and equipment in a well ventilated area with temperature range 7° C to 30° C.
- .9 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .10 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Contract Administrator. After completion of operations, return areas to clean condition to approval of Contract Administrator.
- .11 Remove paint materials from storage only in quantities required for same day use.
- .12 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .13 Fire Safety Requirements:
 - .1 Provide one 4.5 kg Type ABC 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 the National Fire Code of Canada.

1.9 SITE REQUIREMENTS

- .1 Heating, Ventilation and Lighting:
 - .1 Perform no painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10° C for 24 hours before, during and after paint application until paint has cured sufficiently.
 - .2 Where required, provide continuous ventilation for seven days after completion of application of paint.
 - .3 Coordinate use of existing ventilation system with City and ensure its operation during and after application of paint as required.
 - .4 Provide temporary ventilating and heating equipment where permanent facilities are not

- available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
- .5 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities shall be provided by General Contractor.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
- .1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, applied product manufacturer, perform no painting work when:
- .1 ambient air and substrate temperatures are below 10° C.
- .2 substrate temperature is over 32° C unless paint is specifically formulated for application at high temperatures.
- .3 substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
- .4 the relative humidity is above 85% or when dew point is less than 3° C variance between air/surface temperature.
- .5 rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
- .2 Perform no painting work when maximum moisture content of substrate exceeds:
- .1 12% for concrete and masonry (clay and concrete brick/block).
- .2 15% for wood.
- .3 12% for plaster and gypsum board.
- .3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".
- .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
- .1 Apply paint finish only 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 only to adequately prepared surfaces and to surfaces within moisture limits noted herein.
- .3 Apply paint only when previous coat of paint is dry or adequately cured.
- .4 Apply paint finishes only when conditions forecast for entire period of application fall within manufacturer's recommendations.
- .5 Do not apply paint when:
- .1 Temperature is expected to drop below 10° C before paint has thoroughly cured.
- .2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
- .3 Surface to be painted is wet, damp or frosted.
- .6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.
- .7 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
- .8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.
- .9 Paint occupied facilities in accordance with approved schedule only. Schedule operations to approval of the City such that painted surfaces will have dried and cured sufficiently before occupants are affected.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
- .2 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

- .3 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .4 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Paint materials listed in the latest edition of the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Paint materials for paint systems shall be products of a single manufacturer.
- .3 Water-borne surface coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).
- .4 The following must be performed on each batch of consolidated post-consumer material before surface coating is reformulated and canned. These tests must be performed at a laboratory or facility which has been accredited by the Standards Council of Canada.
 - .1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.
 - .2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.
 - .3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

2.2 COLOURS

- .1 Contract Administrator will provide Colour Schedule after Contract award.
- .2 Colour schedule will be based upon selection of three base colours and two accent colours. No more than five colours will be selected for the entire project.
- .3 Selection of colours will be from manufacturers full range of colours.
- .4 Where specific products are available in a restricted range of colours, selection will be based on the limited range.
- .5 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site.
- .2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.
- .3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.
- .4 Thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy

of instructions to Contract Administrator.

- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

- .1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following values:

<u>Gloss Level</u>	<u>Category</u>	<u>Units @ 60°</u>	<u>Units @ 60°</u>
G1	- matte finish	0 to 5	max. 10
G2	- velvet finish	0 to 10	10 to 35
G3	- eggshell finish	10 to 25	10 to 35
G4	- satin finish	20 to 35	min. 35
G5	- semi gloss	35 to 70	
G6	- gloss finish	70 to 85	
G7	- high gloss finish	> 85	

- .2 Gloss level ratings of painted surfaces as noted on Finish Schedule.

2.5 EXTERIOR PAINTING SYSTEMS

- .1 Galvanized Metal: not chromate passivated
 - .1 EXT 5.3A - Latex Gloss Level 5 finish.

PART 3 - EXECUTION

3.1 GENERAL

- .1 Perform preparation and operations for exterior painting in accordance with MPI Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.2 EXISTING CONDITIONS

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Contract Administrator damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to Contract Administrator. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
 - .1 Wood: 15%.

3.3 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 such surfaces as directed by Contract Administrator.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.
- .4 Protect passing pedestrians, building occupants and general public in and about the building.
- .5 Removal of light fixtures, surface hardware on doors, and other surface mounted equipment, fittings and fastenings shall be done prior to undertaking painting operations by General Contractor. Items shall be securely stored and re-installed after painting is completed by General Contractor.
- .6 Move and cover exterior furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

- .7 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas to approval of Contract Administrator.

3.4 CLEANING AND PREPARATION

- .1 Clean and prepare exterior surfaces in accordance with MPI Painting Specification Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and other surface debris by brushing, wiping with dry, clean cloths or compressed air.
 - .2 Wash surfaces with a biodegradable detergent (and bleach where applicable) and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly.
 - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
 - .6 Use trigger operated spray nozzles for water hoses.
 - .7 Many water-based paints cannot be removed with water once dried. However, minimize the use of kerosene or any such organic solvents to clean up water-based paints.
- .2 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.
- .3 Where possible, prime 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.
- .4 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.
- .5 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes.
- .6 Touch up of shop primers with primer as specified in applicable section. Major touch-up including cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas, shall be by supplier of fabricated material.

3.5 APPLICATION

- .1 Method of application to be as approved by Contract Administrator. Apply paint by brush, roller, or airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Contract Administrator.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray Application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
 - .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
 - .4 Brush out immediately runs and sags.
 - .5 Use brushes to work paint into cracks, crevices and places which are not adequately

painted by spray.

- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Contract Administrator.
- .5 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats to remove visible defects.
- .8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.
- .9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Unless otherwise specified, paint exterior exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise.
- .2 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .3 Do not paint over nameplates.
- .4 Paint fire protection piping red.
- .5 Paint steel electrical light standards. Do not paint outdoor transformers and substation equipment.

3.7 RESTORATION

- .1 Clean and re-install all hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashing's on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Contract Administrator. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Contract Administrator.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 09 91 13 – Exterior Painting

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 Architectural Painting Specifications Manual, Master Painters Institute (MPI).

1.3 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Contractor: minimum of five years proven satisfactory experience. Provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
 - .2 Journeymen: qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.
 - .3 Apprentices: working under direct supervision of qualified trades person in accordance with trade regulations.

1.4 SCHEDULING

- .1 Submit work schedule for various stages of painting to Contract Administrator for review. Submit schedule minimum of 48 hours in advance of proposed operations.
- .2 Schedule painting operations to prevent disruption of occupants.

1.5 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit product data and instructions for each paint and coating product to be used.
 - .2 Submit product data for the use and application of paint thinner.
- .3 Samples:
 - .1 Submit full range colour sample chips to indicate where colour availability is restricted.
 - .2 Submit 200 x 300mm sample panels of each paint, stain, clear coating and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:
 - .1 3 mm plate steel for finishes over metal surfaces.
 - .2 13 mm birch plywood for finishes over wood surfaces.
 - .3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
 - .4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.
 - .3 Closeout Submittals: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals include following:
 - .1 Product name, type and use.
 - .2 Manufacturer's product number.
 - .3 Colour numbers.

1.6 MAINTENANCE

- .1 Extra Materials:
 - .1 Deliver to extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Section 01 78 00 - Closeout Submittals.
 - .2 Quantity: provide one - four litre can of each type and colour of primer, stain, finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:

- .1 Pack, ship, handle and unload materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.
- .2 Acceptance at Site:
 - .1 Identify products and materials with labels indicating:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .3 Remove damaged, opened and rejected materials from site.
- .4 Storage and Protection:
 - .1 Provide and maintain dry, temperature controlled, secure storage.
 - .2 Store materials and supplies away from heat generating devices.
 - .3 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C.
- .5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.
- .7 Remove paint materials from storage only in quantities required for same day use.
- .8 Fire Safety Requirements:
 - .1 Provide one 4.5 kg Type ABC fire extinguisher adjacent to storage area.
 - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.
- .9 Waste Management and Disposal:
 - .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .2 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.
 - .3 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
 - .4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
 - .5 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).

1.8 SITE CONDITIONS

- .1 Heating, Ventilation and Lighting:
 - .1 Provide heating facilities to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.
 - .2 Provide continuous ventilation for seven days after completion of application of paint.
 - .3 Provide temporary ventilating and heating equipment where permanent facilities are not

- available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
- .4 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
- .1 Unless pre-approved written approval by product manufacturer, perform no painting when:
 - .1 Ambient air and substrate temperatures are below 10 degrees C.
 - .2 Substrate temperature is above 32 degrees C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
 - .4 The relative humidity is under 85% or when the dew point is more than 3 degrees C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 degrees C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
 - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
 - .6 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
 - .2 Perform painting work when maximum moisture content of the substrate is below:
 - .1 Allow new concrete and masonry to cure minimum of 28 days.
 - .2 15% for wood.
 - .3 12% for plaster and gypsum board.
 - .3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".
 - .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
- .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.
- .4 Additional interior application requirements:
- .1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
 - .2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of City such that painted surfaces will have dried and cured sufficiently before occupants are affected.

1.9 EXTRA MATERIALS

- .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit one - four litre can of each type and colour of primer, stain and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
- .3 Deliver to Contractor and store where directed.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Provide paint materials for paint systems from single manufacturer.
- .3 Conform to latest MPI requirements for interior painting work including preparation and priming.

- .4 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing.
- .5 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.

2.2 COLOURS

- .1 Contract Administrator will provide Colour Schedule after Contract award.
- .2 Colour schedule will be based upon selection of two base colours and three accent colours. No more than six colours will be selected for entire project.
- .3 Selection of colours from manufacturers full range of colours.
- .4 Where specific products are available in restricted range of colours, selection based on limited range.
- .5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .4 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

<u>Gloss Level Category</u>	<u>Units @ 60°</u>	<u>Units @ 60°</u>
G1 - matte finish	0 to 5	max. 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	min. 35
G5 - semi gloss	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	> 85	

- .2 Gloss level ratings of painted surfaces as indicated and as noted on Finish Schedule.

2.5 INTERIOR PAINTING SYSTEMS

- .1 Concrete Floor: smooth
 - .1 INT 3.2D -Polyurethane pigmented finish over epoxy. Premium Grade.
- .2 Galvanized Metal: doors, frames, railings, misc. steel, pipes, overhead decking, and ducts.
 - .1 INT 5.3A - Latex Gloss Level 5 finish. Premium Grade.
- .3 Cedar Ceiling: doors, frames, railings, misc. steel, pipes, overhead decking, and ducts.
 - .1 INT 6.4C - Semi-transparent stain. Premium Grade. Colour to match existing ceiling.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 GENERAL

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.3 EXAMINATION

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Contract Administrator damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
 - .1 Stucco, plaster and gypsum board: 12%.
 - .2 Clay and Concrete Block/Brick: 12%.
 - .3 Wood: 15%.

3.4 PREPARATION

- .1 Protection:
 - .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Contract Administrator.
 - .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
 - .3 Protect factory finished products and equipment.
 - .4 Protect passing pedestrians, building occupants and general public in and about the building.
- .2 Surface Preparation:
 - .1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
 - .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
 - .3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of City.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and other surface debris by vacuuming, or wiping with dry, clean cloths.
 - .2 Wash surfaces with a biodegradable detergent and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly.
 - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
 - .6 Use trigger operated spray nozzles for water hoses.
 - .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.

- .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
- .2 Apply wood filler to nail holes and cracks.
- .3 Tint filler to match stains for stained woodwork.

- .6 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

- .7 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes.

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

3.5 APPLICATION

- .1 Method of application to be as approved by Contract Administrator. Apply paint by brush, roller or airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.

- .2 Brush and Roller Application:
 - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
 - .5 Remove runs, sags and brush marks from finished work and repaint.

- .3 Spray application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
 - .3 Apply paint in uniform layer, with overlapping at edges of spray pattern. Back roll first coat application.
 - .4 Brush out immediately all runs and sags.
 - .5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.

- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.

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

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

- .7 Sand and dust between coats to remove visible defects.

- .8 Finish 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.

- .9 Finish inside of cupboards and cabinets as specified for outside surfaces.

- .10 Finish closets and alcoves as specified for adjoining rooms.

- .11 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.
- .2 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .3 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .4 Do not paint over nameplates.
- .5 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .6 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.
- .7 Do not paint interior transformers and substation equipment.

3.7 SITE TOLERANCES

- .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
- .2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
- .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.8 RESTORATION

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashing's on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Contract Administrator. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Contract Administrator.

End of Section

PART 1 - GENERAL

1.01 REFERENCE STANDARDS

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 Aluminum Association (AA)
 - .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for wall and corner guards and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Installation Drawings:
 - .1 Indicate on drawings large scale details, materials, finishes, dimensions, anchorage and assembly.

1.03 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

PART 2 – PRODUCTS

2.01 MATERIALS

- .1 Extruded, textured, chemical and stain resistant, high-impact, acrylic modified vinyl plastic sheets, .075" thick, 1 220mm x 2 440mm panels. Comply with ASTM E 84 for flame spread and smoke developed to Class 1/A. All panels to have non-exposed fasteners.
 - .1 Standard of Acceptance: Altro Puraguard, White, Smooth.
 - .2 All panels to be sealed with Altro Whiterock Sanitary Sealant

2.02 ACCESSORIES

- .1 Fasteners: self-tapping stainless steel complete with neoprene gaskets.
- .2 Adhesive: water resistant type as recommended by manufacturer for substrate.

PART 3 – EXECUTION

3.01 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wall and corner guards installation in accordance with manufacturer's written instructions.
 - .1 Inform Contract Administrator of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation after unacceptable conditions have been remedied.

3.02 INSTALLATION

- .1 Install units on solid backing and erect with materials and components straight, tight and in alignment.
- .2 Install protective wallcovering to walls in accordance with manufacturer's written instructions.
- .3 Allow wallcovering and adhesive to precondition for a minimum of 24 hours at a temperature between 18°C and 29°C before installation. Maintain constant air and wall temperatures during installation.
- .4 Install protective wallcovering plumb, level and true to line without distortions. Do not use

- materials with chips, cracks, voids, stains or other defects.
- .5 All fasteners are to be stainless steel screws, complete with neoprene gaskets.
 - .6 All penetrations in the protective wallcovering are to be firestopped as required and all penetrations are to be covered with escutcheon plates.
 - .7 Where no firestopping is required at penetrations, all penetrations are to be sealed with mold resistant caulking.

3.03 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .3 Clean surfaces after installation using manufacturer's written recommended cleaning procedures.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .5 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.05 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by wall and corner guards installation.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM B 456, Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - .3 ASTM A 653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM A 924/A924M, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.81, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
 - .2 CAN/CGSB-1.88, Gloss Alkyd Enamel, Air Drying and Baking.
 - .4 CGSB 31-GP-107Ma, Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-B651, Barrier-Free Design.
 - .2 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, and building-in details of anchors for grab bars.

1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for toilet and bath accessories for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 EXTRA MATERIALS

- .1 Provide special tools required for accessing, assembly/disassembly or removal for toilet and bath accessories in accordance with requirements specified in Section 01 78 00 - Closeout Submittals.
- .2 Deliver special tools to City.

PART 2 - PRODUCTS

2.1 COMPONENTS

- .1 Toilet tissue dispenser: surface mounted, dual coreless jumbo roll, 22 gauge stainless steel.
 - .1 Acceptable material: Bradley 5426-11 or approved equal in accordance with B7.
- .2 Security towel hook: 14 gauge stainless steel backplate with satin finish and tamper resistant mounting screws. Stainless steel safety hook with pivoting ball joint that releases when more than 20 lbs of force is applied.
 - .1 Acceptable materials: Bradley SA36, Bobrick B-983, ASI B-123 or approved equal in accordance with B7.
- .3 Hand Dryer: 22 gauge satin finish stainless steel cover, automatic operation.
 - .1 Acceptable materials: Bradley 2902-287400, Bobrick B-7128, ASI 0185 or approved equal in accordance with B7.
- .4 Sanitary Napkin Disposal: surface mounted, satin finish stainless steel
 - .1 Acceptable material: Bradley 4781-15, Bobrick B-270, ASI 20852 or approved equal in accordance with B7.

- .5 Mirrors: 20 gauge bright annealed stainless steel c/w tamper resistant mounting screws
 - .1 Acceptable material: Bradley, 7481 series 610mm x 915mm, ASI8026 or approved equal in accordance with B7.
- .6 Soap Dispenser: surface mounted vertical type, 20 gauge stainless steel construction
 - .1 Acceptable material: Bradley 6562, Bobrick B-2111, ASI 0347 or approved equal in accordance with B7.
- .7 Grab Bars: 32mm x 915mm and 32mm x 610mm concealed mounted grab bar: wall tubing stainless steel, 76 mm diameter wall flanges, concealed screw attachment, flanges welded to tubular bar, provided with steel back plates and all accessories. Grab bar material and anchorage to withstand downward pull of 2.2 kN. Check drawings for length, degree of slope, bends and locations.
 - .1 Acceptable material: Bradley 832 series, Bobrick B-5806 series, ASI 3700 Series or approved equal in accordance with B7.
- .8 Mop and Broom Holder: Type 304 stainless steel, 915mm wide, satin finish with spring loaded, rubber cam, anti slip mop holders.
 - .1 Acceptable material: Bradley 9953, Bobrick B-223 x 36, ASI 8215 or approved equal in accordance with B7.
- .9 Waste Receptacle: 22 gauge stainless steel, 356mm wide x 457mm high x 152mm deep, 6.5 gallon capacity. Fasten to wall with tamper resistant mounting screws. Provide vinyl liner.
 - .1 Acceptable material: Bradley 357, Bobrick B-279, ASI 0828 or approved equal in accordance with B7.

2.2 FABRICATION

- .1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners only where approved.
- .2 Wherever possible form exposed surfaces from one sheet of stock, free of joints.
- .3 Brake form sheet metal work with 1.5 mm radius bends.
- .4 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- .5 Back paint components where contact is made with building finishes to prevent electrolysis.
- .6 Hot dip galvanize concealed ferrous metal anchors and fastening devices to CSA G164.
- .7 Shop assemble components and package complete with anchors and fittings.
- .8 Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates, details and instructions for building in anchors and inserts.
- .9 Provide steel anchor plates and components for installation on studding and building framing.

2.3 FINISHES

- .1 Chrome and nickel plating: to ASTM B 456, satin finish.
- .2 Baked enamel: condition metal by applying one coat of metal conditioner to CGSB 31-GP-107Ma, apply one coat Type 2 primer to CAN/CGSB-1.81 and bake, apply two coats Type 2 enamel to CAN/CGSB-1.88 and bake to hard, durable finish. Sand between final coats. Colour selected from standard range by Contract Administrator.
- .3 Manufacturer's or brand names on face of units not acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install and secure accessories rigidly in place as follows:
 - .1 Masonry walls: install as per manufacturer's recommendation.
- .2 Use tamper proof screws/bolts for fasteners.

-
- .3 Fill units with necessary supplies shortly before final acceptance of building.

3.2 SCHEDULE

- .1 Toilet tissue dispenser: one per toilet fixture.
- .2 Security towel hook: one per washroom.
- .3 Hand Dryer: one per washroom.
- .4 Napkin Receptacle: one per washroom.
- .5 Mirror: one per washroom.
- .6 Soap Dispenser: one per washroom.
- .7 Grab bars: one 610mm and two 915mm per toilet fixture.
- .8 Mop and Broom Holder: one per Building Services room.
- .9 Waste Receptacle: one per washroom.

End of Section

PART 1 - GENERAL

1.1 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American National Standards Institute (ANSI)
 - .1 ANSI/NFPA 10, Portable Fire Extinguishers.
- .2 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S508, Rating and Fire Testing of Fire Extinguishers and Class "D" Extinguishing Media.

1.2 SHOP DRAWINGS AND PRODUCT DATA

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

1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

PART 2 - PRODUCTS

2.1 MULTI-PURPOSE DRY CHEMICAL EXTINGUISHERS

- .1 Stored pressure rechargeable type with hose and shut-off nozzle, ULC labeled for A, B and C class protection. Size 4.5 kg.

2.2 EXTINGUISHER BRACKETS

- .1 Type recommended by extinguisher manufacturer.

2.3 IDENTIFICATION

- .1 Identify extinguishers in accordance with recommendations of ANSI/NFPA 10.
- .2 Attach tag or label to extinguishers, indicating month and year of installation. Provide space for service dates.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install or mount extinguishers in cabinets or on brackets as indicated.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 03 30 00 – Cast-in-Place Concrete.
- .2 Section 32 11 19 – Granular Sub-base.
- .3 Section 32 11 23 – Granular Base.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D 4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.3 SAMPLES

- .1 If requested, submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide Contract Administrator with access to source and processed material for sampling.
- .3 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert unused granular materials from landfill to local facility as approved by Contract Administrator.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D 4791.
 - .1 Greatest dimension to exceed five times least dimension.
- .3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
 - .1 Natural sand.
 - .2 Manufactured sand.
 - .3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
- .4 Coarse aggregates satisfying requirements of applicable section to be one of, or blend of, following:
 - .1 Crushed rock.
 - .2 Gravel composed of naturally formed particles of stone.
 - .3 Light weight aggregate, including slag and expanded shale.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Topsoil stripping
 - .1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.
 - .2 Begin topsoil stripping of areas as indicated after area has been cleared of brush, weeds and grasses and removed from site.
 - .3 Strip topsoil to depths as directed by Contract Administrator. Avoid mixing topsoil with subsoil.
 - .4 Stockpile in locations as Contract Administrator. Stockpile height not to exceed 3.0m.
- .2 Aggregate source preparation

- .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as approved by authority having jurisdiction.
- .2 Where clearing is required, leave screen of trees between cleared area and roadways as directed.
- .3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
- .4 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.
- .5 Trim off and dress slopes of waste material piles and leave site in neat condition.
- .3 Processing
 - .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
 - .2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Contract Administrator.
 - .3 Wash aggregates, if required to meet specifications. Use only equipment approved by Contract Administrator.
 - .4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.
- .4 Handling
 - .1 Handle and transport aggregates to avoid segregation, contamination and degradation.
- .5 Stockpiling
 - .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Contract Administrator. Do not stockpile on completed pavement surfaces.
 - .2 Stockpile aggregates in sufficient quantities to meet Project schedules.
 - .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
 - .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 100 mm of pile into Work.
 - .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
 - .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Contract Administrator within 48 h of rejection.
 - .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Max 1.5 m for coarse aggregate and base course materials.
 - .2 Max 1.5 m for fine aggregate and sub-base materials.
 - .3 Max 1.5 m for other materials.
 - .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
 - .9 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.2 CLEANING

- .1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .2 Leave any unused aggregates in neat compact stockpiles as directed by Contract Administrator.
- .3 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 23 10 - Excavation, Trenching and Backfill.

1.2 DEFINITIONS

- .1 Clearing consists of cutting off trees and brush vegetative growth to not more than a specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
- .2 Close-cut clearing consists of cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or close to, existing grade and disposing of fallen timber and surface debris.
- .3 Clearing isolated trees consists of cutting off to not more than specified height above ground of designated trees, and disposing of felled trees and debris.
- .4 Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm trunk diameter and disposing of all fallen timber and surface debris.
- .5 Grubbing consists of excavation and disposal of stumps and roots and boulders and rock fragments to not less than a specified depth below existing ground surface.

1.3 STORAGE AND PROTECTION

- .1 Prevent damage to fencing, trees, landscaping, natural features, bench marks, existing buildings, existing paved areas, utility lines, site appurtenances, root systems of trees, which are to remain.
 - .1 Repair any damaged items to approval of Contract Administrator.
 - .2 Replace any trees designated to remain, if damaged, as directed by Contract Administrator.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 not applicable

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Inspect site and verify with Contract Administrator, items designated to remain.
- .2 Locate and protect utility lines. Preserve in operating condition active utilities traversing site.
- .3 Notify utility authorities before starting clearing and grubbing.

3.2 CLEARING

- .1 Clear as indicated by Contract Administrator, by cutting at a height of not more than 300 mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations to be not more than 1000 mm above ground surface.
- .2 Cut off branches and cut down trees overhanging area cleared as directed by Contract Administrator.

3.3 CLOSE CUT CLEARING

- .1 Close cut clearing to within 100 mm of ground surface.
- .2 Cut off branches overhanging area cleared as directed by Contract Administrator.

3.4 UNDERBRUSH CLEARING

- .1 Clear underbrush from areas as indicated to within 300 mm of ground surface.

3.5 GRUBBING

- .1 Grub out stumps and roots from areas indicated to not less than 200 mm below ground surface.
- .2 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension.

3.6 REMOVAL AND DISPOSAL

- .1 Remove cleared and grubbed materials off site.

3.7 FINISHED SURFACE

- .1 Leave ground surface in condition suitable for stripping of topsoil to approval of Contract Administrator.

End of Section

PART 1 - GENERAL

1.1 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 Canadian Standard Association (CSA)
 - .1 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.

1.2 SOIL REPORT

- .1 Examine soil report attached to this specification document.

1.3 REGULATIONS

- .1 Shore and brace excavations, protect slopes and banks and perform all work in accordance with Provincial and Municipal regulations whichever is more stringent.

1.4 TESTS AND INSPECTIONS

- .1 Testing of materials and compaction of backfill and fill will be carried out by testing laboratory designated by Contract Administrator.
- .2 Do not begin backfilling or filling operations until material has been approved for use by Contract Administrator.
- .3 Not later than 48 hours before backfilling or filling with approved material, notify Contract Administrator so that compaction tests can be carried out by designated testing agency.
- .4 Before commencing work, conduct, with Contract Administrator, condition survey of existing structures, trees and other plants, lawns, fencing, service poles, wires, rail tracks and paving, survey bench marks and monuments which may be affected by work.

1.5 BURIED SERVICES

- .1 Before commencing work establish the location of all buried services on and adjacent to the site.
- .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work. Pay costs of relocating services.
- .3 Remove obsolete buried services within 2 m of foundations. Cap cut-offs.

1.6 PROTECTION

- .1 Protect excavations from freezing.
- .2 Keep excavations clean, free of standing water, and loose soil.
- .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Contract Administrator's approval.
- .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .5 Protect buried services that are required to remain undisturbed.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Granular A.

PART 3 - EXECUTION

3.1 CLEARING AND GRUBBING

- .1 Remove trees, stumps, logs, brush, shrubs, bushes, vines, undergrowth, rotten wood, dead plant

- material, exposed boulders and debris within areas designated on drawings.
- .2 Remove stumps and tree roots below slabs, and paving, and to 600 mm below finished grade elsewhere.
 - .3 Dispose of cleared and grubbed material off site daily to disposal areas acceptable to authority having jurisdiction.

3.2 EXCAVATION

- .1 Strip topsoil over areas to be covered by new construction, over areas where grade changes are required, and so that excavated material may be stockpiled without covering topsoil. Stockpile topsoil on site for later use.
- .2 Excavate as required to carry out work, in all materials met. Do not disturb soil or rock below bearing surfaces. Notify Contract Administrator when excavations are complete.
- .3 Excavate trenches to provide uniform continuous bearing and support for 150mm thickness of pipe bedding material on solid and undisturbed ground. Trench widths below point 150mm above pipe not to exceed diameter of pipe plus 600 mm.
- .4 Excavate for slabs and paving to subgrade levels. In addition, remove all topsoil, organic matter, debris and other loose and harmful matter encountered at subgrade level.

3.3 BACKFILLING

- .1 Inspection: do not commence backfilling until fill material and spaces to be filled have been inspected and approved by Contract Administrator.
- .2 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.
- .3 Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.
- .4 Compaction of subgrade: compact existing subgrade under walks, paving, and slabs on grade, to same compaction as specified for fill. Fill excavated areas with gravel and sand compacted as specified for fill.
- .5 Placing:
 - .1 Place backfill, fill and basecourse material in 150 mm lifts. Add water as required to achieve specified density.
- .6 Compaction: compact each layer of material to following densities for material to ASTM D 698:
 - .1 To underside of basecourses: 95%.
 - .2 Basecourses: 100%.
 - .3 Elsewhere: 90%.
- .7 Under slabs and paving:
 - .1 Use 150 mm up to bottom of granular base courses.
 - .2 Use 150 mm for base courses.
- .8 In trenches:
 - .1 Up to 300 mm above pipe or conduit: sand placed by hand.
 - .2 Over 300 mm above pipe or conduit: native material approved by Contract Administrator.
- .9 Under seeded and sodded areas: use site excavated material to bottom of topsoil except in trenches and within 600 mm of foundations.
- .10 Against foundations (except as applicable to trenches and under slabs and paving): excavated material or imported material with no stones larger than 200 mm diameter within 600 mm of structures.

3.4 GRADING

- .1 Grade so that water will drain away from buildings, walls and paved areas, to catch basins and other disposal areas approved by the Contract Administrator. Grade to be gradual between finished spot elevations shown on drawings.

3.5 SHORTAGE AND SURPLUS

- .1 Supply all necessary fill to meet backfilling and grading requirements and with minimum and maximum rough grade variance.
- .2 Dispose of surplus material off site.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 05 17 - Aggregate Materials.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C 117, Standard Test Method for Material Finer Than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D 422-63, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D 4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

1.3 DEFINITIONS

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
 - .1 Rock: any solid material in excess of 0.25m and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m³ bucket. Frozen material not classified as rock.
 - .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.
- .3 Topsoil:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
 - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25mm in any dimension.
- .4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .6 Unsuitable materials:
 - .1 Weak, chemically unstable, and compressible materials.
 - .2 Frost susceptible materials:
 - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D 4318, and gradation within limits specified when tested to ASTM D 422 and ASTM C 136: Sieve sizes to CAN/CGSB-8.2.
 - .2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45
 - .3 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.

1.4 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Preconstruction Submittals:
 - .1 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field, clearance record from utility authority, location plan of relocated and abandoned services, as required.
- .3 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures if requested.
 - .2 Submit ten (10) kg samples of type of fill specified including representative samples of excavated material upon request of Contract Administrator.
 - .3 Ship samples prepaid to Contract Administrator, in tightly closed containers to prevent contamination and exposure to elements.

1.5 QUALITY ASSURANCE

- .1 Qualification Statement: submit proof of insurance coverage for professional liability.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Storage and Protection:
 - .1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.
 - .2 Existing buried utilities and structures:
 - .1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .2 Prior to beginning excavation Work, notify City and applicable authorities having jurisdiction, establish location and state of use of buried utilities and structures. City and authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work.
 - .3 Confirm locations of buried utilities by careful test excavations.
 - .4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
 - .5 Where utility lines or structures exist in area of excavation, obtain direction of utility before removing or re-routing.
 - .6 Record location of maintained, re-routed and abandoned underground lines.
 - .3 Existing buildings and surface features:
 - .1 Conduct, with Contract Administrator, condition survey of existing service poles, wires and survey bench marks which may be affected by Work.
 - .2 Protect existing buildings and surface features on adjacent properties from damage while Work is in progress. In event of damage, inform Contract Administrator immediately.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Type 1 and Type 2 fill: properties to Section 31 05 17 - Aggregate Materials and the following requirements:
 - .1 Crushed, pit run or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1.
 - .3 Table:

Sieve Designation	% Passing		Sieve Designation	% Passing	
	Type 1	Type 2		Type 1	Type 2
75mm	-	100	9.5mm	50-100	-
50mm	-	-	4.75mm	30-70	22-85
37.5mm	-	-	2.00mm	20-45	-
25mm	100	-	0.425mm	10-25	5-30
19mm	75-100	-	0.180mm	-	-
12.5mm	-	-	0.075mm	3-8	0-10

- .2 Type 3 fill: selected material from excavation or other sources, approved by Contract Administrator for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.
- .3 Shearmat: honeycomb type bio-degradable cardboard 150mm thick, treated to provide sufficient structural support for poured concrete until concrete cured.
- .4 Polyethylene: 0.254mm thick
- .5 Void form: Aerofoam Type I insulation.
- .6 Pea Gravel: clean, round stone of uniform 9.5mm size.

PART 3 - EXECUTION

3.1 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

3.2 STRIPPING OF TOPSOIL

- .1 Begin topsoil stripping of areas as indicated after area has been cleared of brush, weeds, and grasses and removed from site.
- .2 Strip topsoil to depths as indicated as indicated. Do not mix topsoil with subsoil.
- .3 Stockpile in locations as directed by Contract Administrator. Stockpile height not to exceed 3.0 m and should be protected from erosion.
- .4 Dispose of unused topsoil off site.

3.3 STOCKPILING

- .1 Stockpile fill materials in areas designated by Contract Administrator. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.
- .3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.4 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while Work is in progress.

3.5 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions as indicated.
- .2 Remove concrete, masonry, paving, walks, demolished foundations and rubble and other obstructions encountered during excavation.
- .3 For trench excavation, unless otherwise authorized by Contract Administrator in writing, do not excavate more than 30m of trench in advance of installation operations and do not leave open more than 15m at end of day's operation.
- .4 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Contract Administrator.
- .5 Restrict vehicle operations directly adjacent to open trenches.
- .6 Dispose of surplus and unsuitable excavated material off site.
- .7 Do not obstruct flow of surface drainage or natural watercourses.
- .8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .9 Notify Contract Administrator when bottom of excavation is reached.

- .10 Obtain Contract Administrator approval of completed excavation.
- .11 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Contract Administrator.
- .12 Correct unauthorized over-excavation as follows:
 - .1 Fill under bearing surfaces and footings with concrete specified for footings.
 - .2 Fill under other areas with Type 2 fill compacted to not less than 95 % of corrected Standard Proctor maximum dry density.
- .13 Hand trim, make firm and remove loose material and debris from excavations.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

3.6 FILL TYPES AND COMPACTION

- .1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D 698.
 - .1 Exterior side of perimeter walls: use Type 3 fill to subgrade level. Compact to 95% of corrected maximum dry density.
 - .2 Within building area: use Type 2 to underside of base course for floor slabs. Compact to 100% of corrected maximum dry density.
 - .3 Under concrete slabs: provide 150mm compacted thickness base course of Type 1 fill to underside of slab. Compact base course to 100%.
 - .4 Retaining walls: use Type 3 fill to subgrade level on high side for minimum 500mm from wall and compact to 85%.

3.7 BEDDING AND SURROUND OF UNDERGROUND SERVICES

- .1 Place and compact granular material for bedding and surround of underground services as indicated.
- .2 Place bedding and surround material in unfrozen condition.

3.8 BACKFILLING

- .1 No machine tracks or vehicular tires are allowed within 1.8m of foundation walls. All backfill within 1.8m of foundation wall shall be placed in maximum 300mm lifts and compacted to maximum 95% Standard Proctor density with light duty, hand-operated plate compactors.
- .2 Do not proceed with backfilling operations until completion of following:
 - .1 Contract Administrator has inspected and approved installations.
 - .2 Contract Administrator has inspected and approved of construction below finish grade.
 - .3 Inspection, testing, approval, and recording location of underground utilities.
 - .4 Removal of concrete formwork.
 - .5 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.
- .3 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .4 Do not use backfill material which is frozen or contains ice, snow or debris.
- .5 Place backfill material in uniform layers not exceeding 150mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .6 Backfilling around installations.
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Do not backfill around or over cast-in-place concrete within 72 hours after placing of concrete.
 - .3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 0.6 m.
 - .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
 - .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Contract Administrator or:

- .2 If approved by Contract Administrator, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Contract Administrator.
- .7 Install drainage filter system in backfill as indicated.

3.9 RESTORATION

- .1 Replace topsoil as indicated.
- .2 Reinstate lawns to elevation which existed before excavation.
- .3 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .4 Clean and reinstate areas affected by Work as directed by Contract Administrator.
- .5 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 11 00 - Clearing and Grubbing.
- .2 Section 31 23 10 - Excavation, Trenching and Backfill.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D 698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m³).

1.3 EXISTING CONDITIONS

- .1 Examine subsurface investigation report which is bound into this specification document.
- .2 Known underground and surface utility lines and buried objects are as indicated on site plan.
- .3 Refer to dewatering in Section 31 23 10 – Excavating, Trenching and Backfill.

1.4 PROTECTION

- .1 Protect and/or transplant existing fencing, trees, landscaping, natural features, bench marks, buildings, pavement, surface or underground utility lines which are to remain as directed by Contract Administrator. If damaged, restore to original or better condition unless directed otherwise.
- .2 Maintain access roads to prevent accumulation of construction related debris on roads.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 not used.

PART 3 - EXECUTION

3.1 STRIPPING OF TOPSOIL

- .1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected as determined by Contract Administrator.
- .2 Commence topsoil stripping of areas as indicated after area has been cleared of brush, weeds and grasses and removed from site.
- .3 Rototill weeds and grasses in stripped topsoil and retain as topsoil on site. Avoid mixing topsoil with subsoil.
- .4 Dispose of unused topsoil off site.

3.2 GRADING

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.
- .2 Rough grade to following depths below finish grades:
 - .1 150 mm for grassed areas.
 - .2 375 mm for asphalt paving.
 - .3 250 mm for concrete walks.
- .3 Slope rough grade away from building 1:50 minimum.
- .4 Grade ditches to depth as indicated.
- .5 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and

existing surface at approximately same moisture content to facilitate bonding.

- .6 Compact filled and disturbed areas to maximum dry density to ASTM D 698, as per recommendations in soils report attached to this specification document.

3.3 SURPLUS MATERIAL

- .1 Remove surplus material and material unsuitable for fill, grading or landscaping off site.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 05 17 - Aggregate Materials.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C 117, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D 422-63, Standard Test Method for Particle-Size Analysis of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert unused granular material from landfill to local quarry as approved by Contract Administrator.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Granular sub-base material: in accordance with Section 31 05 17 - Aggregate Materials and following requirements:
 - .1 Crushed, pit run or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.2.
 - .3 Table

Sieve Designation	% Passing			
100mm	-	-	-	-
75mm	100	100	100	-
50mm	-	-	-	100
37.5mm	-	-	-	-
25mm	55-100	-	-	60-100
19mm	-	-	-	-
12.5mm	-	-	-	38-70
9.5mm	-	-	-	-
4.75mm	25-100	25-85	-	22-55
2.00mm	15-80	-	-	13-42
0.425mm	4-50	5-30	0-30	5-28
0.180mm	-	-	-	-
0.075mm	0-8	0-10	0-8	2-10

- .4 Other Properties as follows:
 - .1 Liquid Limit: to ASTM D 4318, Maximum 25.
 - .2 Plasticity Index: to ASTM D 4318, Maximum 6.
 - .3 Los Angeles degradation: to ASTM C 131. Max% Loss by mass: 40.

PART 3 - EXECUTION

3.1 PLACING

- .1 Place granular sub-base after subgrade is inspected and approved by Contract Administrator.
- .2 Construct granular sub-base to depth and grade in areas indicated.
- .3 Ensure no frozen material is placed.
- .4 Place material only on clean unfrozen surface, free from snow or ice.
- .5 Place granular sub-base materials using methods which do not lead to segregation or degradation.
- .6 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Contract Administrator may authorize thicker lifts (layers) if specified compaction can be achieved.
- .7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .8 Remove and replace portion of layer in which material has become segregated during spreading.

3.2 COMPACTION

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Compact to density of not less than 98% corrected maximum dry density.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.
- .4 Apply water as necessary during compaction to obtain specified density.
- .5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Contract Administrator.
- .6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 SITE TOLERANCES

- .1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

3.4 PROTECTION

- .1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by Contract Administrator.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 05 17 - Aggregate Materials.
- .2 Section 32 11 19 - Granular Sub-base.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C 117, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D 698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .5 ASTM D 4318, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

1.3 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver and stockpile aggregates in accordance with Section 31 05 17 - Aggregate Materials. Stockpile minimum 50% of total aggregate required prior to beginning operation.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert unused granular material from landfill to local quarry as approved by Contract Administrator.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Granular base: material in accordance with Section 31 05 17 - Aggregate Materials and following requirements:
 - .1 Crushed stone or gravel.
 - .2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.2.
 - .1 Gradation Method # 1 to:

Sieve Designation	% Passing		
	(1)	(2)	(3)
100mm	-	-	-
75mm	-	-	-
50mm	100	-	-
37.5mm	70-100	-	-
25.0mm	-	100	-
19.0mm	50-75	-	100
12.5mm	-	65-100	70-100
9.5mm	40-65	-	-
4.75mm	30-50	35-60	40-70
2.00mm	-	22-45	23-50
0.425mm	10-30	10-25	7-25
0.180mm	-	-	-
0.075mm	3-8	3-8	3-8

PART 3 - EXECUTION

3.1 SEQUENCE OF OPERATION

- .1 Place granular base after sub-base surface is inspected and approved by Contract Administrator.
- .2 Placing
 - .1 Construct granular base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow and ice.
 - .4 Place material using methods which do not lead to segregation or degradation of aggregate.
 - .5 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Contract Administrator may authorize thicker lifts (layers) if specified compaction can be achieved.
 - .6 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
 - .7 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 Compaction Equipment
 - .1 Compaction equipment to be capable of obtaining required material densities.
- .4 Compacting
 - .1 Compact to density not less than 100% maximum dry density.
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .3 Apply water as necessary during compacting to obtain specified density.
 - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Contract Administrator.
 - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.2 SITE TOLERANCES

- .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

3.3 PROTECTION

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Contract Administrator.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Materials and installation for asphalt concrete pavement for car park areas, driveways to buildings, bikeways and walks or play areas.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 31 05 17 - Aggregate Materials.

1.3 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C 123, Standard Test Method for Lightweight Particles in Aggregate.
 - .2 ASTM C 127, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate.
 - .3 ASTM C 128, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate.
 - .4 ASTM C 136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .5 ASTM D 995, Standard Specification for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
- .2 Asphalt Institute (AI)
 - .1 AI MS-2, Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1, Sieves Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2, Sieves Testing, Woven Wire, Metric.
 - .3 CAN/CGSB-16.1, Cutback Asphalts for Road Purposes.
 - .4 CAN/CGSB-16.2, Emulsified Asphalts, Anionic Type, for Road Purposes.
 - .5 CAN/CGSB-16.3, Asphalt Cements for Road Purposes.

1.4 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit asphalt concrete mix design to Engineer for review.
- .3 Materials to be tested by testing laboratory approved by Engineer.
- .4 Submit test certificates showing suitability of materials at least 4 weeks prior to commencing work.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Unused protective coating 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.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Asphalt concrete aggregates:
 - .1 Coarse aggregate is aggregate retained on 4.75 mm sieve and fine aggregate is aggregate passing 4.75 mm sieve when tested to ASTM C 117.
 - .2 When dryer drum plant or plant without hot screening is used, process fine aggregate through 4.75 mm sieve and stockpile separately from coarse aggregate.
 - .3 Separate stockpiles for coarse and fine aggregate are not required for sheet asphalt.
 - .4 Do not use aggregates having known polishing characteristics in mixes for surface

courses.

- .5 Aggregate: material to Section 31 05 17 - Aggregate Materials and following requirements:
 - .1 Crushed stone or gravel.
 - .2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1.
 - .3 Table

Sieve % Passing

<u>Designation</u>	Asphalt Concrete	Sheet Asphalt
200 mm	-	-
75 mm	-	-
50 mm	-	-
38.1 mm	-	-
25 mm	-	-
19.0 mm	100	-
12.5	-	100
9.5 mm	60-80	100
4.75 mm	40-65	85-100
2.00 mm	30-50	80-95
0.425 mm	15-30	40-70
0.180 mm	5-20	10-35
0.075 mm	3-8	4-14

- .4 Sand equivalent: to ASTM D 2419, Minimum 50.
- .5 Magnesium Sulphate soundness: to ASTM C 88. Max % loss by weight: coarse aggregate 12, fine aggregate 16.
- .6 Los Angeles Degradation: to ASTM C 131. Max % loss by weight: coarse aggregate, 35.
- .7 Absorption: to ASTM C 127. Max % by weight: coarse aggregate, 1.75.
- .8 Lightweight particles: to ASTM C 123. Max % by mass, with less than 1.95. Relative density (formally Specific Gravity): 1.5.
- .9 Flat and elongated particles: to ASTM D 4791, (with length to thickness ratio greater than 5): Max % by weight: coarse aggregate, 15.
- .10 Crushed particles: at least 60 % of particles by mass within each of following sieve designation ranges to have at least 1 freshly fractured face. Material to be divided into ranges using methods of ASTM C 136.
- .11 Table

<u>Passing</u>	<u>Retained on</u>
19 mm	to 9.5 mm
9.5 mm	to 4.75 mm

- .12 Regardless of compliance with specified physical requirements, fine aggregates may be accepted or rejected on basis of past field performance.
- .2 Mineral filler for asphalt concrete:
 - .1 Finely ground particles of limestone, hydrated lime, Portland cement or other approved non-plastic mineral matter, thoroughly dry and free from lumps.
 - .2 Add mineral filler when necessary to meet job mix aggregate gradation or as directed by Engineer to improve mix properties.
- .3 Asphalt cement: to CAN/CGSB-16.3, grade 150-200.
- .4 Asphalt prime: to CAN/CGSB-16.1, grade MC-70.

2.2 EQUIPMENT

- .1 Rollers: sufficient number of rollers of type and weight to obtain specified density of compacted mix.
- .2 Vibratory rollers for parking lots and driveways:
 - .1 Minimum drum diameter: 750 mm.
 - .2 Maximum amplitude of vibration (machine setting): 0.5 mm for lifts less than 40 mm thick.
- .3 Haul trucks: of sufficient number and of adequate size, speed and condition to ensure orderly and continuous operation and as follows:
 - .1 Boxes with tight metal bottoms.
 - .2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
 - .3 In cool weather or for long hauls, insulate entire contact area of each truck box.
- .4 Suitable hand tools.

2.3 MIX DESIGN

- .1 Mix design to AI MS-2.
- .2 Job mix formula to be approved by Engineer.
- .3 Design of mix: by Marshall method to requirements below:
 - .1 Compaction blows on each face of test specimens: 50.
 - .2 Mix physical requirements:

Property	Sheet Asphalt	Concrete
Marshall Stability at 60 degrees C, kN min.	3.0	5.5
Flow Value, mm.	2-5	2-4
Air Voids in Mixture, %	3-5	3-5
Voids in Mineral Aggregate, % min.	16	15
Index of Retained Stability, % min.	75	75

- .3 Measure physical requirements as follows:
 - .1 Marshall load and flow value: to ASTM D 1559.
 - .2 Compute void properties on basis of bulk specific gravity of aggregate to ASTM C 127 and ASTM C 128. Make allowance for volume of asphalt absorbed into pores of aggregate.
 - .3 Voids in mineral aggregate: to AI MS-2, chapter 4.
- .4 Do not change job-mix without prior approval of Engineer. When change in material source proposed, new job-mix formula will be provided to be reviewed by Engineer.
- .5 Return plant dust collected during processing to mix in quantities acceptable to Engineer.

PART 3 - EXECUTION

3.1 GRANULAR SUB-BASE AND GRANULAR BASE

- .1 Place granular base and sub-base material on clean unfrozen surface, free from snow and ice.
- .2 Place granular base and sub-base to compacted thicknesses as indicated. Do not place frozen material.

- .3 Place in layers not exceeding 150 mm compacted thickness. Compact to density not less than 98 % maximum dry density in accordance with ASTM D 698.
- .4 Finished base surface to be within 10 mm of specified grade, but not uniformly high or low.

3.2 ASPHALT PRIME

- .1 Cutback asphalt:
 - .1 Heat asphalt prime for pumping and spraying in accordance with CAN/CGSB-16.1.
 - .2 Apply cutback asphalt prime to granular base, at rate directed by Engineer, but do not exceed 2.2 L/m².
 - .3 Apply on dry surface, unless otherwise directed by [Engineer] [Contract Administrator].
- .2 Do not apply prime when air temperature is less than 5 degrees C or when rain is forecast within 2 hours.
- .3 If asphalt prime fails to set within 24 hours, spread sand blotter material in amounts required to absorb excess material. Sweep and remove excess blotter material.

3.3 PLANT AND MIXING REQUIREMENTS

- .1 In accordance with ASTM D 995.

3.4 ASPHALT CONCRETE PAVING

- .1 Obtain approval of base and primer from Engineer before placing asphalt mix.
- .2 Place asphalt mix only when base or previous course is dry and air temperature is above 5 degrees C.
- .3 Place asphalt concrete in compacted layers not exceeding 50 mm to total thickness as directed in attached geotechnical report.
- .4 Minimum 135 degrees C mix temperature required when spreading.
- .5 Maximum 150 degrees C mix temperature permitted at any time.
- .6 Compact each course with roller as soon as it can support roller weight without undue cracking or displacement.
- .7 Compact parking lot to density not less than 98 % of density obtained with Marshall specimens prepared in accordance with ASTM D 1559 from samples of mix being used. Roll until roller marks are eliminated.
- .8 Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.
- .9 Moisten roller wheels with water to prevent pick up of material.
- .10 Compact mix with hot tampers or other equipment approved by Engineer, in areas inaccessible to roller.
- .11 Finish surface to be within 10 mm of design elevation and with no irregularities greater than 10 mm in 4.5 m.
- .12 Repair areas showing checking, rippling or segregation as directed by Engineer.

3.5 JOINTS

- .1 Remove surplus material from surface of previously laid strip. Do not deposit on surface of freshly laid strip.
- .2 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.
- .3 For cold joints, cut back to full depth vertical face and tack face with hot asphalt.

- .4 For longitudinal joints, overlap previously laid strip with spreader by 25 to 50 mm.

3.6 TESTING

- .1 Inspection and testing of asphalt pavement will be carried out by designated testing laboratory in accordance with Section 01 45 00 - Quality Control.
- .2 Costs of tests will be paid by the City of Winnipeg.

3.7 PROTECTION

- .1 Keep vehicular traffic off newly paved areas until paving surface temperature has cooled below 38 degrees C. Do not permit stationary loads on pavement until 24 hours after placement.
- .2 Provide access to buildings as required. Arrange paving schedule so as not to interfere with normal use of premises.

End of Section

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 05 17 - Aggregate Materials.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C 136-[13], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .2 ASTM C 979/C 979M-[10], Standard Specification for Pigments for Integrally Colored Concrete.
- .2 Canadian Standards Association (CSA)
 - .1 CSA A23.1/A23.2-[09], Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A179-[04(R2009)], Mortar and Grout for Unit Masonry.
 - .3 CSA A231.1/A231.2-[06(R2010)], Precast Concrete Paving Slabs/Precast Concrete Pavers.
 - .4 CSA A283-[06(R2011)], Qualification Code for Concrete Testing Laboratories.

1.3 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company or person specializing in precast concrete paver installations with 5 years documented experience.

PART 2 - PRODUCTS

2.1 CONCRETE PAVERS

- .1 Contractor to reinstall existing pavers.

2.2 BEDDING AND JOINT MATERIAL

- .1 Determine bedding sand hardness as follows:
 - .1 Randomly select single 1.4 kg sample from sand source.
 - .2 Dry sample for 24 hours at 115 degrees C to 121 degrees C.
 - .3 Obtain 3 sub-samples each weighing 0.2 kg by passing original sample several times through riffle box.
 - .4 Carry out sieve analysis test on each sub-sample in accordance with CSA A23.1/A23.2.
- .2 Remix each sub-sample and place in nominal litre capacity porcelain jar with two 2, 25 mm diameter steel ball bearings weighing 75 +/-5 g each. Rotate each jar at 50 rpm for six [6] hours. Repeat sieve analysis. Record individual and average sieve analysis.
- .3 each sample tested, maximum increase in percentages passing each sieve and maximum individual percent passing is in accordance with table as follows:

Sieve Size	Maximum Increase	Maximum Passing
0.075 mm	2%	2%
0.150 mm	5%	15%
0.300 mm	5%	35%

- .4 Bedding and joint sand: clean, non-plastic, free from deleterious or foreign matter, natural or manufactured from crushed rock or gravel. Do not use limestone screenings or stone dust.
- .5 Gradation: to CSA A23.1/A23.2, Table 4 - Grading Limits for Fine Aggregate, and CAN/CSA-A179 as follows:

Sieve Designation	% Passing for Bedding Sand	% Passing for Joint Sand
10 mm	[100]	-
5 mm	[95-100]	[100]

2.5 mm	[80-100]	[95-100]
1.25 mm	[50-90]	[60-100]
630 microns	[25-65]	-
600 microns	-	[35-80]
315 microns	[10-35]	-
300 microns	-	[15-20]
160 microns	[2-10]	-
150 microns	-	[2-15]

2.3 EDGE RESTRAINTS

- .1 Edge restraints shall be pressure treated wood as per drawings.

2.4 CLEANING COMPOUND

- .1 Clear, organic solvent, designed and recommended by manufacturer for cleaning concrete pavers of contamination encountered.
- .2 Acid based chemical detergent, designed and recommended by manufacturer for removal of contamination encountered on pavers.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for precast concrete unit paving installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Contract Administrator of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from Contract Administrator.

3.2 STRUCTURAL SURFACE

- .1 Verify that structural surfaces conform to levels and compaction required for installation of unit pavers. If discrepancies occur, notify Contract Administrator and do not commence work until instructed by Contract Administrator.
- .2 Verify that top of structural surface (top of base) does not exceed plus or minus 5 mm of grade over 3 m straightedge.
- .3 Ensure that structural surface is not frozen or standing water is present during installation.

3.3 INSTALLATION OF EDGE RESTRAINTS

- .1 Install restraints true to grade, in accordance with manufacturer's recommendations.

3.4 PLACING BEDDING MATERIAL

- .1 Ensure bedding material is not saturated or frozen at all times until installation is complete.
- .2 Spread and screed material on structural surface to achieve 25 mm compacted thickness after vibrating pavers in place. Do not use joint sand for bedding sand.
- .3 Do not disturb screeded material. Do not use bedding material to fill depressions in structural surface.

3.5 INSTALLATION OF CONCRETE PAVERS

- .1 Lay pavers to match existing installation. Joints between pavers: as recommended by manufacturer.
- .2 Use appropriate end, edge and corner stones. Saw cut pavers to fit around obstructions and at abutting structures.
- .3 Use a low amplitude, high frequency plate compactor capable of at least 22 kN centrifugal

- compaction force to vibrate pavers into bedding sand.
- .4 Inspect, remove, and replace chipped, broken and damaged pavers.
 - .5 Sweep dry joint sand material into joints.
 - .6 Settle sand by vibrating pavers with plate compactor.
 - .7 Continue application of joint material and vibrating of pavers until joints are full. Do not vibrate within 1 m of unrestrained edges of pavers.
 - .8 Complete installation to within 1 m of laying face, with sand-filled joints, at completion of each work day.
 - .9 Sweep off excess joint material when installation is complete.
 - .10 Proof roll street pavements with at least two passes of a 10 T rubber-tired roller.
 - .11 Final surface elevations not to exceed plus or minus 5mm under 3 m long straightedge.
 - .12 elevation of pavers: 3 to 4 mm above adjacent drainage inlets, concrete collars or channels.
 - .13 Ensure conformance of final elevations.

3.6 PRECAST CONCRETE UNIT CLEANING

- .1 Carry out cleaning at times and conditions recommended by manufacturer of cleaning compound.
- .2 Remove and dispose of loose, extraneous materials from surfaces to be cleaned.
- .3 Apply cleaning compounds appropriate for removal of various contaminants encountered in accordance with manufacturer's recommendations.
- .4 Final surface to be free of contamination.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Supply and installation of all fill and topsoil as necessary for grading, regarding and repairing damaged sodded areas.
- .2 Furnishing all labour, materials, equipment, supervision, incidentals and all other miscellaneous works required to complete the work as shown and detailed on the drawings and/or as specified herein.

1.2 SOURCE QUALITY CONTROL

- .1 Advise Project Administrator of sources of topsoil to be utilized seven days in advance of starting work.
- .2 Contractor is responsible for soil analysis and related costs, and requirements for amendments to supply topsoil as specified.
- .3 Test topsoil for clay, sand and silt, NPK, Mg, soluble salt content, PH, growth inhibitors, soil sterilants and organic matter.
 - .1 Submit 0.5 kg sample of topsoil to testing laboratory and indicate present use, intended use, type of subsoil and quality of drainage. Prepare and ship sample in accordance with provincial regulations and testing laboratory requirements.
 - .2 Submit 2 (two) copies of soil analysis and recommendations for corrections to the Project Administrator.

1.3 SCHEDULE OF WORK

- .1 Schedule finish grading to permit sodding and/or seeding operations under optimum conditions.

1.4 PROTECTION OF EXISTING FACILITIES

- .1 Protect elements surrounding the work of this section from damage or disfiguration.
- .2 Protect landscaping and other features remaining as final Work.
- .3 Protect existing structures, fences, roads, sidewalks, paving and curbs.
- .4 In the event of damage immediately replace such items or make repairs to the same, at no additional cost to the City.

1.5 DELIVERY AND STORAGE

- .1 Coordinate locations for storage of all materials with Project Administrator.
- .2 Deliver and store fertilizer in waterproof bags accompanied in writing by weight, analysis and name of manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Topsoil
 - .1 Shall consist of a screened clay-textured or loam-textured dark topsoil, a fertile, friable material neither of heavy clay nor of very light sandy nature containing by volume, a minimum of 4% to a maximum of 25% organic matter (peat, rotted manure or composted material) and capable of sustaining vigorous plant growth.
 - .2 Ph value: 7.5 to 8.2
 - .3 Contain no toxic elements or growth inhibiting materials.
 - .4 Free from:
 - .1 Debris, roots, stones and clay lumps over 40 mm diameter.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
 - .3 Subsoil contamination.
 - .4 Quackgrass rhizomes, Canada Thistle roots or other noxious weeds.

- .5 Consistence: friable when moist.
- .6 Salinity rating less than 1.5mmhos/cm.
- .5 Planting mix: 4 parts topsoil with 1 part peatmoss.
- .2 Soil Amendments
 - .1 Peatmoss:
 - .1 Derived from partially decomposed species of Sphagnum Mosses.
 - .2 Elastic and homogeneous, brown in colour.
 - .3 Free of wood and deleterious material which could prohibit growth.
 - .4 Shredded particle minimum size: 5 mm.
 - .2 Sand: washed coarse silica sand, medium to coarse textured.
 - .3 Limestone, if required as a result of soil analysis:
 - .1 Ground agricultural limestone containing minimum calcium carbonate equivalent of 85%.
 - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
 - .4 Fertilizer: Synthetic slow release fertilizer with and NPK analysis of 1-2-1 ratio at a rate to provide 48 kg actual Nitrogen, 96 kg actual Phosphate and 48 kg actual Potassium per hectare.

PART 3 - EXECUTION

3.1 PREPARATION OF EXISTING GRADE

- .1 Subsoil shall be fine graded and shaped so that by spreading a uniform depth of topsoil, the final elevations and contours may be achieved. Uneven areas and low spots shall be eliminated to ensure positive grade.
- .2 Verify that grades are correct. If discrepancies occur, notify Project Administrator and do not commence work until instructed by Project Administrator.
- .3 Areas which are to receive topsoil shall be cultivated to a depth of 100 mm. This cultivation shall be repeated and cross cultivated in locations where machinery or equipment has compacted the soil.
- .4 Remove surface debris, roots, vegetation, branches and stones in excess of 40 mm in diameter. Remove any soil contaminated with calcium chloride, toxic materials and petroleum products. Remove debris which protrudes more than 75 mm above surface. Dispose of removed material off site.

3.2 SPREADING OF TOPSOIL

- .1 Subgrade shall be inspected and approved by the City prior to spreading topsoil.
- .2 Topsoil shall be evenly spread with adequate moisture, in uniform layers not exceeding 150 mm, over approved, unfrozen subgrade free of standing water, in locations where sodding or planting is indicated.
- .3 Keep topsoil 25 mm below finished grade in areas to be sodded.
- .4 Apply topsoil to the following minimum depths after settlement and 80% compaction:
 - .1 Refer to drawing details.
 - .2 150 mm for seeded and sodded areas.
 - .3 300 mm for flower beds.
 - .4 500 mm for shrub beds.
- .5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.3 SOIL AMENDMENTS

- .1 Any soil amendments required shall be applied to the topsoil at a rate as specified and as determined by the soil sampling. Mix any soil amendments in to the full depth of the topsoil prior to application of fertilizer.

3.4 APPLICATION OF FERTILIZER

- .1 Spread fertilizer over entire area to receive topsoil at a rate as recommended by the manufacturer or as determined by the soil testing.
- .2 Mix fertilizer thoroughly to a minimum depth of 150 mm of the topsoil

3.5 FINISH GRADING

- .1 Areas shall be leveled and graded to provide positive drainage. Leveling shall be in accordance with the contour lines, elevations, drainage direction arrows and other descriptions as shown on the drawings or specified herein.
- .2 Positive surface drainage shall be provided on all areas to be sodded by creating grade not less than 2% unless otherwise shown on the drawings.
- .3 Prepare loose friable bed by means of cultivation and subsequent raking. Roll lightly and rake wherever topsoil is too loose.
- .4 Roll topsoil with a 100 kg, 1000 mm minimum wide roller, to consolidate topsoil in areas to be sodded. Leave a smooth, uniform surface, firm against deep foot printing. Surface shall be even textured.
- .5 The site shall be kept tidy during operations and all excess material shall be disposed of off-site, to a legal dump site at no cost to the City.

3.6 ACCEPTANCE

- .1 Contract Administrator will inspect topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

End of Section