PART 1 - GENERAL

1.1 Related Requirements

.1 Section 01 41 00 – Regulatory Requirements.
.2 Section 06 20 00 – Finish Carpentry
.3 Section 07 46 23 – Wood Siding
.4 Section 07 62 00 – Sheet Metal Flashing and Trim
.5 Section 08 50 00 – Windows
.6 Section 08 90 00 – Louvers and Vents

1.2 References

.1 CGSB 1-GP-2M-80 Oil, Linseed, Boiled.

.2 CGSB 1-GP-16M-79 Shellac Varnish.

.3 CGSB 1-GP-28M-77 Paint, Exterior, Alkyd, House.

.4 CGSB 1-GP-40M-79 Primer, Structural Steel, Oil Alkyd Type.

.5 CGSB 1-GP-55M-82 Primer, Wood Exterior.

.6 CGSB 1-GP-59M-78 Enamel, Exterior, Gloss, Alkyd Type.

.7 CGSB 1-GP-61Ma-85 Enamel, Alkyd, Marine, Exterior and Interior.

.8 CGSB 1-GP-69M-79 Paint, Aluminum.

.9 CGSB 1-GP-138M-78 Paint, Exterior, Latex Type, Flat.

.10 CGSB 1-GP-189M-78 Primer, Alkyd, Wood, Exterior.

1.3 Source Quality Control

.1 Retain purchase orders, invoices and other documents to prove that material used in contract meets requirements of specification and produce when requested by Departmental Representative.

1.4 Samples

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

.2 Provide Engineer with two (2) litre samples of each paint delivered to site, one sample from Manufacturer's containers and one sample from painters pot.

1.5 Delivery and Storage

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

.2 Deliver and store materials in manufacturers original container with labels intact.

.3 Ensure dry delivery and storage of materials and equipment at site.

.4 Store materials and equipment in a well ventilated place with temperature range 20 to 30° C.

1.6 Existing Conditions

.1 Investigate structural problems related to safe execution of preparation of structure to be painted and report unsatisfactory conditions to Departmental Representative before beginning work.

.2 Report to Engineer conditions of deteriorated materials found during preparation, not previously disclosed.

1.7 Environmental Requirements

.1 Substrate and ambient temperature must be within limits prescribed in paint standard.

1.8 Protection

.1 Protect paint and painting equipment before use and during length of contract from climatic elements.

.2 Protect exterior of structure from markings and other damage. Protect completed work from paint droppings. Use non-staining coverings.

.3 Provide for protection of passing pedestrians and the general public.

1.9 Scheduling of Work

.1 Submit work schedule starting and final completion dates for approval by Departmental Representative.

.2 Take measures necessary to complete work within approved scheduled time. Change in schedule must be approved by Departmental Representative.

.3 Co-ordinate execution with other work at site.

1.10 Alternates

.1 Products conforming with this specification must be identified in writing by contractor for approval by Departmental Representative.

.2 Changing manufacturers brands, sources of supply of painting materials from those previously approved must be approved by Departmental Representative.

.3 Request for alternative approval must be submitted in writing and be accompanied by full literature and recommendations from manufacturers concerned.

PART 2 - PRODUCTS

2.1 Materials

.1 Paint and finishing materials - highest grade, first line quality provided by manufacturer who

agrees to provide supervision service during painting operations. The manufacturers shall be Benjamin Moore Co., or approved alternate.

.2 Paints, enamels, fillers, primers, varnishes and stains - ready mixed products of one of the manufacturers listed herein. Substitutes will not be allowed.

.3 Thinners, cleaners - type and brand recommended by the paint manufacturer.

.4 Only products manufactured by paint manufacturer stated at time of submission of samples will be allowed on Site unless other materials specifically specified herein. No painting to be performed until paint manufacturer identified and acceptance received from the Departmental Representative.

2.2 Tools and Equipment

.1 Departmental Representative will determine areas where power tools or equipment may be used for both preparing and painting of substrate.

2.3 Mixing Paint

.1 Paint to be ready for application by brush or roller when received.

.2 Add thinners for brush or roller application only with prior approval of Departmental Representative.

.3 Mix paint in full containers up to 25 litres capacity by viberator shaker method.

.4 Mix paint in full containers up to 5 litres by propeller mixer method.

.5 Do not mix or keep paint in suspension by means of an air stream under paint surface.

2.4 Proportions

.1 Obtain approval, of Departmental Representative to substitute paint on Qualified Product List.

PART 3 - EXECUTION

3.1 Preparation for Tasks

.1 Ensure that workers are informed of safety rules.

.2 Ensure that safety measures have been taken each day before any job is started.

.3 Verify that equipment meets safety standards.

.4 Encourage workers to report hazards in their work.

.5 Place safety devices and signs near work area as indicated or directed.

3.2 Surface Preparation

.1 Prepare wood surfaces exposed to normally dry rural atmosphere to CGSB 85-GP-2M.

.2 Clean wood surfaces exposed to maritime atmosphere:
.1 Scrub area with diluted detergent solution and clean warm water using a stiff bristle brush to remove salt, dirt and oil.
.2 Hose down scrubbed area with clean water until foreign matter is flushed from surface.
.3 Allow washed area to drain completely and allow to dry thoroughly.

.3 Prepare wood area to CGSB 85-GP-2M.

.4 Prepare galvanized steel surfaces to CGSB 85-GP-16M.

.5 Prepare masonry, stucco and brick surfaces to CGSB 85-GP-31M.

3.3 Paint Application

.1 Method of application and uniform coats of specified film thickness be in agreement with Contractor [and Departmental Representative.

3.4 Finishes

.1 Wood primers:
- .1 CGSB 1-GP-55.
- .2 CGSB 1-GP-189.
- .3 A related approved proprietary primer of known performance.

.2 Wood topcoats:
- .1 CGSB 1-GP-28, type 1.
- .2 CGSB 1-GP-28, type 2.
- .3 CGSB 1-GP-41.
- .4 CGSB 1-GP-138.
- .5 A related approved proprietary topcoat of known performance.

.3 Apply pretreatment or primers and topcoating to previously painted galvanized steel surfaces to CGSB 85-GP-16M.

.4 Apply coatings to previously painted cementitious surfaces to CGSB 85-GP-31M.

3.5 Workmenship

.1 All painting work to be carried out by qualified personnel and to job specifications.

3.6 Field Quality Control

.1 Examine surface for adequate preparation.

.2 Check all materials for correctness.

.3 Inspect during application for correct procedures.

3.7 Cleaning

.1 Avoid paint splashings on exposed surfaces not to be painted. Smears and spatter be removed immediately, using compatible solvent.

.2 Avoid scuffing newly applied paint.

3.8 Protection of Completed Work

.1 Protect area where paint has been applied.

.2 On completion of specified work remove surplus materials, tools and equipment and debris on work area; leave clean and tidy to complete satisfaction of Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 41 00 – Regulatory Requirements.
.2 Section 06 20 00 – Finish Carpentry
.3 Section 07 44 56 – Mineral Fiber Reinforced Cementitious Panels
.4 Section 07 46 23 – Wood Siding
.5 Section 07 62 00 – Sheet Metal Flashing and Trim
.6 Section 08 50 00 – Windows
.7 Section 08 90 00 – Louvers and Vents

1.2 REFERENCES

.2 Environmental Protection Agency (EPA)
.1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

.4 The Master Painters Institute (MPI)
.1 Architectural Painting Specification Manual - February 2004.
.2 Standard GPS-1-05, MPI Green Performance Standard for Painting and Coatings.

.5 National Fire Code of Canada.

.6 Society for Protective Coatings (SSPC)
.1 Systems and Specifications, SSPC Painting Manual 2005.

1.3 QUALITY CONTROL

.1 Qualifications:

.1 Contractor: to have a minimum of five years

proven satisfactory experience. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.

.2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work

.3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.

.4 Conform to latest MPI requirements for exterior painting work including preparation and priming.

.5 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.

All primary products specified in this section shall be supplied by single manunfacturer with a minimum of ten (10) years experience.

.6 Paint materials such as linseed oil, shellac, and turpentine to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.

.7 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Departmental Representative.

.8 Standard of Acceptance:

.1 Walls: No defects visible from a distance of 1000 mm at 90 degrees to surface.

.2 Soffits: No defects visible from floor at 45 degrees to surface when viewed using final lighting source.

.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

1.4 PERFORMANCE REQUIREMENTS

.1 Environmental Performance Requirements:

.1 Provide paint products meeting MPI "Environmentally Friendly" E2 ratings based on VOC (EPA Method 24) content levels.

1.5 SCHEDULING

.1 Submit work schedule for various stages of painting to Departmental Representative for

approval. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from Departmental Representative for changes in work schedule.

.3 Schedule painting operations to prevent disruption of occupants in and about building.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.3 Upon completion, submit records of products used. List products in relation to finish system and include the following:
.1 Product name, type and use.
.2 Manufacturer's product number.
.3 Colour numbers.
.4 MPI Environmentally Friendly classification system rating.
.5 Manufacturer's Material Safety Data Sheets (MSDS).

.4 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
.1 Submit 200 x 300 mm sample panels of each paint with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:
.1 3 mm plate steel for finishes over metal surfaces.
.2 13 mm birch plywood for finishes over wood surfaces.
.2 10 mm siding plywood for finishes over wood surfaces.
.2 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.

.3 Submit full range of available colours where colour availability is restricted.

1.7 QUALITY CONTROL

.1 Provide mock-up in accordance with Section 01 45 00 - Quality Control.

.2 When requested by Departmental Representative or Paint Inspection Agency, prepare and paint designated surface, area, room or item to requirements specified herein, with specified paint or coating showing selected colours, number of coats, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on-site work.

1.8 MAINTENANCE

.1 Extra Materials:
.1 Submit maintenance materials in accordance with Section 01 78 00 Closeout Submittals.

.2 Submit one, one litre can of each type and colour of primer and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

.3 At project closeout, provide to Owner or Owners Representative an executed copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.
1.Duration: Twenty-five (25) years.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements, supplemented as follows:.
.1 Deliver and store materials in original containers, sealed, with labels intact.
.2 Labels: to indicate:
.1 Manufacturer's name and address.
.2 Type of paint or coating.
.3 Compliance with applicable standard.

.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.

.4 Provide and maintain dry, temperature controlled, secure storage.

.5 Observe manufacturer's recommendations for storage and handling.

.6 Store materials and supplies away from heat generating devices.

.7 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C.

.8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Departmental Representative. After completion of operations, return areas to clean condition to approval of Departmental Representative.

.10 Remove paint materials from storage only in quantities required for same day use.

.11 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.12 Fire Safety Requirements:

.1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

.2 Waste Management and Disposal:

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

.2 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

.3 Material which cannot be reused must be treated as hazardous waste and disposed of in an

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

1.10 AMBIENT CONDITIONS

.1 Temperature, Humidity and Substrate Moisture Content Levels:
.1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, applied product manufacturer, perform no painting work when:
.1 Ambient air and substrate temperatures are below 10 degrees C.
.2 Substrate temperature is over 32 degrees C unless paint is specifically formulated for application at high temperatures.
.3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
.4 Relative humidity is above 85%

or when dew point is less than 3 degrees C variance between air/surface temperature.

.5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.

.2 Perform no painting work when maximum moisture content of substrate exceeds:

.1 12% for concrete and masonry (clay and concrete brick/block).

.2 15% for wood.

.3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".

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

.2 Surface and Environmental Conditions:

.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

.2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.

.3 Apply paint when previous coat of paint is dry or adequately cured.

.4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.

.5 Do not apply paint when:

.1 Temperature is expected to drop below 10 degrees C before paint has thoroughly cured.

.2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.

.3 Surface to be painted is wet, damp or frosted.

.6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.

.7 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.

.8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

.9 Paint occupied facilities in accordance

with approved schedule only. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Paint and finishing materials - highest grade, first line quality provided by manufacturer who agrees to provide supervision service during painting operations. The manufacturers shall be Benjamin Moore Co., or approved alternate.

.2 Paints, enamels, fillers, primers, varnishes and stains - ready mixed products of one of the manufacturers listed herein. Substitutes will not be allowed.

.3 Thinners, cleaners - type and brand recommended by the paint manufacturer.

.4 Only products manufactured by paint manufacturer stated at time of submission of samples will be allowed on Site unless other materials specifically specified herein. No painting to be performed until paint manufacturer identified and acceptance received from the Departmental Representative.

.5 Deliver materials to Site in original unbroken containers bearing brand and maker's name. The presence of any unauthorized material or containers for such, on Site shall be of sufficient cause for rejection of ALL paint materials on Site at that time.

2.2 COLOURS

.1 Submit proposed Colour Schedule to Departmental Representative for approval.

.2 Colour schedule will be based upon selection of five base colours and three accent colours. No more than eight colours will be selected for entire project and no more than three colours will be selected in each area.

.3 Selection of colours will be from manufacturers full range of colours.

.4 Where specific products are available in restricted range of colours, selection will be based on limited range.

.5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed only Departmental Representative's written permission.

.2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.

.3 Add thinner to paint manufacturer's recommendations. Do not use kerosene or organic solvents to thin water-based paints.

.4 Thin paint for spraying according in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.

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

2.4 EXTERIOR PAINTING SYSTEMS

Exterior painting system in accordance with specific conditions of the building should be provided by Contractor and approved by Departmental Representative.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 EXAMINATION

.1 Exterior repainting work: inspected by MPI Accredited Paint Inspection Agency (inspector) acceptable to specifying authority and local Painting Contractor's Association. Painting contractor to notify Paint Inspection Agency minimum of one week prior to commencement of work and provide copy of project repainting specification and Finish Schedule.

.2 Exterior surfaces requiring repainting: inspected by both painting contractor and Paint Inspection Agency who will notify Departmental Representative in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.

.3 Where assessed degree of surface degradation of DSD-1 to DSD-3 before preparation of surfaces for repainting is revealed to be DSD-4 after preparation, repair or replacement of such unforeseen defects discovered are to be corrected, as mutually agreed, before repainting is started.

3.3 PREPARATION

.1 Perform preparation and operations for exterior painting in accordance with MPI Maintenance Repainting Manual except where specified otherwise.

.2 Apply paint materials in accordance with paint manufacturer's written application instructions.

.3 Clean and prepare exterior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:

.1 Remove dust, dirt, and surface debris by vacuuming, wiping with dry, clean cloths or compressed air.

.2 Wash surfaces with a biodegradable

detergent] and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
.4 Allow surfaces to drain completely and allow to dry thoroughly. Allow sufficient drying time and test surfaces using electronic moisture meter before commencing work.
.5 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.
.6 Many water-based paints cannot be removed with water once dried. Minimize use of kerosene or such organic solvents to clean up water-based paints.

.4 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements. Remove such contaminates from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.

.5 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.6 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.

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

3.4 EXISTING CONDITIONS

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for

moisture using a simple "cover patch test" and report findings to Departmental Representative. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

.3 Maximum moisture content as follows:
.1 Clay and Concrete Block/Brick: 12%.
.2 Wood: 15%.

3.5 PROTECTION

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Departmental Representative.

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

.3 Protect factory finished products and equipment.

.4 Protect passing pedestrians and general public in and about building.

.5 Remove light fixtures, surface hardware on doors, and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Store items and re-install after painting is completed.

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

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

3.6 APPLICATION

.1 Method of application to be as approved by Departmental Representative. Apply paint by brush and/or roller. Conform to manufacturer's application instructions unless specified otherwise.

.2 Brush and Roller Application:
.1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.

.2 Work paint into cracks, crevices and corners.
.3 Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Departmental Representative.
.5 Remove runs, sags and brush marks from finished work and repaint.

.3 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Departmental Representative.

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

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

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

.7 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.

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

3.7 FIELD QUALITY CONTROL

.1 Inspection:

.1 Field inspection of exterior painting operations to be carried out be independent inspection firm as designated Departmental Representative.
.2 Advise Departmental Representative when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
.3 Co-operate with inspection firm and provide access to areas of work.

.2 Manufacturer's Field Services:
.1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product

installation in accordance with manufacturer's instructions.

3.9 CLEANING

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

.1 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

3.10 RESTORATION

.1 Clean and re-install hardware items removed before undertaken painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA C22.1-12, Canadian Electrical Code, Part 1 (22th Edition), Safety Standard for Electrical Installations.
.2 CAN3-C235-83(R2000), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

.2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
.1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.2 DEFINITIONS

.1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

1.3 DESIGN REQUIREMENTS

.1 Operating voltages: to CAN3-C235.

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
.1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

.3 Language operating requirements: provide identification nameplates and labels for control items in English.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in

Province of Ontario, Canada.
.2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
.3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
.4 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
.5 If changes are required, notify Consultant of these changes before they are made.

.3 Quality Control: in accordance with Section 01 45 00 - Quality Control.
.1 Provide CSA certified equipment and material.
.2 Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for special approval before delivery to site.
.3 Submit test results of installed electrical systems and instrumentation.
.4 Permits and fees: in accordance with General Conditions of contract.
.5 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
.6 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Consultant.

.4 Manufacturer's Field Reports: submit to Consultant manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

1.5 QUALITY ASSURANCE

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

.2 Qualifications: electrical Work to be carried out by qualified, licensed electricians or apprentices in accordance with authorities having jurisdiction as per the conditions of Provincial Act respecting manpower vocational training and qualification.
.1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
.2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.

.3 Site Meetings:
.1 In accordance with Section 01 32 18 - Construction Progress Schedule.
.2 Site Meetings: as part of Manufacturer's Field Services described in Part 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.
.1 After delivery and storage of products, and when preparatory Work is complete but before installation begins.
.2 During progress of Work at 60% complete.
.3 Upon completion of Work, after cleaning is carried out.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Material Delivery Schedule: provide Consultant with schedule within 2 weeks after award of Contract.

1.7 SYSTEM STARTUP

.1 Instruct Consultant and operating personnel in operation, care and maintenance of systems, system equipment and components.

.2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.

.3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant will aspects of its care and operation.

1.8 OPERATING INSTRUCTIONS

.1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.

.2 Operating instructions to include following:
.1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
.2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
.3 Safety precautions.
.4 Procedures to be followed in event of equipment failure.
.5 Other items of instruction as recommended by manufacturer of each system or item of equipment.

.3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.

.4 Post instructions where directed.

.5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.

.6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

.1 Provide material and equipment in accordance with Section 01 61 00 - Common Product Requirements.

.2 Material and equipment to be CSA certified. Where CSA certified material and equipment is are not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - SUBMITTALS.

.3 Factory assemble control panels and component assemblies.

2.2 WARNING SIGNS

.1 Warning Signs: in accordance with requirements of Consultant.

.2 Porcelain enamel signs, minimum size 175 x 250 mm.

2.3 WIRING TERMINATIONS

.1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.4 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates and labels as follows:

.1 Nameplates: lamicoid 3 mm thick plastic engraving sheet, matt white finish face, black core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.

.2 Sizes as follows:

NAMEPLATE SIZES

Size 1	10 x 50 mm letters	1 line	3 mm high
Size 2	12 x 70 mm letters	1 line	5 mm high
Size 3	12 x 70 mm letters	2 lines	3 mm high
Size 4	20 x 90 mm letters	1 line	8 mm high
Size 5	20 x 90 mm letters	2 lines	5 mm high
Size 6	25 x 100 mm letters	1 line	12 mm high
Size 7	25 x 100 mm letters	2 lines	6 mm high

.2 Labels: embossed plastic labels with 6mm high letters unless specified otherwise.

.3 Wording on nameplates and labels to be approved by Consultant prior to manufacture.

.4 Allow for minimum of twenty-five (25) letters per nameplate and label.

.5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

.6 Identify equipment with Size 3 labels engraved "ASSET INVENTORY NO. " as directed by Consultant.

.7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.

.8 Terminal cabinets and pull boxes: indicate system and voltage.

2.5 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, numbered, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour coding: to CSA C22.1.

.4 Use colour coded wires in communication cables, matched throughout system.

2.6 CONDUIT AND CABLE IDENTIFICATION

.1 Colour code conduits, boxes and metallic sheathed cables.

.2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

.3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

Prime	Auxiliary	
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

3.2 NAMEPLATES AND LABELS

.1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.3 CONDUIT AND CABLE INSTALLATION

.1 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

.2 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

3.4 LOCATION OF OUTLETS

.1 Locate outlets in accordance with Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.

.2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.

.3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.

.4 Locate light switches on latch side of doors.
.1 Locate disconnect devices in mechanical and elevator machine rooms on latch side of floor.

3.5 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

.3 Install electrical equipment at following heights unless indicated otherwise.
.1 Local switches: 1400 mm.
.2 Wall receptacles:
.1 General: 300 mm.
.2 Above top of continuous baseboard heater: 200 mm.
.3 Above top of counters or counter splash backs: 175 mm.
.4 In mechanical rooms: 1400 mm.
.3 Panelboards: as required by Code or as indicated.

.4 Telephone and interphone outlets: 300 mm.

.5 Wall mounted telephone and interphone outlets: 1500 mm.

.6 Fire alarm stations: 1500 mm.

.7 Fire alarm bells: 2100mm.

.8 Television outlets: 300 mm.

.9 Wall mounted speakers: 2100mm.

.10 Clocks: 2100 mm.

.11 Door bell pushbuttons: 1500mm.

3.6 CO-ORDINATION OF PROTECTIVE DEVICES

.1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.7 FIELD QUALITY CONTROL

.1 Load Balance:
.1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
.3 Provide upon completion of work, load balance report as directed in PART 1 - SUBMITTALS: phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.

.2 Conduct following tests in accordance with Section 01 45 00 - Quality Control.
.1 Circuits originating from branch distribution panels.
.2 Lighting and its control.
.3 Systems: fire alarm system.
.4 Insulation resistance testing:
.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
.2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
.3 Check resistance to ground before energizing.

.3 Carry out tests in presence of Consultant.

.4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

.5 Manufacturer's Field Services:
.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing,

applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.8 CLEANING

.1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section.

1.2 REFERENCES

.1 CSA International
.1 CAN/CSA-C22.2 No.18.2-06, Outlet Boxes, Conduit Boxes and Fittings.
.2 CAN/CSA-C22.2 No.65-03(R2008), Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).

.3 National Electrical Manufacturers Association (NEMA)

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for wire and box connectors and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for wire and box connectors for incorporation into manual.

1.5 DELIVERY,

.1 Deliver, store and handle materials in accordance with

STORAGE AND HANDLING

Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
.1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect wire and box connectors from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Pressure type wire connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.

.2 Bushing stud connectors: to NEMA to consist of:
.1 Connector body and stud clamp for stranded copper conductors. .. Clamp for stranded copper conductors

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wire and box connectors installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of Consultant.

.2 Inform Consultant of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 INSTALLATION

.1 Remove insulation carefully from ends of conductors and cables and:
.1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.

.2 Install mechanical pressure type connectors and tighten screws. Installation shall meet secureness tests in accordance with CAN/CSA-C22.2 No.65.

.4 Install bushing stud connectors in accordance with NEMA.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for recycling.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section.

1.2 REFERENCES

.1 Section 26 05 00 - Common Work Results for Electrical.

1.3 PRODUCT DATA

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

1.4 DELIVERY, STORAGE AND HANDLING

.1 Packaging Waste Management: remove for reuse of pallets.

PART 2 - PRODUCTS

2.1 BUILDING WIRES

.1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors: size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE Non Jacketted.

2.2 MINERAL-INSULATED CABLES

.1 Conductors: solid bare soft-annealed copper, size as indicated.

.2 Insulation: compressed powdered magnesium oxide or silicon dioxide to form compact homogeneous mass

throughout entire length of cable.

.3 Outer covering: annealed seamless copper stainless steel sheath, Type M1 rated 600 V, 250 degrees C .

.4 Overall jacket: none PVC applied over the sheath and compliant to applicable Building Code classification for this project.

.5 Two hour fire rating.

.6 Connectors: field installed approved for MI cable.

.7 Termination kits: field installed approved for MI cable

2.3 CONTROL CABLES

.1 Type: LVT: 2 soft annealed copper conductors, sized as indicated:
.1 Insulation: thermoplastic.
.2 Sheath : thermoplastic jacket.

.2 Type: low energy 300 V control cable: stranded annealed copper conductors sized as indicated LVT: 2 soft annealed copper conductors, sized as indicated:
.1 Insulation: PVC.
.2 Shielding: tape coated with paramagnetic material wire braid over eachconductor.
.3 Overall covering: polyethylene jackets.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Perform tests using method appropriate to site conditions and to approval of Consultant and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

3.2 GENERAL CABLE INSTALLATION

.1 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).

.2 Cable Colour Coding: to Section 26 05 00 - Common Work Results for Electrical.

.3 Conductor length for parallel feeders to be identical.

.4 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.

.5 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.

.6 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.

.7 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

3.3 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:
.1 In conduit systems in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

3.4 INSTALLATION OF MINERAL-INSULATED CABLES

.1 Install cable exposed concealed, securely supported by staples straps hangers.

.2 Support 2 hour fire rated cables at 1 m intervals.

.3 Make cable terminations by using factory-made kits.

.4 Cable terminations: use thermoplastic sleeving over bare conductors.

.5 Where cables are buried in cast concrete or masonry, sleeve for entry exit of cables.

.6 Do not splice cables unless indicated.

3.5 INSTALLATION OF

.1 Install control cables in conduit.

CONTROL CABLES

.2 Ground control cable shield.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA C22.2 No.41-M1987(R1999), Grounding and Bonding Equipment.

1.3 PRODUCT DATA

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

1.4 WASTE MANAGEMENT AND DISPOSAL

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

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

.3 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Consultant.

PART 2 - PRODUCTS

2.1 CONNECTORS AND TERMINATIONS

.1 Copper short barrel compression connectors to CSA C22.2 No. as required sized for conductors.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Bond and ground as required to CSA C22.2 No.41.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section.

1.2 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials.

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

PART 2 - PRODUCTS

2.1 SUPPORT CHANNELS

.1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted suspended.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Secure equipment to solid masonry, tile and plaster surfaces with lead anchors.

.2 Secure equipment to poured concrete with expandable inserts.

.3 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

.4 Fasten exposed conduit or cables to building construction or support system using straps.

.1 One-hole malleable iron steel straps to secure

surface conduits and cables 50 mm and smaller.
.2 Two-hole steel straps for conduits and cables larger than 50 mm.
.3 Beam clamps to secure conduit to exposed steel work.

.5 Suspended support systems.
.1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.
.2 Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.

.6 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.7 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

.8 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.9 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Consultant.

.10 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA C22.1-12, Canadian Electrical Code, Part 1, 22th Edition.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.
.1 Provide drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

PART 2 - PRODUCTS

2.1 JUNCTION AND PULL BOXES

.1 Construction:welded steel enclosure.

.2 Covers Flush Mounted: 25 mm minimum extension all around.

.3 Covers Surface Mounted: screw-on flat covers.

PART 3 - EXECUTION

3.1 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.1.

3.2 IDENTIFICATION

.1 Equipment Identification: to Section 26 05 00- Common Work Results for Electrical .

.2 Identification Labels: size 2 indicatingsystem name voltage and phase or as indicated.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA C22.1-12, Canadian Electrical Code, Part 1, 20th Edition.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

PART 2 - PRODUCTS

2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA C22.1.

.2 102 mm square or larger outlet boxes as required.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

.5 347 V outlet boxes for 347 V switching devices.

.6 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 GALVANIZED STEEL OUTLET BOXES

.1 One-piece electro-galvanized construction.

.2 Single and multi gang flush device boxes for flush

installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

.3 Utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.

2.3 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 35mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

.4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Do not install reducing washers.

.5 Vacuum clean interior of outlet boxes before installation of wiring devices.

.6 Identify systems for outlet boxes as required.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CAN/CSA C22.2 No. 18-98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.

.2 CSA C22.2 No. 45-M1981(R2003), Rigid Metal Conduit.

.3 CSA C22.2 No. 56-R2009, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.

.4 CSA C22.2 No. 83-M1985(R2003), Electrical Metallic Tubing.

.5 CSA C22.2 No. 211.2-06(R2011), Rigid PVC (Unplasticized) Conduit.

.6 CAN/CSA C22.2 No. 227.3-R2010, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product data: submit manufacturer's printed product literature, specifications and datasheets.
.1 Submit cable manufacturing data.

.3 Quality assurance submittals:
.1 Test reports: submit certified test reports.
.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
.3 Instructions: submit manufacturer's installation instructions.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling.

.2 Place materials defined as hazardous or toxic waste in designated containers.

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

PART 2 - PRODUCTS

2.1 CABLES AND REELS

.1 Provide cables on reels or coils.

.1 Mark or tag each cable and outside of each reel or coil, to indicate cable length, voltage rating, conductor size, and manufacturer's lot number and reel number.

.2 Each coil or reel of cable to contain only one continuous cable without splices.

2.2 CONDUITS

.1 Rigid metal conduit: to CSA C22.2 No. 45, galvanized steel threaded.

.2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings with expanded ends.

.3 Rigid pvc conduit: to CSA C22.2 No. 211.2.

2.3 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits 50 mm and smaller.

.1 Two hole steel straps for conduits larger than 50 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Threaded rods, 6 mm diameter, to support suspended channels.

2.4 CONDUIT FITTINGS

.1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.

.2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.

.3 Watertight connectors and couplings for EMT.
.1 Set-screws are not acceptable.

2.5 FISH CORD

.1 Polypropylene.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Conceal conduits except in mechanical and electrical service rooms in unfinished areas.

.3 Use rigid galvanized steel threaded conduit except where specified otherwise.

.4 Use epoxy coated conduit underground in corrosive areas.

.5 Use electrical metallic tubing (EMT) except in cast concrete above 2.4 m not subject to mechanical injury.

.6 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.

.7 M nimum conduit size for lighting and power circuits: 19mm.

.8 Install EMT conduit from computer room branch circuit panel to outlet boxes located in sub floor.

.9 Bend conduit cold:
.1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.10 Mechanically bend steel conduit over 19 mm diameter.

.11 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.12 Install fish cord in empty conduits.

.13 Terminate these conduits in 152 x 152 x 102 mm junction boxes in ceiling space or in case of an exposed concrete slab, terminate each conduit in surface type box.

.14 Remove and replace blocked conduit sections.
.1 Do not use liquids to clean out conduits.

.15 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.

.3 Run conduits in flanged portion of structural steel.

.4 Group conduits wherever possible on suspended channels.

.5 Do not pass conduits through structural members except as indicated.

.6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.4 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Do not install horizontal runs in masonry walls.

.3 Do not install conduits in terrazzo or concrete toppings.

3.5 CLEANING

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

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

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 41 00 – Regulatory Requirements.

.2 Section 31 23 33.01 - Trenching and Backfilling.

.3 Section 03 30 00.01 - Cast-in-Place Concrete.

.4 Section 05120 - Structural Steel.

1.2 REFERENCES

.1 Conform to the Ontario Building Code Regulations 403/97 as amended by O.Reg. 22/98, 102/98, 122/98, 152/99, 278/99, Minister's Ruling 99-BC-01, 593/99, 597/99, 205/00, 283/01 and 220/02 and any applicable acts of any authority having jurisdiction and the following:
.1 S16.1-09, Limit States Design for Steel Structures.
.2 O86.1-09, Engineering Design in Wood (Limit States Design).

.2 ASTM A 325M-05, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength Metric.

.3 ASTM A 490M, Standard Specification for High Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints Metric.

.4 CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.5 CSA-S16-09, Limit States Design of Steel Structures.

.6 CSA-S136, North America Specification for the Design of Cold Formed Steel Structural Members including supplement CSA-S136.1.

.7 CSA W59, Welded Steel Construction (Metal Arc Welding).

.8 CAS-S157-05/S157.1-05 (R2010) - Strength Design in Aluminum.

.9 Perform work in accordance with the Standards and Guidelines for the Conservation of Historic Places in Canada (SGCHPC) which can be accessed through the link http://www.historicplaces.ca/en/pages/standard - normes.aspx. As this structure is a National Historic Site of Canada (NHSC) and is classified as a level 1 cultural resource, the SGCHPC must be reviewed and adhered to as required for the significance of this historic structure.

1.3 EXAMINATION

.1 Examine the site and buildings on it. Establish conditions under which the work is to be done, and accept the premises as found upon taking possession of the property. The Owner will make no allowance for conditions that were apparent at the time of submission of tender. Direct all inquiries to the Departmental Representative.

.2 Investigate the existing building to determine actual field conditions, take field dimensions, ascertain loads and forces to be supported or resisted, and perform other inspection necessary to carry out design of shoring, needling, bracing, and the like, to schedule the sequence of operations, and prepare shop drawings and details

1.4 RESPONSIBILITY

.1 Engage a professional engineer, registered in the Province of Ontario, who has demonstrated competence in shoring work, to design and supervise construction of temporary structures. Shoring sub-contractor shall have a minimum of 10 years experience in installing similar type shoring.

.2 Take full responsibility for design, supplying, placing, installation, maintenance and removal of shoring system

.3 Comply with all safety requirements of The Occupational Health and Safety Act and Ontario Building Code.

.4 The Contractor shall be responsible for all damage arising out of the work of the contract and for all damage to adjacent private or public property. The Contractor shall make good damages caused in the performance of this contract to the satisfaction of the Departmental Representative.

.5 Review of shoring design drawings by the Departmental

Representative shall in no way relieve the Contractor of its responsibility for carrying out the work in a manner which ensures the complete safety of the existing work, persons and adjacent property and also ensures that no damage occurs thereto during any period of the alterations.

1.5 DESIGN OF SHORING SYSTEM

.1 Design shoring, and bracing, stairs and platform so that loads applied to them will be safely carried. Superimposed live loads and construction loads shall be taken into account and the lateral stability of the elements supported and the shoring shall be insured.

.2 The shoring system must be designed, erected and maintained by the contractor and the shoring system manufacturer for loads indicated on the drawings for a period of at least 10 years while the existing bricks dry naturally. The scaffolding may be used for future restoration of the existing structure after the 10 year period.

.3 The shoring must be designed and erected such that the moisture of the bricks can be measured. The shoring system is to include stairs and platforms to allow access to the soffit of the brick vaults and to allow access to the existing roof access stairs.

.4 The shoring must be adjustable to allow for settlement of the slab that supports the shoring and to allow for shrinkage of the bricks when they dry out.

.5 Design underpinning and temporary supports for the existing structure to safely resist all loads including loads which may be imposed as a result of construction operations.

.6 Design stairs, handrails and guardrails to meet the requirements of the current Ontario Building Code.

.7 Design shoring and bracing to be fully effective at all stages of construction. Prestress bracing and shoring posts, if required, to control deflection of the existing structure.

.8 The design of shoring and bracing, and the sequence of their installation and the sequence of the work shall be prepared by a Professional Engineer licensed in the Province of Ontario and experienced in this type of work.

.9 Prepare design of shoring and bracing, in cooperation with other trades so that new work may be installed as required.

1.6 SUBMITTALS AND SHOP DRAWINGS

.1 Submit shop drawings of shoring and bracing systems. Shop drawing to bear seal and signature of a professional engineer, registered in the Province of Ontario, who has carried out the design and who will provide construction supervision of temporary structures.

.2 Indicate on shop drawings the following:
.1 Dimensions and elevations
.2 Relationship to existing structures
.3 Material designations, grades, sizes, etc.
.4 Temporary post and bracing struts, etc., their relationship to permanent structure and schedule for removal
.5 Maximum deflections of shoring members when deflection limitations have been specified in this Section.
.6 Design loads, design assumptions, all loading restrictions and proposed sequence of construction.
.7 Identification of Engineer of record who will be responsible for design calculations, checking of shop drawings, inspection and supervision of fabrication and installation, monitoring of the structure for a period of at least 10 years and filing of reports with the appropriate authorities.
.8 Complete field instructions required during installation and any other pertinent information.

.3 Submit calculations to the Departmental Representative if requested.

.4 The Departmental Representative will not review or check such shop drawings for structural adequacy. The Contractor shall take the full responsibility for design, supplying, placing installation and maintenance.

.5 Submit a monitoring and shoring adjustment programme that shall include but not be limited to the following items:
.1 Schedule of monitoring/measuring settlement to the existing structure and settlement of the shoring structure. The monitoring and shoring adjustment shall be carried out at least twice per year for a period of 10 years unless directed otherwise by the Departmental Representative.
.2 Proposed monitoring locations. In general, the locations shall be as shown on the Contract Drawings, however, alternate or additional monitoring locations should be identified in the monitoring programme.
.3 Procedures for measuring the gaps between the existing structure and the shoring system due to drying of the bricks.

.4 Proposed shoring adjustment procedures and other actions to be carried out based on the magnitude of measurements taken during monitoring.

1.7 SHORING PERFORMANCE REQUIREMENTS

.1 General Requirements

.1 Construct substantially shoring systems suitable for geotechnical conditions encountered and which will meet all requirements of these performance Specifications. Prevent destabilization of brick structure or damage to any structure and/or works.

.2 Monitoring Deflection

.1 Monitor and keep a written record of deflections of the shoring system at all critical locations and where shown on the Contract Drawings. The Departmental Representative reserves the right to review and field check the Contractor's records.

.3 Permits

.1 Arrange and pay for all permits, notices and inspections necessary for the proper execution and completion of the work, except for inspections and testing by Independent Inspection and Testing Companies as specified under Inspection and Testing.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Shoring system shall be manufactured by Peri or reviewed equivalent.

.2 Structural Steel: to CSA G40.21 with a minimum yield strength of 300 MPa.

.3 Steel connections: steel gusset plates angles to CSA G40.21, grade 230 260 300 350, type G W T.

.4 Aluminum: to conform to 6061-T6 with a minimum yield strength of 240 MPa.

.5 Nails: to CSA B111.

.6 Bolts: lag screws, nuts and washers to CAN/CSA O86.1.

.7 High-tensile bolts: to ASTM A 325M ASTM A 490M.

.8 Welding materials: CSA W59.

PART 3 - EXECUTION

3.1 GENERAL

.1 Shoring to be installed in accordance with the shop drawings and under review of the shoring by design engineer.

3.2 INSPECTION

.1 Before work is begun, inspect conditions upon which work depends. Inform the Departmental Representative in writing of conditions not identified on the drawings.

3.3 PLACEMENT - GENERAL

.1 Do not place any part of shoring and bracing systems until permission by the Departmental Representative has been given to proceed.

.2 Retain professional engineer responsible for design and supervision of construction of the shoring system to verify that work is carried out in conformance with the design. Engineer to provide written acceptance of "As Constructed" shoring at the completion of construction.

.3 Have shoring systems installed by personnel with demonstrated competence and experience in this type of work

.4 Set all shoring to a true vertical and to dimensions and elevations indicated on reviewed shop drawings.

.5 Do not encase any part of shoring structure in the structural concrete of the permanent structure without written permission from the. Departmental Representative.

.6 If bracing members are to be removed during construction, timing and procedure for removal shall not induce stresses in permanent structures or bracing members in excess of those allowed by applicable codes.

3.4 INSPECTION AND TESTING

.1 The Departmental Representative will appoint an Independent Inspection and Testing Company to make inspections or perform tests as the Departmental Representative directs. The Independent Inspection and Testing Company shall be responsible only to the Departmental Representative and shall make only such inspections or tests as the Departmental Representative may direct. The inspections by the Independent Inspection Company do not waive the responsibility of the Contractor and the Shoring System Manufacturer to inspect and maintain the shoring system as specified herein.

3.5 MONITORING DEFLECTION

.1 Monitor relative change in dimension and any gap between of shoring systems and existing building structure, twice per year in accordance with the reviewed monitoring programme. Verify that their deflections are within specified requirements.

.2 Settlement limits for the shoring foundation slab and the existing building foundations are as follows:
.1 Slab Settlement 20 mm
.2 Existing Building Settlement 3 mm.

.3 Report to the Departmental Representative immediately if specified settlement limits are exceeded.

.4 Submit written records of settlement and deflection result to the Departmental Representative twice per year in conjunction with the monitoring.

3.6 SHORING REMOVALS

.1 Shoring is to remain in place and properly maintained by the General Contractor and the Shoring System Manufacturer for a period of ten (10) years.

.2 When approved for removal by the Departmental Representative, the shoring system shall be removed and disposed of off site in accordance with local bylaws and environmental regulations.

3.7 QUALITY CONTROL

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

.2 Bring to the attention of Departmental Representative any defects in the work or departures from the Contract Documents and shop drawings which may occur during construction. The Departmental Representative will decide upon corrective action and state recommendations in writing.

.3 The Departmental Representative's general review during construction and inspection and testing by Independent Inspection and Testing Companies reporting to the Departmental Representative are both undertaken to inform the Departmental Representative of the Contractor's performance and shall in no way augment the Contractor's quality control or relieve him of contractual responsibility

3.8 NOTIFICATION

.1 Give the Departmental Representative advance notice of shop fabrication, field installation and other phases of the work so as to afford the Departmental Representative reasonable opportunity to inspect the work for compliance with contract requirements. Failure to meet this requirement may be a cause for the Departmental Representative to classify the work as defective.

3.9 DEFECTIVE MATERIALS AND WORK

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

.2 All testing shall be conducted in accordance with the requirements of the Ontario Building Code, except where

this would, in the Departmental Representative's opinion, cause undue delay or give results and representative of the rejected material in place. In this case, the tests shall be conducted in accordance with the standards given by the. Departmental Representative.

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

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 41 00 – Regulatory Requirements.

.2 Section 03 30 00.1 - Cast-in-Place Concrete.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
.1 ASTM C 117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
.2 ASTM C 136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
.3 ASTM D 422-632002, Standard Test Method for Particle-Size Analysis of Soils.
.4 ASTM D 698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ^{3}) (600 kN-m/m ^{3}).
.5 ASTM D 1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ^{3}) (2,700 kN-m/m ^{3}).
.6 ASTM D 4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.3 Perform work in accordance with the Standards and Guidelines for the Conservation of Historic Places in Canada (SGCHPC) which can be accessed through the link http://www.historicplaces.ca/en/pages/standard - normes.aspx. As this structure is a National Historic Site of Canada (NHSC) and is classified as a level 1 cultural resource, the SGCHPC must be reviewed and adhered to as required for the significance of this historic structure.

1.3 DEFINITIONS

.1 Excavation classes: one class of excavation will be recognized; common excavation.
.1 Common excavation: excavation of materials of whatever nature.

.2 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.3 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.4 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

.5 Unsuitable materials:
.1 Weak, chemically unstable, and compressible materials.
.2 Frost susceptible materials:
.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D 4318, and gradation within limits specified when tested to ASTM D 422 and ASTM C 136: Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.
.2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45

.3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

.6 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

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

.1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.
.2 Submit for review by Departmental Representative proposed dewatering and heave prevention methods as described in PART 3 of this Section.
.3 Submit to Departmental Representative written notice at least 7 days prior to excavation work, to ensure cross sections are taken.
.4 Submit to Departmental Representative written notice when bottom of excavation is reached.
.5 Submit to Departmental Representative testing and inspection results and report as described in PART 3 of this Section.

.3 Preconstruction Submittals:
.1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
.2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field clearance record from utility authority location plan of relocated and abandoned services, as required.

.4 Samples:
.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
.2 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.
.3 Submit 70 kg samples of type of fill specified.
.4 Ship samples to Departmental Representative , in tightly closed containers to prevent contamination and exposure to elements.

1.5 QUALITY ASSURANCE

.1 Submit design and supporting data at least 2 weeks prior to beginning Work.

.2 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province Ontario, Canada.

.3 Keep design and supporting data on site.

.4 Engage services of qualified professional Engineer who is registered or licensed in Province of Ontario, Canada in which Work is to be carried out to design and inspect shoring, bracing and underpinning required for Work.

.5 Do not use soil material until written report of soil test results are reviewed by Departmental Representative.

.6 Health and Safety Requirements:
.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 WASTE MANAGEMENT AND DISPOSAL

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

1.7 EXISTING CONDITIONS

.1 Buried services:
.1 Before commencing work verify location of buried services on and adjacent to site.
.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
.3 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing re-routing. Costs for such Work to be paid by Departmental Representative.
.4 Record location of maintained, re-routed and abandoned underground lines.
.5 Confirm locations of recent excavations adjacent to area of excavation.

.2 Existing buildings and surface features:
.1 Conduct, with Departmental Representative, condition survey of existing buildings, and monuments which may be affected by Work.
.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

1.8 PROTECTION

.1 Prevent damage to existing structure, utilities, trees, lanscaped areas and site appurtenances which were to remain. Make good any damage.

.2 Verify locations of utilities shown on the drawings prior to commencing any excavation.

.3 There are significant archaeological resources on site. Archaelogists may monitor work to ensure no archaelogical resources are damaged. See section 01 11 00 Summary of Work for requirements. Be aware that work could be stopped in the area where such resources are found and redirected elsewhere until situation is resolved to satisfaction of Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 High Performance Bedding (HPB)Dufferin Aggregates Cayuga (washed) High Performance Bedding TM or reviewed equivalent. The "Cayuga(washed) HPBT" is a limestone aggregate non-uniformly graded gravel with a 9.5 mm maximum aggregate size.

.2 Granular A to OPSS 1010.

PART 3 - EXECUTION

3.1 PREPARATION/ PROTECTION

.1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.

.4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.5 Protect buried services that are required to remain undisturbed.

3.2 STOCKPILING

.1 Stockpile fill materials in areas designated by Departmental Representative.
.1 Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

3.3 EXCAVATION

.1 Excavate to lines, grades, elevations and dimensions as indicated as directed by Departmental Representative and as shown on the drawings.

.2 Remove concrete masonry and rubbles and other obstructions encountered during excavation in accordance with Section 02 41 13 - Selective Site Demolition and as directed by the Departmental Representative.

.3 Excavation must not interfere with bearing capacity of adjacent foundations and is to be carried out under full time review of the Departmental Representative.

.4 Dispose of surplus and unsuitable excavated material off site in accordance with local bylaws and environmental regulations.

.5 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.6 Notify Departmental Representative when bottom of excavation is reached to allow for inspection by the Geotechnical Engineer.

.7 Obtain Departmental Representative's approval of completed excavation.

.8 Correct unauthorized over-excavation as follows:
.1 Fill under bearing surfaces and footings with High Performance Bedding compacted to not less than 100% of Standard Proctor maximum dry density.

.9 Hand trim, make firm and remove loose material and debris from excavations.
.1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil unless directed otherwise by the Departmental Representative.

.10 Hand excavated adjacent to existing walls carefully to avoid damaging the existing walls.

.11 Prior to excavation, remove existing brick floor carefully and store the bricks on site as directed by the Departmental Representative.

3.4 FILL TYPES AND COMPACTION

.1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D 698.

.2 Within building area: use High Performance Bedding to underside of base course for floor slabs. Compact to 100 % of corrected maximum dry density. Minimum thickness of High Performance Bedding to be 200 mm.

.3 Under concrete slabs: provide 50 mm minimum Granular A to underside of slab. Place Granular A on compacted High Performance Bedding. Compact base course to 100 % of corrected maximum dry density.

3.5 BACKFILLING

.1 Do not proceed with backfilling operations until completion of following:
.1 Departmental Representative has inspected and approved of construction below finish grade.
.2 Inspection, testing, approval, and recording location of underground utilities.
.3 Removal of shoring and bracing; backfilling of voids with satisfactory fill material.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Compaction to be carried out with equipment that creates minimal vibration such as steel drum follers and small vibrator plate compactors.

3.6 Vibration Monitoring

.1 Vibration monitoring is to be carried out during Excavation and Backfilling. Monitoring locations are indicated on the drawings.

.2 Vibration during Excavation and Backfilling shall not exceed 8 mm/s PPV (Peak Particle Velocity) measured on the existing structure.

.3 Vibration to be monitored continuously during

excavation and backfill operations unless directed otherwise by the Departmental Representative.

3.7 RESTORATION

.1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 21 - Construction/Demolition Waste Management.

END OF SECTION