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1.2 RELATED REQUIREMENTS

.1 Section 01600 - Product Requirements: Product substitutions and options.

1.3 CASH ALLOWANCES

.1 Costs Included in Cash Allowances: Cost of Product to Contractor or subcontractors, less applicable trade discounts; delivery to site, and applicable taxes.

.2 If a Cash Allowance item described in the Allowances Schedule below indicates the inclusion of installation, include in the Cash Allowance amount, provision for Product handling at the site, including unloading, uncrating, storage, protection of Products from elements and from damage, labour for installation and finishing, insurance, labour costs, taxes, bonding if applicable, equipment rental, overhead and profit.

.3 If a Cash Allowance item described in the Allowances Schedule below indicates supply only, include in the Contract Price costs not included in Cash Allowances but included in the Contract Price: Product handling at the site including unloading, uncrating, storage, protection of Products from elements and from damage, labour for installation and finishing, insurance, labour costs, taxes, bonding if applicable, equipment rental, overhead and profit.

.4 Consultant Responsibilities:

- .1 Consult with Contractor for consideration and selection of Products, suppliers, and installers.
- .2 Owner and Consultant to select Products.
- .3 Prepare Change Order.

.5 Contractor Responsibilities:

.1 Assist Consultant in selection of Products, suppliers and installers.

.2 Obtain proposals from suppliers and installers and offer recommendations.

.3 On notification of selection by Consultant or Owner, execute purchase agreement with designated supplier and installer.

.4 Arrange for and process shop drawings, product data, and samples. Arrange for delivery.

.5 Promptly inspect Products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

.6 Differences in costs will be adjusted by Change Order.

.7 Allowances Schedule:

.1 N/A

1.4 CONTINGENCY ALLOWANCE

.1 Include 10% contingency allowance for use upon owners' instruction.

.2 Contractor's costs for Products, delivery, installation, labour, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.

.3 Funds will be drawn from the Contingency Allowance only by Change Order.

.4 At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.5 INSPECTING AND TESTING ALLOWANCES

.1 Costs Included in Inspecting and Testing Allowances: Cost of engaging an inspecting or testing agency; execution of inspecting and tests; and reporting results.

.1 Testing agency to provide testing procedure outlining tests, testing frequency, any quantities and procedures to Owner and Consultant.

.2 Costs Not Included in the Inspecting and Testing Allowance but Included in the Contract Price:

.1 Costs of incidental labour and facilities required to assist inspecting or testing agency.

.2 Costs of testing services used by Contractor separate from Contract Document requirements.

.3 Costs of retesting upon failure of previous tests as determined by Consultant.

.3 Payment Procedures:

.1 Submit one copy of the inspecting or testing firm's invoice with next application for payment.

.2 Pay invoice on approval by Consultant.

.4 Inspecting and Testing Allowances Schedule:

.1 Include the sum of $5,000.00 for testing.

.5 Differences in cost will be adjusted by Change Order.

1.6 APPLICATIONS FOR PAYMENT

.1 Submit each application electronically by the 27th of each month for review by the Consultant. Reviews and revisions must be completed by the Contractor and Consultant for submission to Owner by the 15th of the month following.

.2 Include copies of invoices for amounts drawn on allowances.

.3 Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

.4 Payment Period: 30 days.

.5 Include an updated construction progress schedule, statutory declaration and current WSIB Clearance Certificate for all trades.

1.7 CHANGE PROCEDURES

.1 The Consultant will advise of minor changes in the Work not involving an adjustment to Contract Price or Contract Time as authorized by issuing supplemental instructions.

.2 The Consultant may issue a Notice of Change which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change. Contractor will prepare and submit an estimate within three (3) days.

.3 The Contractor may propose changes by submitting a request for change to the Consultant, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Price and Contract Time with full documentation. Document any requested substitutions.

.4 Stipulated Price Change Order: Based on Proposal Request or Notice of Change and Contractor's fixed price quotation or Contractor's request for a Change Order as approved by Consultant.

.5 Change Order Forms: SPH Engineering Change Order.

.6 Execution of Change Orders: Consultant will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

1.8 DEFECT ASSESSMENT

.1 Replace the Work, or portions of the Work, not conforming to specified requirements.

.2 If, in the opinion of the Owner, it is not practical to remove and replace the Work, the Owner will direct an appropriate remedy or adjust payment.

1.9 SUBSTITUTIONS

.1 Consultant will consider requests for Substitutions only within five (5) days after date of Owner-Contractor Agreement.

.2 Substitutions will not be considered when a Product becomes unavailable through no fault of the Contractor.

.3 Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

.4 A request constitutes a representation that the Bidder or Contractor:

.1 Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.

.2 Will provide the same warranty for the Substitution as for the specified Product.

.3 Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.

.4 Waives claims for additional costs or time extension which may subsequently become apparent.

.5 Will reimburse Owner and Consultant for review or redesign services associated with re-approval by authorities.

.5 Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

.6 Substitution Submittal Procedure:

.1 Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.

.2 Submit shop drawings, product data, and certified test results attesting to the proposed Product equivalence. Burden of proof is on proposer.

.3 The Consultant will notify Contractor in writing of decision to accept or reject request.

1.10 ALTERNATIVES

.1 Accepted Alternatives will be identified in Owner-Contractor Agreement.

.2 Submit alternatives identifying the effect on adjacent or related components.

.3 Alternatives quoted on Bid Forms will be reviewed and accepted or rejected at the Owner's option. Accepted alternatives will be identified in the Owner-Contractor Agreement.

.4 Coordinate related work and modify surrounding work to integrate the Work of each alternative.

1.11 SEPARATE PRICES

.1 Separate Price items do NOT replace or substitute items already in the Bid Documents. Accepted Separate Prices will be:

.1 identified in the Construction Agreement as an increase to the Bid Price, or

.2 in a subsequent Change Order.

.2 Submit Separate Prices to identify items that may be added to the Contract, at the Owner's option. Include in the quoted Separate Price, overhead and profit, the effect on adjacent or related components already in the Work described in the Bid Documents.

.3 Coordinate related Work and modify surrounding Work to integrate the work of each Separate Price.

Schedule of Separate Prices: Refer to Bid Form.

PART 2 Products

.1 Not Used

PART 3 Execution

.1 Not Used

END OF SECTION

PART 1 General

1.1 REQUIREMENTS INCLUDED

.1 Quality assurance - control of installation.

.2 Coordination and project conditions.

.3 Tolerances

.4 References and standards.

.5 Testing services.

.6 Inspection services.

.7 Pre-construction meeting.

.8 Progress meetings.

.9 Manufacturers' field services.

1.2 RELATED REQUIREMENTS

.1 Section 01300 - Administrative Requirements: Submission of manufacturers' instructions and certificates.

.2 Section 01700 - Execution Requirements: Starting of Systems.

1.3 COORDINATION AND PROJECT CONDITIONS

.1 Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

.2 Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

.3 Coordinate space requirements, supports, and installation of mechanical and electrical Work, which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

.4 In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

.5 Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

.6 After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.4 QUALITY ASSURANCE - CONTROL OF INSTALLATION

.1 Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

.2 Comply with manufacturers' instructions, including each step in sequence.

.3 Should manufacturers' instructions conflict with Contract Documents, request clarification from Consultant before proceeding.

.4 Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

.5 Perform Work by persons qualified to produce required and specified quality.

.6 Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

.7 Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.5 TOLERANCES

.1 Monitor fabrication and installation tolerance control of Products to produce acceptable Work. Do not permit tolerances to accumulate.

.2 Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Consultant before proceeding.

.3 Adjust Products to appropriate dimensions; position before securing Products in place.

1.6 REFERENCES AND STANDARDS

.1 For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

.2 Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by code.

.3 Obtain copies of standards where required by product specification sections.

.4 Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Consultant shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.7 TESTING SERVICES

.1 Owner will appoint and employ services of an independent firm to perform testing. Contractor shall pay for services from cash allowance(s) specified in Section 01200.

.2 The independent firm will perform tests and other services specified in individual specification sections and as required by the Consultant or Owner.

.3 Testing and source quality control may occur on or off the project site. Perform off-site testing as required by the Consultant or the Owner.

.4 Reports will be submitted by the independent firm to the Consultant and Contractor, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

.5 Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labour as requested.

.1 Notify Consultant and independent firm 24 hours prior to expected time for operations requiring services.

.2 Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

.6 Testing does not relieve Contractor to perform Work to contract requirements.

.7 Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Consultant. Payment for re-testing will be charged to the Contractor by deducting testing charges from the Contract Sum/Price.

1.8 INSPECTION SERVICES

.1 Owner will appoint and employ services of an independent firm to perform inspection. Contractor shall pay for services from cash allowance(s) specified in Section 01200.

.2 The independent firm will perform inspections and other services specified in individual specification sections and as required by the Consultant or Owner.

.3 Inspecting may occur on or off the project site. Perform off-site inspecting as required by the Consultant or the Owner.

.4 Reports will be submitted by the independent firm to the Consultant and Contractor, in duplicate, indicating inspection observations and indicating compliance or non-compliance with Contract Documents.

.5 Cooperate with independent firm; furnish safe access and assistance by incidental labour as requested.

.1 Notify Consultant and independent firm 24 hours prior to expected time for operations requiring services.

.6 Inspecting does not relieve Contractor to perform Work to contract requirements.

1.9 PRECONSTRUCTION MEETING

.1 Owner will schedule a meeting after Notice of Award.

.2 Attendance Required: Owner, Consultant, Safety Contact and Contractor.

.3 Agenda:

.1 Safety Orientation.

.2 Execution of Owner-Contractor Agreement.

.3 Submission of executed bonds and insurance certificates.

.4 Distribution of Contract Documents.

.5 Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.

.6 Designation of personnel representing the parties in Contract, Owner and the Consultant.

.7 Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.

.8 Scheduling.

.4 Record minutes and distribute copies within two days after meeting to participants, with one copy to Consultant, Owner, participants, and those affected by decisions made.

1.10 SITE MOBILIZATION MEETING

.1 Owner will schedule a meeting at the Project site prior to Contractor occupancy.

.2 Attendance Required: Owner, Consultant, Contractor, Contractor's Superintendent, and major Subcontractors.

.3 Agenda:

.1 Use of premises by Owner and Contractor.

.2 Owner's requirements and occupancy.

.3 Construction facilities and controls provided by Owner.

.4 Temporary utilities provided by Owner.

.5 Security and housekeeping procedures.

.6 Schedules.

.7 Application for payment procedures.

.8 Procedures for testing.

.9 Procedures for maintaining record documents.

.10 Requirements for start-up of equipment.

.11 Inspection and acceptance of equipment put into service during construction period.

.4 Record minutes and distribute copies within two days after meeting to participants, with one copy to Consultant, Owner, participants, and those affected by decisions made.

1.11 PROGRESS MEETINGS

.1 Prepare weekly progress reports with photographs and provide to Consultant and Owner Representatives.

.2 Schedule and administer meetings with owner representative and Consultant throughout progress of the Work at maximum weekly intervals.

.3 Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

.4 Attendance Required: Job superintendent, major Subcontractors and suppliers, owner representative, Consultant, as appropriate to agenda topics for each meeting.

.5 Agenda:

.1 Site Safety performance.
.2 Review minutes of previous meetings.
.3 Review of Work progress.
.4 Field observations, problems, and decisions.
.5 Identification of problems which impede planned progress.
.6 Review of submittals schedule and status of submittals.
.7 Review of off-site fabrication and delivery schedules.
.8 Maintenance of progress schedule.
.9 Corrective measures to regain projected schedules.
.10 Planned progress during succeeding work period.
.11 Coordination of projected progress.
.12 Maintenance of quality and work standards.
.13 Effect of proposed changes on progress schedule and coordination.
.14 Other business relating to Work.

.6 Record minutes and distribute copies within two days after meeting to participants, with one copy to Consultant, Owner, participants, and those affected by decisions made.

1.12 MANUFACTURERS' FIELD SERVICES

.1 When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, and to initiate instructions when necessary.

.2 Submit qualifications of observer to Consultant (10) ten days in advance of required observations.

.3 Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

PART 2 Products

.1 Not Used

PART 3 Execution

.1 Not Used.

END OF SECTION

PART 1 General

1.1 REQUIREMENTS INCLUDED

.1 Temporary Utilities: Electricity, heating, cooling, ventilation, telephone service, facsimile and internet service, water service, and sanitary facilities.

.2 Temporary Controls: Barriers, fencing, water control, exterior enclosures, and protection of installed work.

.3 Construction Facilities: Site Access, parking, progress cleaning and waste removal, field offices and sheds, removal of utilities, facilities, and controls, security program, entry control, and restrictions.

1.2 RELATED REQUIREMENTS

.1 Section 01700 - Execution Requirements: Final cleaning.

1.3 TEMPORARY ELECTRICITY

.1 Cost: By Contractor; arrange and pay for temporary power service. Exercise measures to conserve energy.

.2 Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.

.3 Permanent convenience receptacles may be utilized during construction.

1.4 TEMPORARY HEATING

.1 Provide and pay for heating devices and heat as needed to maintain appropriate conditions for construction operations.

.2 Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

1.5 TEMPORARY COOLING

.1 Provide and pay for cooling devices and cooling as needed to maintain appropriate conditions for construction operations.

Prior to operation of permanent equipment for temporary cooling purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

1.6 TEMPORARY VENTILATION

.1 Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapours, or gases.

.2 Utilize existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

1.7 TELEPHONE SERVICE

.1 Provide, maintain, and pay for telephone service to field office at time of project mobilization.

1.8 FACSIMILE AND INTERNET SERVICE

.1 Provide, maintain and pay for facsimile and internet service to field office at time of project mobilization.

1.9 TEMPORARY WATER SERVICE

.1 Cost: By Contractor; arrange with property owner for temporary connection to existing water service if required. Exercise measures to conserve water.

1.10 TEMPORARY SANITARY FACILITIES

.1 Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

1.11 BARRIERS

.1 Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

.2 Provide barricades and covered walkways required by governing authorities for public rights-of-way.

.3 Provide protection for plants designated to remain. Replace damaged plants.

.4 Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.12 FENCING

.1 Construction: Contractor's option.

.2 Provide 1800 mm high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.13 WATER CONTROL

Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

.1 Protect site from puddling or running water. Provide water barriers as required to protect site and adjacent sites.

1.14 EXTERIOR ENCLOSURES

.1 Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.15 PROTECTION OF INSTALLED WORK

.1 Protect installed Work and provide special protection where specified in individual specification sections.

.2 Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.

.3 Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

.4 Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

.5 Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

.6 Prohibit traffic from landscaped areas.

1.16 STORAGE/MATERIAL LAYDOWN

.1 The asphalt pad on the north side of the two existing barns is to be used as the work/laydown area. Aside from installation of site servicing, trenching and backfill/restoration of trenching, the work/laydown area needs to remain limited to this area.

.2 Construction activities must remain separated from publicly accessible areas at all times, including but not limited to daily, PA Day, and summer camp visitors to the museum.

1.17 CONTRACTOR PARKING

.1 A portion of the existing museum parking lot can be used for contractor parking.

.2 When site space is not adequate, provide additional off-site parking.

1.18 PROGRESS CLEANING AND WASTE REMOVAL

.1 Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

.2 Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

.3 Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

.4 Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site.

.5 Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.19 FIELD OFFICES AND SHEDS

.1 Office: Contractor field office permitted by owner and to be supplied by contractor.

.2 Provide appropriate facilities for workers.

.3 Locate offices and sheds a minimum distance of 9.0 m from existing and new structures.

1.20 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

.1 Remove temporary utilities, equipment, facilities, materials, and prior to Substantial Completion inspection.

.2 Remove underground installations to a minimum depth of 600 mm. Grade site as indicated.

.3 Clean and repair damage caused by installation or use of temporary work.

1.21 SECURITY PROGRAM

.1 Protect Work from theft, vandalism, and unauthorized entry.

1.22 ENTRY CONTROL

.1 Restrict entrance of persons and vehicles into Project site.

.2 Allow entrance only to authorized persons with proper identification.

1.23 RESTRICTIONS

.1 Do not allow cameras on site or photographs taken except by written approval of Owner.

PART 2 Products

Not Used

PART 3 Execution

.1 Not Used

END OF SECTION

PART 1 General

1.1 REQUIREMENTS INCLUDED

.1 Products.

.2 Product options.

1.2 RELATED REQUIREMENTS

.1 Document 00205 - Instructions to Bidders: Product options and substitution procedures.

.2 Section 01400 - Quality Requirements: Product quality monitoring.

1.3 PRODUCTS

.1 Do not use materials, Products, or equipment removed from existing premises, except as specifically permitted by the Contract Documents.

.2 Provide interchangeable components of the same manufacture for components being replaced with permission of owner and consultant.

1.4 PRODUCT OPTIONS

.1 Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.

.2 Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.

.3 Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not listed along with all relevant data.

PART 2 Products

.1 Not Used

PART 3 Execution

.1 Not Used

END OF SECTION

PART 1 General

1.1 REQUIREMENTS INCLUDED

.1 Examination.

.2 Preparation.

.3 Field engineering.

.4 Cutting and patching.

.5 Transportation and handling.

.6 Storage and protection.

.7 Closeout procedures.

.8 Final cleaning.

.9 Adjusting.

.10 Project record documents.

.11 Operation and maintenance data.

.12 Spare parts and maintenance Products.

.13 Warranties.

.14 Maintenance service.

.15 Starting systems.

.16 Demonstration and instructions.

.17 Testing, adjusting, and balancing.

1.2 RELATED REQUIREMENTS

.1 Section 01400 - Quality Requirements: Manufacturers field reports.

.2 Section 01500 - Temporary Facilities and Controls: Progress cleaning.

.3 Section 01700 - Execution Requirements: System start-up, testing, adjusting, and balancing; system operation and maintenance data and extra materials.

1.3 EXAMINATION

.1 Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

.2 Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

.3 Examine and verify specific conditions described in individual specification sections.

.4 Verify that utility services are available, of the correct characteristics, and in the correct locations.

1.4 PREPARATION

.1 Clean substrate surfaces prior to applying next material or substance.

.2 Seal cracks or openings of substrate prior to applying next material or substance.

.3 Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

1.5 FIELD ENGINEERING

.1 Employ a Land Surveyor registered in the Province of Owner and acceptable to Owner.

.2 Contractor shall locate and protect survey control and reference points.

.3 Control datum for survey is that shown on Drawings.

.4 Verify set-backs and easements; confirm drawing dimensions and elevations.

.5 Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

.6 Submit a copy of site drawing signed by the Land Surveyor that the elevations and locations of the Work are in conformance with the Contract Documents.

1.6 CUTTING AND PATCHING

.1 Employ skilled and experienced installer to perform cutting and patching.

.2 Submit written request in advance of cutting or altering elements which affect:

- .1 Structural integrity of element.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of element.
- .4 Visual qualities of sight exposed elements.
- .5 Work of Owner or separate contractor.

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

- .1 Fit the several parts together, to integrate with other Work.
- .2 Uncover Work to install or correct ill-timed Work.
- .3 Remove and replace defective and non-conforming Work.
- .4 Remove samples of installed Work for testing.

.5 Provide openings in elements of Work for penetrations of mechanical and electrical Work.

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

.5 Cut masonry and concrete materials using masonry saw or core drill.

.6 Restore Work with new Products in accordance with requirements of Contract Documents.

.7 Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.8 Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

.9 Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

.10 Identify hazardous substances or conditions exposed during the Work to the Consultant for decision or remedy.

1.7 TRANSPORTATION AND HANDLING

.1 Transport and handle Products in accordance with manufacturer's instructions.

.2 Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.

.3 Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

1.8 STORAGE AND PROTECTION

.1 Store and protect Products in accordance with manufacturers' instructions.

.2 Store with seals and labels intact and legible.

.3 Store sensitive Products in weather tight, climate controlled, enclosures in an environment favourable to Product.

.4 For exterior storage of fabricated Products, place on sloped supports above ground.

.5 Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.

.6 Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

.7 Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.

.8 Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

1.9 CLOSEOUT PROCEDURES

.1 Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Consultant's review.

.2 Provide submittals to Owner that are required by governing or other authorities.

.3 Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.10 FINAL CLEANING

.1 Execute final cleaning prior to final project assessment.

.2 Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

.3 Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

.4 Replace filters of operating equipment.

.5 Clean debris from roofs, gutters, downspouts, and drainage systems.

.6 Clean site; sweep paved areas, rake clean landscaped surfaces.

.7 Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.11 ADJUSTING

.1 Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.12 PROJECT RECORD DOCUMENTS

.1 Maintain on site one set of the following record documents; record actual revisions to the Work:

- .1 Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Change Orders and other modifications to the Contract.
- .5 Reviewed Shop Drawings, Product Data, and Samples.
- .6 Manufacturer's instruction for assembly, installation, and adjusting.

.2 Ensure entries are complete and accurate, enabling future reference by Owner.

.3 Store record documents separate from documents used for construction.

.4 Record information concurrent with construction progress.

.5 Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

.1 Manufacturer's name and product model and number.

.2 Product substitutions or alternates utilized.

.3 Changes made by Addenda and modifications.

.6 Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:

.1 Measured depths of foundations in relation to finish main 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 concealed in construction, referenced to visible and accessible features of the Work.

.4 Field changes of dimension and detail.

.5 Details not on original Contract drawings.

.7 Submit documents to Owner with claim for final Application for Payment.

1.13 OPERATION AND MAINTENANCE DATA

.1 Submit data bound in 8-1/2 x 11 inch text pages, **four** D side ring binders with durable plastic covers and CD with pdf copies of all data.

.2 Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project.

.3 Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

.4 Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, typed on 20 pound white paper, in three parts as follows:

.1 Part 1: Directory, listing names, addresses, and telephone numbers of Consultant, Contractor, Subcontractors, and major equipment suppliers.

.2 Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:

.1 Significant design criteria.

.2 List of equipment.

.3 Parts list for each component.

.4 Operating instructions.

.5 Maintenance instructions for equipment and systems.

.6 Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

.3 Part 3: Project documents and certificates, including the following:

.1 Shop drawings and product data.

.2 Air and water balance reports.

.3 Certificates.

.4 Originals of warranties and bonds.

.5 As-Built drawings in electronic and paper format.

.5 Submit 1 draft copy of completed volumes ten days prior to final inspection. This copy will be reviewed and returned, with owner comments. Revise content of all document sets as required prior to final submission.

.6 Submit three sets of revised final volumes, within 10 days after final inspection.

1.14 SPARE PARTS AND MAINTENANCE PRODUCTS

.1 Provide spare parts, maintenance, and extra Products in quantities specified in individual specification sections.

.2 Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

1.15 WARRANTIES

.1 Provide duplicate notarized copies.

.2 Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

.3 Provide Table of Contents and assemble in three D side ring binder with durable plastic cover.

.4 Submit prior to final Application for Payment.

.5 For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

1.16 MAINTENANCE SERVICE

.1 Furnish service and maintenance of components indicated in specification sections for one year from date of Substantial Completion.

.2 Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

.3 Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

.4 Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

1.17 STARTING SYSTEMS

.1 Coordinate schedule for start-up of various equipment and systems.

.2 Notify Owner seven days prior to start-up of each item.

.3 Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

.4 Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

.5 Verify that wiring and support components for equipment are complete and tested.

.6 Execute start-up under supervision of applicable manufacturer's representative and Contractors' personnel in accordance with manufacturers' instructions.

.7 When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

.8 Submit a written report in accordance with Section 01300 that equipment or system has been properly installed and is functioning correctly.

1.18 DEMONSTRATION AND INSTRUCTIONS

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

1.19 TESTING, ADJUSTING, AND BALANCING

.1 Not used.

PART 2 Products

.1 Not Used

PART 3 Execution

.1 Not Used

END OF SECTION

PART 1 General

1.1 REQUIREMENTS INCLUDED

.1 Demolition of designated structures and removal of materials from site.

.2 Demolition and removal of foundations and slabs-on-grade.

.3 Disconnecting and capping of identified utilities.

.4 Removal of underground tanks and piping.

1.2 RELATED REQUIREMENTS

.1 Section 01500 - Temporary Facilities and Controls:

.2 Section 01600 - Product Requirements.

.3 Section 01700 - Execution Requirements: Project record documents.

.4 Section 1960 – Selective Demolition

1.3 PROJECT RECORD DOCUMENTS

.1 Submit to Section 01700.

.2 Accurately record actual locations of capped utilities, subsurface obstructions, and rail lines.

1.4 REGULATORY REQUIREMENTS

.1 Conform to applicable code for demolition of structures, safety of adjacent structures, dust control, runoff control, and disposal.

.2 Obtain required permits from authorities.

.3 Notify affected utility companies before starting work and comply with their requirements.

.4 Do not close or obstruct roadways, sidewalks, hydrants without permits.

.5 Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.

.6 Test soils around buried tanks for contamination.

1.5 SEQUENCING

.1 Sequence work to requirements of Section 01100.

1.6 SCHEDULING

.1 Schedule work to requirements of Section 01300.

.2 Schedule Work to coincide with new construction.

.3 Describe demolition removal procedures and schedule.

PART 2 Products

2.1 FILL MATERIALS

.1 Fill Material: Type Granular 'A' fill, specified in Section 02060.

.2 Fill Material: Type Granular 'B' fill, specified in Section 02060.

PART 3 Execution

3.1 PREPARATION

.1 Provide, erect, and maintain temporary barriers and security devices at locations indicated.

.2 Protect existing appurtenances and structures, which are not to be demolished.

.3 Prevent movement or settlement of adjacent structures. Provide bracing and shoring.

.4 Mark location of utilities.

3.2 DEMOLITION REQUIREMENTS

.1 Conduct demolition to minimize interference with adjacent structures and occupancies.

.2 Cease operations immediately if adjacent structures appear to be in danger. Notify Owner or Consultant. Do not resume operations until directed.

.3 Conduct operations with minimum interference to plant accesses. Maintain egress and access at all times.

.4 Sprinkle Work with water to minimize dust. Provide hoses and water connections for this purpose.

3.3 DEMOLITION

.1 Disconnect, remove and cap designated utilities within demolition areas.

.2 Remove concrete slabs on grade.

.3 Remove materials to be re-installed or retained in manner to prevent damage. Store and protect in accordance with requirements of Section 02316.

.4 Backfill areas excavated caused as a result of demolition, in accordance with Section 02320.

.5 Rough grade and compact areas affected by demolition to maintain site grades.

.6 Remove demolished materials from site.

.7 Do not burn or bury materials on site. Leave site in clean condition.

.8 Remove temporary work.

END OF SECTION

PART 1 General

1.1 REQUIREMENTS INCLUDED

.1 Alteration project procedures.

.2 Removal of designated building equipment and fixtures.

.3 Removal of designated construction.

.4 Disposal of materials.

.5 Identification of utilities.

.6 Refer to items as indicated.

1.2 RELATED REQUIREMENTS

.1 Section 01100 - Summary:

.2 Section 01500 - Temporary Facilities and Controls

.3 Section 01700 - Execution Requirements: Project record documents.

.4 Section 01950 - Demolition.

1.3 ALTERATION PROJECT PROCEDURES

.1 Materials: As specified in Product sections or drawings; match existing Products and work for patching and extending work.

.2 Employ skilled and experienced installer to perform alteration work.

.3 Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.

.4 Remove, cut, and patch Work in a manner to minimize damage and to provide means of restoring Products and finishes to original or specified condition.

.5 Refinish existing visible surfaces to remain in renovated rooms and spaces, to renewed condition for each material, with a neat transition to adjacent finishes.

.6 Where new Work abuts or aligns with existing, provide a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

.7 When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and submit recommendation to Consultant for review.

.8 Where a change of plane of ¼ inch or more occurs, submit recommendation for providing a smooth transition; to Consultant for review.

.9 Patch or replace portions of existing surfaces which are damaged, lifted, discoloured, or showing other imperfections.

.10 Finish surfaces as specified in individual Product sections.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01300: Procedures for submittals.

.2 Shop Drawings: Indicate demolition and removal sequence and location of salvageable items; location and construction of temporary work.

1.5 SUBMITTALS FOR CLOSEOUT

.1 Section 01700: Procedures for submittals.

.2 Project Record Documents: Accurately record actual locations of capped utilities and subsurface obstructions.

1.6 REGULATORY REQUIREMENTS

.1 Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection.

.2 Obtain required permits from authorities.

.3 Do not close or obstruct egress width to any building or site exit.

.4 Do not disable or disrupt building fire or life safety systems without 3 days prior written notice to Owner.

.5 Conform to procedures applicable when hazardous or contaminated materials are discovered.

1.7 SCHEDULING

.1 Section 01300: Work schedule.

.2 Schedule Work to coincide with new construction.

.3 Describe demolition removal procedures and schedule.

.4 Coordinate timing with owner for all noisy, malodorous, dusty or obstructive work:

1.8 PROJECT CONDITIONS

.1 Conduct demolition to minimize interference with adjacent and occupied building areas.

.2 Cease operations immediately if structure appears to be in danger and notify Consultant. Do not resume operations until directed.

PART 2 Products

Not Used

PART 3 Execution

3.1 PREPARATION

.1 Provide, erect, and maintain temporary barriers at locations indicated of the work.

.2 Erect and maintain weatherproof closures for exterior openings.

.3 Erect and maintain temporary partitions to prevent spread of dust, odours, and noise to permit continued Owner occupancy.

.4 Protect existing materials which are not to be demolished.

.5 Prevent movement of structure; provide bracing and shoring.

.6 Notify affected utility companies before starting work and comply with their requirements.

.7 Mark location and termination of utilities.

.8 Provide appropriate temporary signage including signage for exit or building egress.

3.2 DEMOLITION

.1 Disconnect, remove, cap, and identify designated utilities within demolition areas.

.2 Demolish in an orderly and careful manner. Protect existing supporting structural members, utilities and finishes.

.3 Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.

.4 Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.

.5 Remove temporary Work.

3.3 SCHEDULES

.1 Owner will remove and keep the following material and equipment:

.1 Furniture and office equipment

END OF SECTION

PART 1 General

1.1 SECTION INCLUDES

.1 Excavating for slabs-on-grade, and foundations.

1.2 RELATED SECTIONS

.1 Section 01400 - Quality Requirements: Inspection of bearing surfaces.

.2 Section 01500 - Construction Facilities and Temporary Controls: Dewatering of excavations and water control.

.3 Section 02320 - Backfilling.

1.3 FIELD MEASUREMENTS

.1 Verify that survey benchmark and intended elevations for the Work are as indicated.

PART 2 Products

Not Used.

PART 3 Execution

3.1 PREPARATION

.1 Identify required lines, levels, contours, and datum locations.

.2 Protect benchmarks, survey control points, existing structures, fences, from excavating equipment and vehicular traffic.

3.2 EXCAVATING

.1 Excavate subsoil to accommodate foundations, trenching, and slabs-on-grade.

.2 Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity; perform compaction in accordance with Section 02320.

.3 Do not interfere with 45 degree bearing splay of foundations.

.4 Hand trim excavation. Remove loose matter.

.5 Notify Consultant of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

.6 Correct areas over excavated in accordance with Section 02320.

.7 Remove excavated material from site.

3.3 FIELD QUALITY CONTROL

.1 Section 01400 - Quality Requirements: Field inspection and testing.

.2 Provide for visual inspection of bearing surfaces.

3.4 PROTECTION

.1 Prevent displacement or loose soil from falling into excavation; maintain soil stability.

.2 Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

END OF SECTION

PART 1 General

1.1 SECTION INCLUDES

.1 Excavating trenches for utilities from five [5] feet outside building to main lines or for municipal utilities.

.2 Compacted fill from top of utility bedding to subgrade elevations.

.3 Backfilling and compaction.

1.2 RELATED SECTIONS

.1 Section 01400 - Quality Requirements: Testing fill compaction.

.2 Section 01500 - Temporary Facilities and Controls: Water control in excavations.

.3 Section 02055 - Soil Materials.

.4 Section 02060 - Aggregate Materials.

.5 Section 02311 - Rough Grading: Topsoil and subsoil removal from site surface.

.6 Section 02320 - Backfilling: General backfilling.

1.3 REFERENCES

.1 AASHTO T180 - Moisture-Density Relations of Soils Using a 4.54 kg Rammer and a 457 mm Drop.

.2 ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D698 - Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN/m³ (12,400 ft - lb/ft³)).

.4 ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.

.5 ASTM D1557 - Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (2,700 kN - m/m³ (56,000 ft - lb/ft³)).

.6 ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

.7 ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

.8 ASTM D3017 - Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.4 DEFINITIONS

.1 Utility: Any buried pipe, duct, conduit, or cable.

1.5 FIELD MEASUREMENTS

.1 Verify that survey bench mark, control point, and intended elevations for the Work are as shown on drawings.

1.6 COORDINATION

.1 Coordinate work to Section 01300.

.2 Verify work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 Products

2.1 FILL MATERIALS

.1 Fill Type Granular 'B'.

.2 Structural Fill Type Granular 'A'.

.3 Concrete: Lean concrete with a compressive strength of 10 MPa.

2.2 ACCESSORIES

.1 Geotextile Fabric: Non-biodegradable, woven.

.2 Filter Fabric: Non-biodegradable, woven.

PART 3 Execution

3.1 PREPARATION

.1 Identify required lines, levels, contours, and datum locations.

.2 Protect plant life, lawns and other features remaining as a portion of final landscaping.

.3 Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

.4 Maintain and protect above and below grade utilities which are to remain.

.5 Identify areas of subgrade not capable of compaction in place using procedure in the soils investigation report. Follow procedure for required subexcavation called for in the soils investigation report.

3.2 EXCAVATING

.1 Excavate subsoil required for utilities to municipal utilities.

.2 Cut trenches sufficiently wide to enable installation and allow inspection. Remove water or materials that interfere with Work.

.3 Do not interfere with 45 degree bearing splay of foundations.

.4 Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

.5 Remove lumped subsoil, boulders, and rock.

.6 Correct areas over excavated in accordance with Section 02320.

.7 Stockpile excavated material in area designated on site and remove excess material not being used.

3.3 BACKFILLING

.1 Backfill trenches to contours and elevations with unfrozen fill materials.

.2 Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

.3 Granular Fill: Place and compact materials in equal continuous layers not exceeding 12 inches compacted depth.

.4 Employ a placement method that does not disturb or damage utilities in trench.

.5 Maintain optimum moisture content of fill materials to attain required compaction density.

.6 Remove surplus fill materials from site.

.7 Leave fill material stockpile areas completely free of excess fill materials.

3.4 TOLERANCES

.1 Top Surface of Backfilling under Paved Areas 25 mm from required elevations.

.2 Top Surface of General Backfilling: Plus or minus 1inch from required elevations.

3.5 FIELD QUALITY CONTROL

.1 Section 01400 - Quality Requirements: Field inspection and testing.

.2 Compaction testing will be performed in accordance with ASTM D1556

.3 If tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest.

.4 Frequency of Tests: By Inspection Company

3.6 PROTECTION OF FINISHED WORK

.1 Protect finished Work to Section 01300.

.2 Reshape and re-compact fills subjected to vehicular traffic during construction.

END OF SECTION

PART 1 General

1.1 SECTION INCLUDES

.1 Building perimeter and site structure backfilling to subgrade elevations.

.2 Site filling and backfilling.

.3 Fill under slabs-on-grade.

.4 Consolidation and compaction as scheduled.

1.2 RELATED SECTIONS

.1 Document 00320 - Subsurface Investigation Report: Geotechnical report; bore hole locations and findings of subsurface materials.

.2 Section 01200 - Price and Payment Procedures: Requirements applicable to unit prices for the work of this section.

.3 Section 01400 - Quality Requirements: Compaction testing.

.4 Section 02316 - Excavating.

.5 Section 02317 - Trenching: Backfilling of utility trenches.

.6 Section 03300 - Cast-in-Place Concrete: Concrete materials.

1.3 REFERENCES

.1 AASHTO T180 - Moisture-Density Relations of Soils Using a 10 lb Rammer and an 18 inch Drop.

.2 ASTM D698 - Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft - lb/ft^3).

.3 ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.

.4 ASTM D1557 - Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft - lb/ft^3).

.5 ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

.6 ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

.7 ASTM D3017 - Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

PART 2 Products

2.1 FILL MATERIALS

.1 Existing granular material as approved by soil consultant.

.2 Fill Type Granular ‘B’.

.3 Structural Fill Type Granular ‘A’.

.4 Concrete: Lean concrete conforming to Section 03300 with a compressive strength of 10 MPa.

PART 3 Execution

3.1 EXAMINATION

.1 Verify structural ability of unsupported walls to support imposed loads by the fill.

3.2 PREPARATION

.1 Compact subgrade to density requirements for subsequent backfill materials.

.2 Cut out soft areas of subgrade not capable of compaction in place. Backfill with Type Granular ‘B’ fill and compact to density equal to or greater than requirements for subsequent fill material.

.3 Scarify and proof roll subgrade surface to a depth of 12 inches to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.3 BACKFILLING

.1 Backfill areas to contours and elevations with unfrozen materials.

.2 Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

.3 Granular Fill: Place and compact materials in equal continuous layers not exceeding 12 inches compacted depth.

.4 Employ a placement method that does not disturb or damage other work.

.5 Maintain optimum moisture content of backfill materials to attain required compaction density.

.6 Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

.7 Make gradual grade changes. Blend slope into level areas.

.8 Remove surplus backfill materials from site.

.9 Leave fill material stockpile areas free of excess fill materials.

3.4 TOLERANCES

.1 Top Surface of Backfilling: Plus or minus ½ inch from required elevations.

.2 Top Surface of General Backfilling: Plus or minus ½ inch from required elevations.

3.5 FIELD QUALITY CONTROL

.1 Section 01400 - Quality Requirements: Field inspection and testing.

.2 Compaction testing will be performed in accordance with ASTM D1556

.3 If tests indicate Work does not meet specified requirements, remove Work, replace and retest.

.4 Proof roll compacted fill surfaces under slabs-on-grade, and press foundation

3.6 PROTECTION OF FINISHED WORK

.1 Protect finished Work to Section 01300.

.2 Reshape and re-compact fills subjected to vehicular traffic.

END OF SECTION

PART 1 General

1.1 SECTION INCLUDES

.1 Formwork for cast-in place concrete, with shoring, bracing and anchorage.

.2 Openings for other work.

.3 Form accessories.

.4 Form stripping.

1.2 RELATED SECTIONS

.1 Section 03200 - Concrete Reinforcement.

.2 Section 03300 - Cast-in-Place Concrete: Supply of concrete accessories for placement by this section.

.3 Section 05500 - Metal Fabrications: Supply of metal fabrications for placement by this section.

1.3 REFERENCES

.1 ACI 301 - Structural Concrete.

.2 ACI 318 - Building Code Requirements for Structural Concrete and Commentary.

.3 ACI 347 - Guide to Formwork for Concrete.

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

.5 CAN/CSA-O86.1 - Engineering Design in Wood (Limit States Design).

.6 CSA O151 - Canadian Softwood Plywood.

.7 CAN/CSA O188.0 - Standard Test Methods for Mat-Formed Wood Particleboards and Waferboard.

.8 CSA O437 Series - Standards on OSB and Waferboard.

.9 CSA S269.1 - Falsework for Construction Purposes.

.10 CAN/CSA-S269.3 - Concrete Formwork.

.11 COFI (Council of Forest Industries of British Columbia) - Exterior Plywood for Concrete Formwork.

.12 PS 1 - Construction and Industrial Plywood.

1.4 DESIGN REQUIREMENTS

.1 Design, engineer and construct formwork, shoring and bracing to conform to code requirements; resultant concrete to conform to required shape, line and dimension.

.2 Conform to CSA S269.1 and CSA S269.3.

1.5 DRAWINGS

.1 Shop Drawings:

.1 Maintain on site for reference by consultant or owner.

.2 Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.

.3 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts.

.4 Comply with CSA S269.1, for falsework drawings and CAN/CSA-S269.3 for form work drawings.

.5 Each shop drawing shall bear stamp and signature of qualified Professional Engineer registered or licensed in Province of Ontario, Canada.

.2 Product Data: Maintain on site data on void form materials and installation requirements.

1.6 QUALITY ASSURANCE

.1 Perform Work in accordance with CAN/CSA-O86.1 standards.

1.7 DELIVERY, STORAGE, AND PROTECTION

.1 Transport, handle, store, and protect products.

.2 Deliver void forms and installation instructions in manufacturer's packaging.

.3 Store off ground in ventilated and protected manner to prevent deterioration from moisture.

PART 2 Products

2.1 WOOD FORM MATERIALS

.1 Form Materials: At the discretion of the Contractor.

2.2 FORMWORK ACCESSORIES

.1 Form Ties: Snap-off type, galvanized metal, adjustable length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch in concrete surface.

.2 Form Release Agent:

.1 Colourless mineral oil which will not stain concrete, or absorb moisture.

.2 Non-toxic, biodegradable, low VOC.

.3 Form Stripping Agent: Colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene.

.4 Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

.5 Waterstops: Preformed mineral colloid strips, 3/8 thick, moisture expanding.

PART 3 Execution

3.1 EXAMINATION

.1 Verify lines, levels and centres before proceeding with formwork.

.2 Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

.1 Earth forms with approval of the owner.

3.3 ERECTION - FORMWORK

.1 Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

.2 Fabricate and erect false work in accordance with CSA S269.1.

.3 Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

.4 Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

.5 Align joints and make watertight. Keep form joints to a minimum.

.6 Obtain approval before framing openings in structural members which are not indicated on Drawings.

.7 Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.

.8 Coordinate this section with other sections of work which require attachment of components to formwork.

.9 If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Consultant.

3.4 APPLICATION - FORM RELEASE AGENT

.1 Apply form release agent on formwork in accordance with manufacturer's recommendations.

.2 Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

.3 Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

.1 Provide formed openings where required for items to be embedded in passing through concrete work.

.2 Locate and set in place items which will be cast directly into concrete.

.3 Coordinate with work of other sections in forming and placing openings, slots, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

.4 Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.

.5 Install waterstops in accordance with manufacturer's instructions continuous without displacing reinforcement. Heat seal joints watertight.

.6 Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

.7 Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.6 FORM CLEANING

.1 Clean forms as erection proceeds, to remove foreign matter within forms.

.2 Clean formed cavities of debris prior to placing concrete.

.3 Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

.4 During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.7 FORMWORK TOLERANCES

.1 Construct formwork to maintain tolerances required by ACI 301.

3.8 FIELD QUALITY CONTROL

.1 Section 01400: Field inspection and testing.

.2 Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

3.9 FORM REMOVAL

.1 Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

.2 Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

.3 Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

END OF SECTION

PART 1 General

1.1 SECTION INCLUDES

.1 Reinforcing steel bars, wire fabric and accessoriesF for cast-in-place concrete.

1.2 RELATED SECTIONS

.1 Section 03100 - Concrete Forms.

.2 Section 03300 - Cast-in-Place Concrete.

.3 Section 03355 - Concrete Floor Finishing: Reinforcement for concrete floor toppings.

1.3 REFERENCES

.1 ACI 301 - Structural Concrete.

.2 ACI 318 - Building Code Requirements For Structural Concrete and Commentary.

.3 ACI SP-66 - American Concrete Institute - Detailing Manual.

.4 ASTM A82 - Steel Wire, Plain, for Concrete Reinforcement.

.5 ASTM A184/A184M - Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.

.6 ASTM A185 - Steel Welded Wire Reinforcement, Plain, for Concrete.

.7 ASTM A496 - Steel Wire, Deformed, for Concrete Reinforcement.

.8 ASTM A497 - Steel Welded Wire Reinforcement, Deformed, for Concrete.

.9 ASTM A615/A615M - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

.10 ASTM A704/A704M - Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.

.11 ASTM A706 - Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.

.12 ASTM A767/A767M - Zinc-Coated (Galvanized) Bars for Concrete Reinforcement.

.13 ASTM A775/A775M - Epoxy-Coated Reinforcing Steel Bars.

.14 ASTM D3963D3963M - Fabrication and jobsite handling of Epoxy-Coated Steel Reinforcing Bars.

.15 AWS (American Welding Society) D1.1 - Structural Welding Code -Steel.

.16 AWS (American Welding Society) D12.1 - Welding Reinforcement Steel, Metal Inserts and Connections in Reinforced Concrete Construction.

.17 CRSI - Concrete Reinforcing Steel Institute - Manual of Practice.

.18 CRSI 63 - Recommended Practice For Placing Reinforcing Bars.

.19 CRSI 65 - Recommended Practice For Placing Bar Supports, Specifications and Nomenclature.

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

.21 CAN3-A23.3 - Design of Concrete Structures.

.22 CSA G30.3 - Cold-Drawn Steel Wire for Concrete Reinforcement.

.23 CSA G30.5 - Welded Steel Wire Fabric for Concrete Reinforcement.

.24 CSA G30.14 - Deformed Steel Wire for Concrete Reinforcement.

.25 CSA G30.15 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.

.26 CAN/CSA-G30.18 - Billet-Steel Bars for Concrete Reinforcement.

.27 CAN/CSA-G40.21 - Structural Quality Steels.

.28 CAN/CSA-G164 - Hot Dip Galvanizing of Irregularly Shaped Articles.

.29 CSA W186 - Welding of Reinforcing Bars in Reinforced Concrete Construction.

.30 RSIC (Reinforcing Steel Institute of Canada) - Reinforcing Steel Manual of Standard Practice.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01300: Procedures for submittals.

.2 Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel and wire fabric, bending and cutting schedules, and supporting and spacing devices.

.3 Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada.

.4 Detail lap lengths and bar development lengths to CAN3-A23.3.

1.5 SUBMITTALS FOR INFORMATION

.1 Section 01300: Procedures for submittals.

.2 Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

.3 Submit certified copies of mill test report of reinforcement materials analysis.

1.6 QUALITY ASSURANCE

.1 Perform Work in accordance with CRSI 63, 65 and Manual of Practice

PART 2 Products

2.1 REINFORCEMENT

.1 Reinforcing Steel: CAN/CSA-G30.18, billet steel, Grade 400, deformed bars, weldable low alloy bars, unfinished.

.2 Welded Steel Wire Fabric: CSA G30.14 - Deformed steel wire, CSA G30.15 - Welded deformed steel wire.

2.2 ACCESSORIES

.1 Tie Wire: Minimum 16 gauge annealed type.

.2 Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapour barrier puncture.

.3 Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel type; size and shape as required.

2.3 FABRICATION

.1 Fabricate concrete reinforcing in accordance with:

.1 CAN/CSA-A23.1.

.2 RSIC - Reinforcing Steel Manual of Standard Practice.

.2 Locate reinforcing splices not indicated on drawings, at point of minimum stress.

PART 3 Execution

3.1 PLACEMENT

.1 Place, support and secure reinforcement against displacement. Do not deviate from required position to CAN/CSA A23.1.

.2 Do not displace or damage vapour barrier.

.3 Accommodate placement of formed openings.

.1 Maintain concrete cover around reinforcing as per drawings.

3.2 FIELD QUALITY CONTROL

.1 Section 01400: Field inspection and testing.

.2 Inspect for acceptability.

END OF SECTION

PART 1 General

1.1 SECTION INCLUDES

.1 Cast-in-place concrete floors, foundation walls.

.2 Floors and slabs on grade.

.3 Control, expansion and contraction joint devices associated with concrete work.

1.2 RELATED SECTIONS

.1 Section 03100 - Concrete Formwork: Formwork and accessories.

.2 Section 03200 - Concrete Reinforcement.

.3 Section 03355 - Concrete Floor Finishing.

.4 Section 03390 - Concrete Curing.

1.3 REFERENCES

.1 ACI 211.1 - Selecting Proportions for Normal, Heavyweight, and Mass Concrete.

.2 ACI 211.2 - Selecting Proportions for Structural Lightweight Concrete.

.3 ACI 301 - Structural Concrete.

.4 ACI 302 - Guide for Concrete Floor and Slab Construction.

.5 ACI 304 - Guide for Measuring, Mixing, Transporting and Placing Concrete.

.6 ACI 305R - Hot Weather Concreting.

.7 ACI 306R - Cold Weather Concreting.

.8 ACI 308 - Guide to Curing Concrete.

.9 ACI 318 - Building Code Requirements for Structural Concrete and Commentary.

.10 ASTM B221/B221M - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

.11 ASTM C33 - Concrete Aggregates.

.12 ASTM C94/C94M - Ready-Mix Concrete.

.13 ASTM C150 - Portland Cement.

.14 ASTM C260 - Air Entraining Admixtures for Concrete.

.15 ASTM C330 - Light Weight Aggregates For Structural Concrete.

.16 ASTM C332 - Lightweight Aggregates For Insulating Concrete.

.17 ASTM C494/C494M - Chemical Admixtures for Concrete.

.18 ASTM C618 - Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

.19 ASTM C827 - Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.

.20 ASTM C948 - Test Method for Dry and Wet Bulk Density, Water Absorption and Apparent Porosity of Thin Sections of Glass-Fiber-Reinforced Concrete.

.21 ASTM D412 -Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.

.22 ASTM D624 - Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.

.23 ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type).

.24 ASTM D1190 - Concrete Joint Sealer, Hot-Poured Elastic Type.

.25 ASTM D1751 - Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

.26 ASTM D1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

.27 CAN/CSA A5 - Portland Cement.

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

.29 CAN/CSA A23.2 - Methods of Test for Concrete.

.30 CAN/CSA A23.5 - Cementitious Materials Compendium.

.31 CAN/CSA A363 - Cementitious Materials Compendium.

1.4 SUBMITTALS FOR INFORMATION

.1 Section 01300: Procedures for submittals.

.2 Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent Work.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

.1 Section 01700: Procedures for submittals.

.2 Accurately record actual locations of embedded utilities and components which are concealed from view.

1.6 QUALITY ASSURANCE

.1 Perform Work in accordance with ACI 301.

.2 Acquire cement and aggregate from same source for all work.

.3 Conform to ACI 305R when concreting during hot weather.

.4 Conform to ACI 306R when concreting during cold weather.

PART 2 Products

2.1 CONCRETE MATERIALS

.1 Portland Cement: CAN/CSA-A5, Type III, Natural colour.

.2 Portland Cement: ASTM C150, Type III - High Early Strength Natural colour.

.3 Fine and Coarse Aggregates: CAN/CSA-A23.1

.4 Water: CAN/CSA-A23.1, clean and not detrimental to concrete.

2.2 ADMIXTURES

.1 Air Entrainment: ASTM C260.

2.3 ACCESSORIES

.1 Shrinkage Compensating Grout: Premixed compound consisting of metallic non-metallic aggregate, Portland cement, water reducing and plasticizing agents.

- .1 Compressive strength: 32 MPa at 28 days.
- .2 Consistency:
  - .1 Fluid: to ASTM C827. Time of efflux through flow cone (ASTM C939), under 30 s.
  - .2 Flowable: to ASTM C827. Flow table, 5 drops in 3 s, (ASTM C109, applicable portion) 125 to 145%.
  - .3 Plastic: to ASTM C827. Flow table, 5 drops in 3 s, (ASTM C109, applicable portions) 100 to 125 %.
  - .4 Dry pack to manufacturer's requirements.
- .3 Net shrinkage at 28 days: maximum 1 %.

.2 Non-Premixed Dry Pack Grout: Composition of non metallic aggregate, Portland cement with sufficient water for mixture to retain its shape when made into a ball by hand and capable of developing compressive strength of 48 MPa when measured at 28 days.

.3 Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 17 MPa in 48 hours and 48 MPa in 28 days.

2.4 JOINT DEVICES AND FILLER MATERIALS

.1 Joint Filler: Semi rigid epoxy filler (dural 337 or Equal). Install not less than 90 days after concrete placement.

.2 Ribbed Water Stops: Extruded PVC, Arctic Grade:

.1 Tensile Strength: ASTM D412, Method A, Die "C", minimum 13.94 MPa.

.2 Elongation: ASTM D412, Method A, Die "C", minimum 275%.

.3 Tear Resistance: ASTM D624, Method A, Die "B", minimum 14.6 kN/m.

.3 Sealant: Cold applied.

2.5 CONCRETE MIX

.1 Mix and deliver concrete in accordance with CAN/CSA-A23.1.

.2 Mix and deliver concrete in accordance with ASTM C94, Alternative No. 2.

.3 Use accelerating admixtures in cold weather only when approved by Consultant. Use of admixtures will not relax cold weather placement requirements.

.4 Use calcium chloride only when approved by Consultant.

.5 Use set retarding admixtures during hot weather only when approved by Consultant.

.6 Add air entraining agent to normal weight concrete mix for work exposed to exterior.

PART 3 Execution

3.1 EXAMINATION

.1 Verify site conditions to Section 01700.

.2 Verify requirements for concrete cover over reinforcement.

.3 Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.2 PREPARATION

.1 Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

.2 In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

.3 Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

3.3 PLACING CONCRETE

.1 Place concrete in accordance with CAN/CSA-A23.1.

.2 Notify Consultant minimum 24 hours prior to commencement of operations.

.3 Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.

.4 Water Stops.

.1 Install water stops to provide continuous water seal.

.2 Do not distort or pierce water stop in such a way as to hamper performance.

.3 Do not displace reinforcement when installing water stops.

.4 Use equipment to manufacturer's requirements to field splice water stops.

.5 Tie water stops rigidly in place.

.6 Use only straight heat sealed butt joints in field.

.7 Use factory welded corners and intersections.

.5 Separate slabs on grade from vertical surfaces with ½ inch thick joint filler.

.6 Extend joint filler from bottom of slab to within 1/8 inch of finished slab surface. Conform to Section 07900 for finish joint sealer requirements.

.7 Apply sealants in joint devices in accordance with Section 07900.

.8 Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

.9 Place concrete continuously between predetermined expansion, control, and construction joints.

.10 Do not interrupt successive placement; do not permit cold joints to occur.

.11 Place floor slabs in pattern indicated.

.12 Saw cut joints within 24 hours after placing. See drawings for size.

.13 Screed floors and slabs on grade level, maintaining surface flatness as per drawings.

3.4 CONCRETE FINISHING

.1 Provide a broom finish on all exterior concrete slabs unless concrete mix is fibre mesh.

.2 Finish fibre mesh mixes with a single machine float finish (power trowel fitted with magnesium float. Ensure finish is slip resistant..

3.5 CURING AND PROTECTION

.1 Cure exterior slabs with one coat of pigmented curing compound at a rate and method as recommended by manufacturer.

3.6 FIELD QUALITY CONTROL

.1 Section 01400 - Quality Requirement: Field inspection and testing.

.2 Provide free access to Work and cooperate with appointed firm.

.3 Submit proposed mix design to inspection and testing firm for review prior to commencement of Work.

.4 Tests of cement and aggregates may be performed to ensure conformance with specified requirements.

.5 Three concrete test cylinders will be taken for every 76 or less cu m of concrete placed.

.6 One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.

.7 One slump test will be taken for each set of test cylinders taken.

3.7 PATCHING

.1 Allow Consultant to inspect concrete surfaces immediately upon removal of forms.

.2 Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Consultant upon discovery.

.3 Patch imperfections as directed.

3.8 DEFECTIVE CONCRETE

.1 Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

.2 Repair or replacement of defective concrete will be determined by the Consultant.

.3 Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Consultant for each individual area.

END OF SECTION

PART 1 General

1.1 SECTION INCLUDES

.1 Finishing slabs-on-grade and monolithic floor slab and separate floor toppings.

.2 Surface treatment with concrete hardener and sealer.

1.2 RELATED SECTIONS

.1 Section 03300 - Cast-in-Place Concrete:

.2 Section 03390 - Concrete Curing.

1.3 REFERENCES

.1 ACI 301 - Structural Concrete.

.2 ACI 302 - Guide for Concrete Floor and Slab Construction.

.3 ASTM E1155/E1155M - Determining F Floor Flatness and F Floor Levelness Numbers.

1.4 SUBMITTALS

.1 Section 01300: Submission procedures.

.2 Product Data: Provide data on concrete hardener and sealer compatibilities and limitations.

1.5 MAINTENANCE DATA

.1 Section 01700: Submission procedures.

.2 Maintenance Data: Provide data on maintenance renewal of applied coatings

1.6 QUALITY ASSURANCE

.1 Perform Work in accordance with ACI 301.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, protect, and handle products to site.

.2 Deliver materials in manufacturer's packaging including application instructions.

1.8 ENVIRONMENTAL REQUIREMENTS

.1 Temporary Heat: Ambient temperature of 10 degrees C minimum.

.2 Ventilation: Sufficient to prevent injurious gases from temporary heat or other sources affecting concrete.

1.9 COORDINATION

.1 Section 01300: Coordinate work.

.2 Coordinate the work with concrete floor placement and concrete floor curing.

PART 2 Products

2.1 COMPOUNDS - HARDENERS AND SEALERS

.1 Hardener: See Drawings.

.2 Sealer: See Drawings.

PART 3 Execution

3.1 EXAMINATION

.1 Section 01700: Verify site conditions.

.2 Verify that floor surfaces are acceptable to receive the work of this section.

3.2 FLOOR FINISHING

.1 Finish concrete floor surfaces in accordance with ACI 301.

.2 Wood float surfaces which will receive ceramic tile with full bed setting system.

.3 Steel trowel surfaces which will receive carpeting and thin set ceramic tile.

.4 Steel trowel surfaces which are scheduled to be exposed.

.5 In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains as indicated on drawings.

3.3 FLOOR SURFACE TREATMENT

.1 Apply dry shake hardener to manufacturer's instructions on floor surfaces.

.2 Apply sealer to manufacturer's instructions on floor surfaces.

3.4 TOLERANCES

.1 Maximum Variation of Surface Flatness For Exposed Concrete Floors: See drawings.

.2 Correct defects in the defined traffic floor by grinding or removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

END OF SECTION

PART 1 General

1.1 SECTION INCLUDES

.1 Initial and final curing of horizontal and vertical concrete surfaces.

1.2 RELATED SECTIONS

.1 Section 03300 - Cast-In-Place Concrete.

.2 Section 03355 - Concrete Floor Finishing.

1.3 REFERENCES

.1 ACI 301 - Structural Concrete.

.2 ACI 302 - Recommended Practice for Concrete Floor and Slab Construction.

.3 ACI 308 - Guide to Curing Concrete.

.4 ASTM C171 - Sheet Materials for Curing Concrete.

.5 ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

.6 ASTM D2103 - Polyethylene Film and Sheeting.

1.4 SUBMITTALS

.1 Submit to Section 01300.

.2 Product Data: Provide data on curing compounds compatibilities, and limitations.

1.5 QUALITY ASSURANCE

.1 Perform Work in accordance with ACI 301.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, protect, and handle products.

.2 Deliver curing materials in manufacturer's packaging including application instructions.

PART 2 Products

2.1 MATERIALS

.1 Water: Potable, not detrimental to concrete.

.2 Absorptive Mats burlap-polyethylene, minimum 270 grams/sq m bonded to prevent separation during handling and placing.

PART 3 Execution

3.1 EXAMINATION

.1 Verify substrate conditions to Section 01300.

.2 Verify that substrate surfaces are ready to be cured.

3.2 EXECUTION - HORIZONTAL SURFACES

.1 Cure floor surfaces in accordance with ACI 308.

.2 Use one of the following methods subject to owner approval.

- .1 Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.
- .2 Spraying: Spray water over floor slab areas and maintain wet for 7 days.
- .3 Absorptive Mat: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place for 7 days.
- .4 Plant areas only provide cure and seal membrane compatible with hardener and sealer approved by the owner.

3.3 EXECUTION - VERTICAL SURFACES

.1 Cure surfaces in accordance with ACI 308.

3.4 PROTECTION OF FINISHED WORK

.1 Protect finished Work to Section 01500.

.2 Do not permit traffic over unprotected floor surface.

END OF SECTION

PART 1 General

1.1 SECTION INCLUDES

.1 Structural floor, wall, and roof framing.

.2 Built-up structural beams and columns.

.3 Diaphragm trusses fabricated on site.

.4 Floor, wall, and roof sheathing.

.5 Sill gaskets and flashings.

.6 Preservative treatment of wood.

.7 Fire retardant treatment of wood.

.8 Miscellaneous framing and sheathing.

.9 Telephone and electrical panel back boards.

.10 Concealed wood blocking for support of toilet and bath accessories wall cabinets wood trim..

1.2 REFERENCES

.1 AHA (American Hardboard Association) A135.4 - Basic Hardboard.

.2 ALSC (American Lumber Standards Committee) - Softwood Lumber Standards.

.3 ANSI A208.1 - Mat-Formed Wood Particleboard.

.4 APA (American Plywood Association) Product Guide - Grades and Specifications.

.5 AWPA (American Wood Preservers Association) C1 - All Timber Products - Preservative Treatment by Pressure Process.

.6 AWPA (American Wood Preservers Association) C20 - Structural Lumber Fire Retardant Treatment by Pressure Process.

.7 NFPA (National Forest Products Association) - Grading Rules.

.8 RIS (Redwood Inspection Service): Standard Specifications for Grades of California Redwood Lumber.

.9 SPIB (Southern Pine Inspection Bureau) - Grading Rules.

.10 WCLIB (West Coast Lumber Inspection Bureau) - Grading Rules.

.11 WWPA (Western Wood Products Association) - Grading Rules.

1.3 SUBMITTALS FOR REVIEW

.1 Section 01300: Submission procedures.

.2 Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.

.3 Shop Drawings For Site Fabricated Truss Frame: Indicate dimensions, wood species and grades, component profiles, drilled holes, fasteners, connectors, erection details and sequence.

1.4 SUBMITTALS FOR INFORMATION

.1 Section 01300: Submission procedures.

.2 Manufacturer's Certificate: Certify that Products conform to specified requirements.

1.5 QUALITY ASSURANCE

.1 Perform Work in accordance with applicable codes and standards.

.2 Design structural site and shop fabricated trusses under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the Province of Ontario.

1.6 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01600: Transport, handle, store, and protect products.

.2 Protect trusses from warping or other distortion by stacking in vertical position, braced to resist movement.

PART 2 Products

2.1 LUMBER MATERIALS

.1 Lumber Grading Rules: NLGA

.2 All gravity load bearing and wind bearing framing to be Grade N0. 1/N0. 2 of SPF Species.

2.2 STRUCTURAL SHEATHING MATERIALS

.1 Plywood floor Sheathing: Douglas Fir Pywood of thickness noted on the drawings with CSA performance mark suitable for the span and use and support conditions of the sheathing.

.2 Plywood Wall Sheathing (shear walls): Douglas Fir Pywood of thickness noted on the drawings with CSA performance mark suitable for the span and use and support conditions of the sheathing. Wall sheathing to bear the mark W16.

PART 3 Execution

3.1 FRAMING

.1 Set structural members level and plumb, in correct position.

.2 Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

.3 Place horizontal members, crown side up.

.4 Construct load bearing framing and curb members full length without splices.

.5 Place sill gasket directly on cementitious foundation. Puncture gasket clean and fit tight to protruding foundation anchor bolts.

.6 Coordinate installation of wood decking, wood chord metal joists, prefabricated wood trusses, and plywood web joists.

.7 Coordinate curb installation with installation of decking and support of deck openings, roofing vapour retardant, parapet construction, and other items as required.

3.2 SHEATHING

.1 Secure roof sheathing with longer edge perpendicular to framing members and with ends staggered and sheet ends over bearing.

.2 Use sheathing clips between sheets between roof framing members ubless indicated as solid blocking on the drawings. Fully engage tongue and groove edges.

.3 Secure wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered.

.4 Secure subfloor sheathing with longer edge perpendicular to floor framing and with end joints staggered and sheet ends over bearing. Attach as required by joist designer or architectural drawings or specifications.

.5 Install plywood to two span continuous.

END OF SECTION

1. PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Requirements of the Contract Documents apply to work of this section.

1.1.2 Refer to Specification 01400 "Quality Requirements.

1.2 SUMMARY

1.2.1 This section includes the following:

A. Millwork complete with plastic-laminate countertops.

1.3 DEFINITIONS

1.3.1 Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

1.4 SUBMITTALS

1.4.1 Product data: For each type of product indicated, including cabinet hardware and accessories.

1.4.2 Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

A. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other sections.

B. Show locations and sizes of cutouts and holes for plumbing fixtures and other items installed in architectural woodwork.

1.5 QUALITY ASSURANCE

1.5.1 Fabricator qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program.

1.5.2 Installer qualifications: Fabricator of products.

1.5.3 Quality standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

A. Provide AWI Quality Certification Program labels indicating that woodwork, including installation, complies with requirements of grades specified.

1.6 DELIVERY, STORAGE, AND HANDLING

1.6.1 Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.7 PROJECT CONDITIONS

1.7.1 Environmental limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7.2 Field measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

A. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

B. Established dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

1.8.1 Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

2. PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

2.1.1 Wood Products: Comply with the following:

A. Particleboard: 720 kg/m^3 density conforming to CAN/CSA O188.1M, sanded face.

B. Softwood plywood: Douglas Fir conforming to CSA O121-M, G2S.

2.1.2 High-Pressure Decorative Laminate

A. NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.

B. Acceptable manufacturers: Subject to compliance with requirements, provide high-pressure decorative laminates by one of the following:

1. Formica Corporation.

2. Lamin-Art, Inc.

3. Nevamar Company, LLC; Decorative Products Div.

4. Wilsonart International; Division of Premark International, Inc.

2.2 CABINET HARDWARE AND ACCESSORIES

2.2.1 General: Provide cabinet hardware and accessory materials associated with architectural cabinets.

2.2.2 Frameless concealed hinges (European type): BHMA A156.9, B01602, 135 degrees of opening, self-closing.

2.2.3 Wire pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter.

2.2.4 Catches: Magnetic catches, BHMA A156.9, B03141.

2.2.5 Shelf rests: BHMA A156.9, B04013; metal, two-pin type with shelf hold-down clip.

2.2.6 Drawer slides: BHMA A156.9, B05091; side mounted and extending under bottom edge of drawer; full-extension type; epoxy-coated-steel with steel ball-bearings; of the following grades:

A. Box drawer slides: Grade 1HD-100.

2.2.7 Door locks: BHMA A156.11, E07121.

2.2.8 Exposed hardware finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

A. Bright chromium plated: BHMA 625 for brass or bronze base; BHMA 651 for steel base.

2.2.9 For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.3 MISCELLANEOUS MATERIALS

2.3.1 Furring, blocking, shims, and hanging strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

2.3.2 Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.4 PLASTIC-LAMINATE CABINETS

2.4.1 Grade: Custom.

2.4.2 AWI type of cabinet construction: Flush overlay.

2.4.3 Laminate cladding for exposed surfaces: High-pressure decorative laminate complying with the following requirements:

A. Horizontal surfaces other than tops: Grade HGS.

B. Postformed surfaces: Grade HGP.

C. Vertical surfaces: Grade HGS.

D. Edges: Grade HGS.

2.4.4 Materials for Semi-Exposed Surfaces:

A. Surfaces other than drawer bodies: High-pressure decorative laminate, Grade VGS.

1. Edges of plastic-laminate shelves: PVC tape, 0.018-inch minimum thickness, matching laminate in color, pattern, and finish.

2. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, Grade VGS.

B. Drawer sides and backs: Thermoset decorative panels.

C. Drawer bottoms: Thermoset decorative panels.

2.4.5 Concealed backs of panels with exposed plastic laminate surfaces: High-pressure decorative laminate, Grade BKL.

2.4.6 Colors, patterns, and finishes: As selected by Owner's Representative.

2.5 PLASTIC-LAMINATE COUNTERTOPS, SHELVES AND SILLS

2.5.1 Grade: Custom.

2.5.2 High-pressure decorative laminate grade: HGS.

2.5.3 Edge treatment: Same as laminate cladding on horizontal surfaces.

2.5.4 Core material: Particleboard or medium-density fiberboard; use plywood for sills.

2.5.5 Core material at sinks: Particleboard made with exterior glue.

2.5.6 Paper backing: Provide paper backing on underside of countertop substrate.

2.5.7 Colors, patterns, and finishes: As selected by Owner's Representative.

2.6 FABRICATION, GENERAL

2.6.1 Interior woodwork grade: Unless otherwise indicated, provide Custom-grade interior woodwork complying with referenced quality standard.

2.6.2 Wood moisture content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

2.6.3 Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

2.6.4 Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

A. Seal edges of openings in countertops with a coat of varnish.

2.7 SHOP FINISHING

2.7.1 Grade: Provide finishes of same grades as items to be finished.

2.7.2 General: Finish architectural woodwork at fabrication shop as specified in this section. Defer only final cleaning and polishing until after installation.

2.7.3 Preparation for finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.

A. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative panels.

3. PART 3 - EXECUTION

3.1 PREPARATION

3.1.1 Before installation, condition woodwork to average prevailing humidity conditions in installation areas.

3.1.2 Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

3.2.1 Grade: Install woodwork to comply with requirements for the same grade specified in PART 2 for fabrication of type of woodwork involved.

3.2.2 Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in PART 2, to extent that it was not completed in the shop.

3.2.3 Install work level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 3 mm in 2440 mm.

3.2.4 Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

3.2.5 Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and

drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

A. Install cabinets with no more than 3 mm in 2440 mm sag, bow, or other variation from a straight line.

B. Fasten wall cabinets through back, near top and bottom, at ends and not more than 400 mm o.c.

3.2.6 Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

A. Install countertops with no more than 3 mm in 2440 mm sag, bow, or other variation from a straight line.

B. Secure backsplashes to tops with concealed metal brackets at 400 mm o.c. and to walls with adhesive.

C. Caulk space between backsplash and wall with sealant specified in Section 07900 "Sealants and Firestopping Systems."

3.3 ADJUSTING AND CLEANING

3.3.1 Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

3.3.2 Clean, lubricate, and adjust hardware.

3.3.3 Clean woodwork on exposed and semiexposed surfaces.

END OF SECTION

PART 1 General

1.1 RELATED DOCUMENTS

1.1.1 Requirements of the Contract Documents apply to work of this section.

1.1.2 Refer to Specification 01400 "Quality Requirements.

1.2 SECTION INCLUDES

.1 Insulation in exterior wall and roof construction.

1.3 RELATED SECTIONS

.1 Section 07260 - Vapour Retarders: Vapour retarder materials to adjacent insulation.

1.4 REFERENCES

.1 ASTM C665 - Mineral-Fibre Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

.2 ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.

.3 NFPA 255 - Test of Surface Burning Characteristics of Building Materials.

.4 UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.5 SYSTEM DESCRIPTION

.1 Materials of This Section: Provide continuity of thermal barrier at building enclosure elements.

.2 Materials of This Section: Provide thermal protection to vapour retarder in conjunction with vapour retarder materials in Section 07260.

1.6 SUBMITTALS

.1 Section 01300: Submission procedures.

.2 Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.7 COORDINATION

.1 Section 01300: Coordinate work.

.2 Coordinate the work with Section 07260 for installation of vapour retarder.

PART 2 Products

2.1 MANUFACTURERS - INSULATION MATERIALS

.1 Owens Corning fibreglass insulation or equal

.2 Substitutions: Permitted on approval.

2.2 MATERIALS

.1 Batt Insulation: ASTM C665; preformed glass fibre roll, conforming to the following:

- .1 Thermal Resistance: R of 21 (minimum; see drawings)
- .2 Batt Size: 24 inch width.
- .3 Facing: Unfaced.
- .4 Flame/Smoke Properties: UL 723.

.2 Sheet Vapour Retarder: Polyethylene film for above grade application, 6 mil thick; manufactured by Lamtec.

.3 Tape: Polyethylene self-adhering type, mesh reinforced, 2 inches wide.

PART 3 Execution

3.1 EXAMINATION

.1 Section 01700: Verify site conditions.

.2 Verify that substrate, adjacent materials, and insulation are dry and ready to receive insulation.

3.2 INSTALLATION

.1 Install insulation and vapour retarder in accordance with manufacturer's instructions.

.2 Install in exterior wall spaces without gaps or voids. Do not compress insulation.

.3 Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

.4 Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.

.5 Install with factory applied vapour retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.

.6 Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

.7 Wood Framing: Place vapour retarder on warm side of insulation by stapling 6 on centre. Lap and seal sheet retarder joints over member face.

.8 Metal Framing: Place vapour retarder on warm side of insulation; lap and seal sheet retarder joints over member face.

.9 Tape seal tears or cuts in vapour retarder.

.10 Extend vapour retarder tight to full perimeter of adjacent window and door frames and other items interrupting the plane of membrane. Tape seal in place.

.11 Coordinate work of this section with construction of vapour retarder specified in Section 07260.

3.3 SCHEDULES

.1 Provide insulation as shown on Drawings.

END OF SECTION

PART 1 – General

1.1 RELATED WORK

The author shall give all the necessary references.

1.1.1 Electrical connections, water tightness of openings, and so on. Remember**:** all electrical connections and installations must be done by a qualified electrician as recommended by the manufacturer of the electric garage door operators. (Section 16,150)

1.1.2 Preparation of the opening of the garage door (Section 05 500 or 06 100).

1.1.3 These construction specifications and shop drawings are applicable to **Garaga Inc.** products only.

1.2 SHOP DRAWINGS

1.2.1 Submit the shop drawings as per the instructions outlined in Section 01 300.

1.2.2 The shop drawings shall include all the following information: the type of materials, the type of opening mechanism, the required tolerances, the electrical connections, the structural fastenings executed by the general contractor, and the suitable matching with neighboring materials.

1.3 MAINTENANCE RECORDS

1.3.1 Provide the necessary instructions to ensure proper operation and maintenance of all the hardware components for the doors as well as the electric garage door operators, and include these instructions with the manual on use and maintenance described in Section 01 300.

1.4 QUALIFICATIONS

1.4.1 The manufacturer of the specified products must be a sectional garage door manufacturer with at least 5 years of experience.

1.4.2 The installation must be executed by a company approved by the garage door manufacturer as an installer, using skilled installers experienced on this work.

PART 2: GARAGE DOORS

2.1 CALCULATION CRITERIA

2.1.1 The doors and the hardware system must be designed to meet standard ANSI/DASMA 102 (American National Standard Specifications for Sectional Overhead-Type Doors; DASMA: Door & Access Systems Manufacturer Association).

(Note: for doors wider than 18' (5.5m), or high wind situations, consult our engineering department).

2.1.2 The doors shall have a thermal resistance factor of R-16 or RSI 2.8 (k = 0.357 W/m^2K).

2.1.3 The doors, the tracks, and the springs shall be designed to withstand at least _____operation cycles per year and _____total cycles over their lifespan.

Note: *the number of spring cycles can vary from 10,000 to 100,000 cycles. However, you must realize that you cannot get 100,000 cycles for every size of door. If you want the best operating system, with the highest cycles possible, please specify "springs shall be designed for the maximum operation cycles".*

2.2 MATERIALS

2.2.1 Enameled steel (26-gauge on both sides)

Galvanized steel sheet in accordance with ASTM A653 and ASTM A653M, has G60 coating with a thickness of 26-gauge, exterior and interior, in the manufacturer's standard color. The galvanized steel sheet has a zinc coating with a minimum thickness of 0.04 lb. /ft^2 (180 g/m^2). The polyester paint finish, 2 coats, conforms to standard ASTM A924 and ASTM A924M and has a thickness of 1.0 mil. The surface of the steel sheet is woodgrain with horizontal grooves.

2.2.2 Insulation

High-pressure, CFC-free, polyurethane foam has been injected between the walls of each section. Its density is 2.5 lb./ft^3 (40.4 kg/m^3) with a thermal resistance factor of RSI 1.6 per 1" (25 mm) of thickness. The total insulation factor is R-16, RSI 2.8 (k = 0.357 W/m^2K).

2.2.3 Reinforcement plates

Steel reinforcement plates, with a minimum thickness of 14-gauge (0.07" or 1.8 mm) are inserted within the door sections to provide proper fastening for the hinges and plates for an electric garage door operator with central trolley.

2.2.4 Section ends

A block of grade 4 dry pine, guaranteed against cracking and rot, is inserted at both ends of each insulated garage door section for superior strength in the

fastening of the lateral hinges. These wood end blocks ensure a thermal break with the door's exterior.

2.2.5 Assembly joints

Galvanized steel sheets of each door section will be assembled with a mechanically-embedded, triple-contact weatherstripping, known as Interlok™, ensuring a thermal break, and the integrity and strength of the assembly.

2.2.6 Regular windows *(if applicable)*

Windows have clear, double thermo panes with a total thickness of 3/4" (19 mm). The 1/8" (3 mm) panes are sealed in stainless steel extrusions using the Intercept™ system with a 1/2" (13 mm) air space. The windows are inserted in an expanded PVC frame and factory installed by the manufacturer.

or Panoramic windows *(if applicable)*

Windows have clear, double thermo panes with a total thickness of 7/8" (22 mm). The 1/8" (3 mm) panes are sealed in stainless steel extrusions using the Intercept™ system with a 5/8" (16 mm) air space. The windows are inserted in aluminum tubular extrusions. The windows are secured with rigid PVC moldings. They are factory installed by the manufacturer.

2.3 DOORS

2.3.1 The garage doors shall be of the model G-5000 as made by Garaga Inc. The sections are shaped with 26-gauge steel, interior and exterior, on a roll forming machine, and electronically injected with high-pressure polyurethane for a total minimum thickness of 1 3/4" (44.5 mm).

2.3.2 The doors shall have the following sizes and features:
Refer to drawings

2.4 WEATHER TIGHTNESS

2.4.1 Provide and install continuous weatherstripping at the bottom of the lower section. The weatherstripping shall be made of a U-shaped PVC extrusion as well as semi-circular TPE (thermoplastic elastomer) tubing.

2.4.2 Interlok™ joints, which are **t**riple-contact inset weatherstripping of flexible and rigid PVC, shall be found at the intersection of each section. This type of weatherstripping will ensure an efficient thermal barrier as well as double weather tightness in accordance with the following standards: when submitted to a pressure of 0.075 kPa, which is equivalent to winds of 25 mph (40 km/h), the air infiltration rating as measured using standard ASTM E-283 shall be 0.033 liter/second per meter of joint between the door sections.

2.4.3 Provide and install, on the exterior side of the door jambs and lintel, weatherstripping made up of an aluminum extrusion as well as a double-edged strip of arctic vinyl.

2.5 OPTIONS (TO *CHOOSE FROM)*

2.5.1 Steel end caps: made of 16-gauge galvanized steel are installed at the end of each section where the hinges are to be fastened, for car/truck washes or to meet Agriculture Canada requirements.

2.5.2 Exhaust ports, 3” (76.2 mm) in diameter are factory installed on each door in order to place flexible hoses for venting exhaust gases.

PART 3: HARDWARE WITH TORSION SPRINGS

3.1 PRODUCTS

3.1.1 Tracks

The tracks are made of 12-gauge (0.1” (2.6 mm)) galvanized steel 3” (76 mm) wide. The horizontal track is reinforced with a 2" X 2” (50 x 50 mm) steel angle.

3.1.2 Hardware

The hinges are made of 13-gauge galvanized steel. Industrial rollers 3” (76 mm) in diameter with 10 ball bearings are used.

3.1.3 Struts for large doors *(if applicable)*

Doors **12' 4" (3759 mm)** wide or wider will come with 22-gauge galvanized steel horizontal struts and 13-gauge double hinges at each end.

3.1.4 Type of movement

The movement of the hardware will allow for the most space possible available underneath the door when it is in the open position.
Refer to drawings.

3.1.5 Torsion-type springs

The torsion spring lifting system will consist of all the parts and accessories needed for its installation. All doors weighing more than 1000 lb. (454 kg), including hardware parts, must be approved by an installation professional as to the choice of hardware (drums, galvanized cables, springs, anchor plates, 1” (25 mm) solid shaft)).

3.2 OPTIONS (*TO CHOOSE FROM*)

3.2.1 3"-long (76 mm) rubber rollers, in UHMW (*for apartment buildings only)*

Garage door rollers for 3” (76 mm) tracks will have a UHMV head (nylon). They also include a sealed 6202 precision ball bearing and are mounted on a galvanized zinc-plated steel rod.

3.2.2 3"-long (76 mm) rollers, NB SS (*for car or truck washes)*

Garage door rollers for 3” (76 mm) tracks will have UHMV head (nylon) on a stainless steel rod.

3.2.3 3"-long (76 mm) precision rollers, machined steel (*for doors weighing over 770 lb./350 kg, or dusty locations*)

Garage door rollers for 3" (76 mm) tracks will have a machined steel head. They also include a sealed 6203 precision ball bearing and are mounted on a steel rod.

3.2.4 Track guards, L-shaped

The vertical tracks are protected by non-galvanized, L-shaped track guards 5’ x 0.3” (1524 mm x 6.4 mm), in order to avoid accidental breaking. Track guards should be painted with a bright color after installation.

3.2.5 Track guards, Z-shaped

The vertical tracks are protected non-galvanized, Z-shaped track guards 5’ x 0.2” (1524 mm x 5.0 mm) in order to avoid accidental breaking. Track guards should be painted with a bright color after installation.

3.2.6 Chain hoist

Doors over 10’ (3 m) high with manual operation will come equipped with a chain hoist mounted on the wall.

Note: *If an electric door opener is included, this option is unnecessary. Consult specs in the next section.*

3.2.7 Pull chain

Manual operation doors less than 10’ (3 m) high will come with a pull chain to assist the lowering of the door.

Note: *If an electric door opener is included, this option is unnecessary. Consult specs in the next section.*

3.2.8 Pusher springs

For doors exceeding 161 ft^2 (15 m^2), standard movement or low headroom hardware will come with pusher springs at the end of the horizontal tracks in order to prevent the cables from falling off the drums.

3.2.9 "C" bumper springs

For dock doors (ex: 8’ x 8’ (2438 mm x 2438 mm)), the vertical lift movement hardware will come with “C” bumper springs at the end of the horizontal tracks.

3.2.10 Flanged bearing

The end bearing plates will come equipped with flanged bearings for doors weighing more than **660 lb. (300 kg)**. Center plate (football bearings) will also be included with doors exceeding this weight.

3.2.11 Tension bridge reinforcements

Doors that are 18' 3" (5563 mm) wide and over will come equipped with tension bridge reinforcement. They will be mounted at each end of the top section and held in the center by a support whose height is adjusted according to the width of the door. These reinforcements must be installed according to the Garaga's exact specifications.

Note: *all doors weighing more than* ***1000 lb. (454 kg),*** *including hardware parts attached to the door, must be designed according to manufacturer's specifications, in order to assure the proper choice of hardware Consult the Garaga technical service department.*