1.0 GENERAL

Work under this Contract includes the repair and protection of the podium deck and basement areas located at 2213 Dufferin Street in the City of Toronto in the Province of Ontario.

1.1 Description of Existing Structure

.1 The 2213 Dufferin Street site includes a community center building, outdoor park, asphalt paved parking areas, and miscellaneous amenities. The site is located south of the Dufferin Street and Eglinton Avenue West intersection, and is bound by Dufferin Street on the West, Keywest Avenue on the North, Gibson Street on the South, and residential properties abutting Northcliffe Blvd on the east. The site is roughly rectangular in shape, running approximately 730 feet north to south, and 400 feet east to west, with a total gross area of approximately 325,000 square feet, including exterior recreational areas.

The community center incorporates an original two-story structure that spans sloping exterior grade to incorporate a partially below-grade lower level. The original building utilizes load-bearing perimeter and interior masonry walls with steel floor framing that incorporates open-web-steel joists and w-section steel beams.

The original building was expanded to the north and west after original construction to add above-grade recreation facilities and below-grade amenity space. The total building is approximately 200 feet north to south and 80 feet east to west, with a total footprint of roughly 16,000 square feet. The lower level of the original building extends approximately 50 feet west beyond the footprint of the above-grade building, creating a landscaped podium deck.

The west extension is below grade with finished interior space beneath a landscaped podium deck slab. The below-grade areas include a corridor, multipurpose room, washrooms, a kitchen, and storage areas. The interior areas are typically finished with gypsum board and acoustic tile ceilings, suspended with lightweight galvanized steel stud framing. The podium deck structure utilizes normally reinforced cast-in-place concrete construction. A stairwell exits to the podium deck surface near the south extent.

The podium deck slab has openings for five skylights and includes a mix of hard and soft landscaping. The skylights are elevated above the landscaped surface. There are also two large, raised planter beds. The west skylights include decorative concrete masonry and glass block perimeter walls with roofing above to provide indirect lighting to the interior. The east skylights incorporate sloped glazing on perimeter curbs. The raised planter beds utilize perimeter cast-in-place concrete curbs that were faced with decorative precast concrete masonry units; however, the decorative units have typically been removed. A hot-rubberized asphaltic waterproofing system is present beneath the podium deck finishes to protect the slab and interior areas against moisture ingress. A drainage layer is present above the waterproofing system. The soft-landscaped areas utilize planting medium and sod. The hard-landscaped areas utilize precast concrete unit pavers on a sand setting bed.

1.2 Description of Work

.1 It is the Contractor's responsibility to provide all labour, material, equipment and supervision to complete the repairs outlined in this specification taking into account all site conditions, noise restriction, work area restrictions, protection requirements, accessibility restrictions, etc. No extras will be entertained for inconveniences after the award of this Contract.

.2 In particular, the work includes but is not necessarily limited to the following:

.1 The installation and maintenance of hoarding, dust protection, and construction signage around each phase of work as described in Section 01 56 00.

.2 The installation and maintenance of ventilation and exhaust systems into and out of work area as described in Section 01 56 00.

.3 Targeted removal and disposal of deteriorated interior finishes, lightweight steel framing, and batt insulation.

.4 Removal and disposal of existing guards at the podium deck perimeter.

.5 Removal and disposal of the podium deck landscaping, drainage board, and waterproofing systems to expose the structural slab below. The scope will include demolition of the raised planter beds, guards and skylight structures. Excavate around the podium deck to expose minimum 36" of the foundation wall downturn.

.6 Installation of new framing and podium deck infill slab, at all skylight openings. Fabricator to design full shear connector at existing beams. Where welding is not feasible, fully weld new framing to baseplates and design connection to concrete surfaces. Contractor to expose beams and verify dimensions and existing conditions as part of shop drawing preparation.

.7 Localized podium deck surface repairs and foundation wall vertical repairs at areas of corrosion-related concrete deterioration.

.8 Installation of new cast-in-place concrete ramp complete with AODA compliant guards and handrails.

.9 Installation of new cast-in-place concrete curbs at the podium deck perimeter and building exterior wall as shown on the drawings.

.10 Installation of new elastomeric acrylic coating on curbs as shown on the drawings. Work to include temporary removal and reinstatement of exterior brick to facilitate curb installation.

.11 Installation of new bi-level area drains to replace existing drains and where required to provide adequate supplemental drainage. Work to include all tie-ins to the existing drainage systems.

.12 Installation of sloped bonded concrete topping on the podium deck to slope to drains.

.13 Surface preparation and installation of a new hot rubberized waterproofing system on the podium deck surfaces, complete with drainage and protection board. The waterproofing system to be upturned at all vertical surfaces.

.14 Installation of new concrete topping hard landscaping finishes, complete with new granular setting bed to slope to drains.

.15 Flushing and cleaning of the podium deck and stairwell roof drainage systems.

.16 Installation of a new fenced enclosure complete with operable access gate beneath the north access walkway.

.17 Installation of new electrical lighting on the east building elevation. Work to include verification of existing wiring.

.18 Relocation of existing site signage including installation of new concrete foundations.

.19 Installation of new code compliant podium deck guards at the podium deck perimeter and where shown on the drawings.

.20 Reinstatement of existing and installation of new interior finishes to match existing conditions, including beneath skylight infill. Work to include removal and reinstatement of fixtures where required.

.21 Final cleaning of structure, fixtures, piping, etc., and the disposal all waste products and/ or debris generated by the construction activity as well as any material present in the work area prior to the commencement of the Work. The areas requiring cleaning shall consist of all areas affected by the Work.

1.3 Work Sequence

.1 The work areas will be available as of **7:00 AM at August 25th, 2025.** Contractor to confirm start date. All work outlined in these specifications is to be complete by **October 20th, 2025** providing for a construction schedule of **8 weeks**.

1.4 Construction Schedule

.1 In conjunction with and in a form acceptable to the Consultant and Owner, provide within 5 working days after award of contract a detailed schedule indicating the following parameters.

.1 Start date and completion date for each phase of the work.

.2 Start and completion dates for concrete repairs for each phase of work based on estimated quantities in Bid Form.

.3 Start and completion of waterproofing work coordinated with concrete repair schedule and patch curing.

.4 Coordination of other repair items (drainage system, expansion joints, etc.) with the concrete and waterproofing repairs.

.5 Daily and weekly schedule for labour and equipment, hours of operation, and crew sizes.

.2 The construction schedule shall reflect completion of all work under the Contract within the specified time and in accordance with these Specifications.

.3 If the Contractor desires to make a major change in the method of operation after commencing construction, or if the schedule fails to reflect the actual progress, the Contractor shall submit to the Consultant a revised construction schedule in advance of beginning revised operation.

END OF SECTION

1.0 GENERAL

1.1 Contractor's Use of Site

.1 Building is to remain open throughout the course of the Work. Contractor has use and access to designated work areas during specified work hours, unless otherwise stipulated by the Owner during the course of the Work.

.2 Coordinate work schedule with the Owner to minimize disruption of the site and building. No work shall be performed until approved by Owner.

.3 It is Contractor's responsibility to ensure the building remains operational at all times and to perform work as required to keep exits and entrances available to building users at all times.

.4 It is Contractor's responsibility to control traffic and to redirect if necessary to allow access to building areas outside of work area. Any required traffic rerouting and work sequence shall be closely coordinated with the Owner.

.5 Provide signage of professional quality, barriers, and hoarding as necessary to protect the public from construction and Contractor operations, to secure the work area, and to route traffic through or around designated work areas. Provide signage at each entrance indicating that repairs are being performed and we are sorry for the inconvenience. Refer to Drawings and Section 01 56 00 for a list and locations of non-standard construction signage that must be supplied by the Contractor. These signage requirements are in addition to any standard signs required to control and reroute traffic or maintain public safety.

.6 Hoarding and dust protection is to be provided around each area of work in accordance with Section 01 56 00. Each phase of work is to be sealed to prevent the release of construction dust into other areas.

.7 Completely enclose and ventilate work areas (fresh air in and exhaust out) without allowing dust to escape from the work area. Exhaust system must filter dust out of the air before it is released into the atmosphere. All exhaust systems must be filtered and directed to the outside through ducting, which is to be installed in a manner acceptable to the Owner and Consultant. Clean and replace filters regularly.

.8 Implement temporary measures to maintain interior air quality, temperature, and ventilation during performance of the Work.

.9 Use of power plant and percussive equipment to be in accordance with all local by-laws and ordinances.

.10 Do not unreasonably encumber site with materials or equipment.

.11 Do not overload slab areas with equipment or stored materials. Review all equipment weights and loading procedures with Consultant prior to commencing work.

.12 Do not close, obstruct, or store materials in roadways, sidewalks, or passageways without prior approval from the Owner. Do not interfere with safe passage to and from building and adjacent public sidewalks and roads.

.13 Move stored products or equipment that interfere with operation of the building, Owner, or residents.

.14 Obtain and pay for all necessary approvals, deposits and permits to facilitate the work, locate equipment or materials on city property, excluding building permit. Contractor responsible for applying for and securing tree protection permit as required.

.15 Protect existing light standards, walls, plants, finishes, windows, doors, etc.

.16 Protect all utilities, gas mains, electrical conduit, etc. that must remain in service throughout the construction period.

.17 During transportation of materials or equipment through occupied areas, protect the public, property, and finishes from damage. All damage caused by the Contractor is to be repaired or rectified at Contractor’s expense.

.18 Make allowance in price to cover all costs of temporary removal and replacement or relocation of existing electrical wiring and mechanical hardware required for completion of the Work.

.19 Propane powered equipment is not permitted within interior areas.

.20 Temporary heat and ventilation used during construction – including the cost of installation, fuel, operation, maintenance, and removal of equipment – shall be paid for by the Contractor. Use of direct-fire heaters discharging waste products into work areas is not permitted.

.21 Use Dufferin Street for delivery and removal of material for duration of Project. Disposal bins, supply trucks, etc. are to be located within hoarded areas in a location coordinated with the Owner. Contractor is responsible for all required permits.

.22 Maintain free access routes for ambulance, fire emergency vehicles, garbage trucks, etc.

1.2 Hours of Work

.1 Use of all equipment to be restricted in accordance with local and municipal noise by-laws and regulations.

.2 All All Work, including noise-generating work, shall be limited to the hours of 8:00 A.M. to 6:00 P.M. MONDAY through FRIDAY. No work is permitted on SATURDAY, SUNDAY, and STATUTORY HOLIDAYS unless otherwise coordinated with the Owner during the course of the Work.

1.3 Effect on Building and Site

.1 Schedule operations to minimize interruption of the normal use of the site and building, and to comply with laws, by-laws, ordinances, rules, and regulations relating to the Work.

.2 Locate all existing utilities prior to construction and protect them during construction.

END OF SECTION

1.0 GENERAL

1.1 Substitution of Materials Prior to Bid Closing

.1 Substitution of specified products or systems is permitted only when alternatives have been approved by the Consultant, in writing, prior to bid closing.

.2 Inform the Consultant in writing when specified products or systems are not anticipated to be available at the Place of the Work during construction. The Consultant will advise Bidders of alternatives.

.3 If specified products or systems are not available and the Consultant was not notified prior to bid submission, the Consultant will choose a suitable substitute product at the time of construction.

1.2 Request for Approval of Alternatives

.1 A Bidder or Supplier of a product or system may apply for approval of their product or system as an alternative up to seven calendar days prior to bid closing. The Consultant will advise applicants of the status of their request prior to bid closing.

.2 Provide the Consultant with sufficient information to review the alternative. This information may include:

.1 Project name and number

.2 Specification sections affected by the proposed alternative

.3 Product technical data sheets

.4 Supplier installation instructions and requirements

.5 Supplier warranty and warranty requirements

.6 Product application sample at specified material thickness and finish on sample substrate

.7 Installation history, including:

.1 Installation locations, dates, project sizes, project values

.2 Description of project and product usage

.3 Owner and consultant

.8 Test data

1.3 Approval of Alternatives

.1 The Consultant reserves the right to reject any requests for approval of alternatives.

.2 The Consultant will outline approved alternatives by addenda issued prior to bid closing. The addenda will indicate the alternative Product or system, where and how it may be used, and limitations. If an addendum is not issued, the bid is to be based on use of the specified Product or system.

.3 The Contractor assumes full responsibility and bears all associated costs where an alternative Product or system is incorporated into the Work. Claims for increases to the Contract Price or for changes to the Date for Substantial Performance of the Work due to changes in the Work that are necessitated by the use of an alternative will not be considered. All associated costs are to be included in the bid.

.4 The Contractor is to reimburse the Owner for their additional costs associated with incorporating alternatives into the Work. This may include additional consulting costs billed to the Owner to accommodate changes to the Contract Documents necessitated by the change.

.5 Contractor cost savings arising from approval of alternatives are to be reflected in the Contract Price.

END OF SECTION

1.0 GENERAL

1.1 Project Coordination

.1 The Contractor is responsible for coordination of trades. Lines of demarcation between Contractor and trades or trade and trade are solely the responsibility of the Contractor.

.2 Contractor is responsible for coordination with the Owner for on-site activity as it affects the operation of the building.

1.2 Notification for Field Review

.1 Notify the Consultant at least 24 hours in advance for field review. No work shall be covered or concealed until reviewed by the Consultant unless informed that a field review will not be performed. Such review does not absolve the Contractor from their responsibility to perform the work in accordance with the Contract Documents.

.2 The Consultant shall notify the designated testing company for material sampling and testing.

.3 Provide the Consultant with safe access to any part of the Work requiring field review.

.4 The Owner may be present during field review at the Owner’s discretion.

1.3 Superintendence

.1 Provide a full time Superintendent who is to be on-site on a continuous basis during the execution of the work. Superintendent shall have a mobile phone at all times during working hours to allow for communication with the Consultant or Owner.

.2 Superintendent shall have facility with written and verbal English.

.3 Superintendent shall be satisfactory to the Owner and the Consultant, and shall not be changed without the Consultant or Owner’s consent.

.4 Superintendence shall be deemed unsatisfactory and changes or additions to superintendence may be demanded when control, organization, or coordination of the Work is not satisfactory, quality of the Work does not meet requirements of the Contract Documents, directions given in accordance with the Contract Documents are not followed, or progress is behind schedule.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Administration of Project Meetings

.2 Pre-Construction Meetings

.3 Progress Meetings

1.2 Administration of Project Meetings

.1 Consultant will preside at meetings.

.1 A representative of the Consultant will record the minutes, include significant proceedings and decisions, and identify "action by" parties.

.2 Consultant will reproduce and distribute copies of the minutes to meeting participants, affected parties not in attendance, the Owner, and the Contractor.

.2 Consultant will:

.1 Schedule and administer project meetings unless otherwise noted.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each unscheduled meeting three days in advance of meeting date to the Contractor and Owner. Contractor is to notify relevant Subcontractors.

.3 City to provide physical space for site meetings.

.4 Contractor, Subcontractor, and Supplier representatives at meetings shall be qualified and authorized to act on behalf of the party each represents.

1.3 Pre-Construction Meeting

.1 After award of Contract, a meeting of all parties in the Contract shall be held to discuss and resolve administrative procedures and responsibilities.

.2 Representatives of the Owner, Consultant, Contractor, major Subcontractors, and construction review personnel will attend.

.3 Consultant will establish a time and location of the meeting and notify concerned parties at least five days before the meeting.

.4 Agenda to include the following:

.1 Appointment of official representatives of participants of the Work.

.2 Schedule of Work, progress scheduling.

.3 Shop drawings (if required) and schedule of shop drawing submissions.

.4 Requirements of temporary facilities, site signage, hoarding, dust protection, offices, storage sheds, utilities, fences.

.5 Delivery schedule of critical equipment.

.6 Site security.

.7 Contemplated change orders, procedures, approvals required.

.8 Take over procedures, acceptance, warranties.

.9 Monthly progress claims, administrative procedures, holdbacks.

.10 Appointment of inspection and testing agencies or firms.

.11 Insurance, transcript of policies.

1.4 Progress Meetings

.1 The Consultant will schedule construction progress meetings every two weeks. Additional meetings may be scheduled by the Consultant, Contractor, or Owner as required to expedite the Work.

.2 Consultant, Contractor, major Subcontractors involved in the Work, and Owner, when required, are to attend.

.3 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems that impede construction schedule, conflicts.

.4 Progress, schedule during succeeding work period.

.5 Corrective measures and procedures to regain projected schedule.

.6 Revisions to construction schedule.

.7 Review of off-site fabrication delivery schedules.

.8 Review submittal schedules; expedite as required.

.9 Maintenance of quality standards.

.10 Pending changes and substitutions, Notices of Proposed Change, Change Orders.

.11 Review proposed changes effect on construction schedule and on completion date.

.12 Other business.

END OF SECTION

1.0 GENERAL

.1 This Section specifies general requirements and procedures for shop drawing, product data, sample, and mock-up submissions for Consultant's review. Additional specific submission requirements may be specified in other Sections.

.2 Do not proceed with Work until relevant submissions are reviewed by Consultant.

.3 Present shop drawings, product data, samples, and mock-ups in SI metric units. Where items or information is not produced in SI metric, converted values are acceptable.

.4 Contractor's responsibility for errors or omissions in any submission is not relieved by Consultant's review of the submission.

.5 Notify Consultant, in writing at time of submission, of any deviations from the requirements of Contract Documents that form part of submissions. Also indicate the reasons for the deviations.

.6 Contractor's responsibility for deviations from the requirements of the Contract Documents in submissions is not relieved by Consultant's review of the submissions unless Consultant provides written acceptance of the identified deviations.

.7 Make any changes in submissions that Consultant may require consistent with the Contract Documents and resubmit where directed by Consultant.

.8 Notify Consultant in writing of any revision other than those requested by Consultant when resubmitting.

1.1 Submission Requirements

.1 Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.

.2 Submit electronic copies of product data, manufacturer's catalogue sheets, brochures, literature, performance charts, and diagrams.

.3 Comply with the following requirements in regards to submission of product data:

.1 Delete information not applicable to project.

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

.3 Provide certification of compliance to applicable codes.

.4 Provide manufacturer's certification as to current production.

.4 Allow 10 working days for Consultant's review of each submission.

.5 Accompany submissions with an electronic transmittal letter that contains:

.1 Date.

.2 Project title and number.

.3 Contractor's name and address.

.4 Identification and quantity of each shop drawing, product data, and sample.

.5 Other pertinent data.

.6 Submission shall include:

.1 Date and revision dates.

.2 Project title and number.

.3 Name and address of:

.1 Subcontractor.

.2 Supplier.

.3 Manufacturer.

.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

.5 Details of appropriate portions of Work as applicable:

.1 Fabrication.

.2 Layout, showing dimensions, including identified field dimensions and clearances.

.3 Setting or erection details.

.4 Capacities.

.5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Wiring diagrams.

.9 Single line and schematic diagrams.

.10 Relationship to adjacent work.

.6 After Consultant's review, distribute electronic copies to relevant affected subcontractors.

1.2 Shop Drawings

.1 Provide electronic copies of shop drawings pertaining to installations and fabrications required by the Contract for Consultant review prior to commencing work. Provide full-size hard copy submissions if requested by Consultant. Unless noted otherwise, submit shop drawings for the following:

.1 Skylight infill framing including all connections to the base building structure.

.2 New guards, fence enclosure, handrails, etc.

.2 As part of RJC's field services, RJC will review shop drawings pertaining to work shown on RJC's drawings by means of an appropriate rational sampling procedure and will comment on the accuracy with which the Contractor prepared the shop drawings.

.3 Review of shop drawings is for the sole purpose of ascertaining conformance with the general design concept and is not an approval of the detail design inherent in the shop drawings. Design responsibility remains with the Contractor submitting the shop drawings.

.4 Review of shop drawings does not relieve Contractor of their responsibility for errors and omissions in shop drawings or for meeting all requirements of the Contract Documents.

.5 Contractor is solely responsible for information pertaining to fabrication process, techniques of construction and installation, and coordination of subcontractors.

.6 Cross-reference shop drawing information to applicable portions of Contract Documents.

.7 Shop drawings that require approval of any legally constituted authority having jurisdiction shall be provided by the Contractor to such authority for approval.

1.3 Product Data

.1 Product Data: Manufacturer's catalogue sheets, brochures, literature, performance charts, and diagrams, used to illustrate standard manufactured products.

.2 Submit electronic copies of product data.

.3 Sheet Size: 215 x 280 mm.

.4 Delete information not applicable to project.

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

.6 Cross-reference product data information to applicable portions of Contract Documents.

1.4 Samples

.1 Samples: Examples of materials, equipment, quality, finishes, workmanship.

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

.3 Reviewed and accepted samples will become standard of workmanship and material against which installed work will be reviewed.

END OF SECTION

1.0 GENERAL

1.1 Temporary Utilities

.1 Provide and pay for where specified, locate where directed, and maintain temporary facilities for the Work and for all Subcontractors, and remove them upon completion of the Work.

.2 Where specified to provide utilities, make all arrangements with the public utilities, obtain all necessary permits, provide or pay for connections, and pay all respective fees.

1.2 Electrical Power

.1 Discuss available power with the Owner prior to bidding.

.2 The Contractor shall pay for any alternations to the electrical system that may be needed to accommodate the Contractor’s equipment. Coordinate any required alterations with the Owner’s Representative. Reinstate the system to its original condition upon completion of the Work.

.3 The Owner shall pay for electrical consumption from building sources made available by the Owner.

1.3 Water Supply

.1 Contractor shall pay for the cost of any temporary water connections or alterations that are required to perform the Work. Reinstate the system to its original condition upon completion of the Work.

.2 The Owner shall pay for water consumption from building sources made available by the Owner.

1.4 Temporary Lighting

.1 Provide and maintain temporary lighting for safe demolition and working conditions conforming to Ontario Occupational Health and Safety Act.

.2 Illumination must be provided and maintained at all areas affected by the Work.

1.5 Damage to Electrical Systems

.1 Contractor is to have an electrical subcontractor at the ready to implement temporary or permanent electrical repairs to equipment and systems damaged during implementation of the work within a two (2) hour period.

.1 If the damaged lighting cannot be repaired within the specified period, the Contractor must promptly notify the Owner.

.2 If the Contractor does not repair the damaged lighting within the specified time and does not promptly notify the Owner, the Owner can coordinate repairs and deduct costs from the Contract.

1.6 Temporary Telephone

.1 Provide the foreman a mobile telephone for communication with the Consultant and Owner.

1.7 Temporary Fire Protection

.1 Provide and maintain temporary fire protection equipment during performance of the Work as required by governing codes, regulations, and by-laws.

1.8 Temporary First Aid Facilities

.1 Provide well-stocked and maintained first aid kits within the site office that are adequate to meet the requirements and hazards of the Work.

.2 Maintain safety data sheets (SDS) for all material being used at the project site. Ensure the SDS are readily available to the Consultant, Owner, and Contractor’s forces.

1.9 Temporary Sanitary Facilities

.1 Provide temporary sanitary facilities at the time of initial mobilization and maintain them throughout the course of the work. An exception will be granted to this requirement only where Owner has confirmed in writing that on-site washrooms are available for Contractor use.

.1 Sanitary facility is to include an odourless flushing chemical type temporary toilet that is properly enclosed, weatherproof, and serviced periodically as required.

.2 The building toilets and facilities shall not be used by the Contractor’s forces unless approved by Owner

1.10 Temporary Barriers and Enclosures

.1 Provide hoarding, fencing, barriers, barricades, and plant protection as required by the authorities and specified herein to protect persons and property, public and private. Refer to Section 01 56 00 for signage and hoarding requirements.

.2 Maintain barriers in sound, clean, and where required painted condition throughout the Work.

.3 Keep site clear of unauthorized signs.

.4 Provide barriers with required warning lights and signs.

.5 Hoarding, fencing, barriers, and barricades are to be constructed and supported in such a manner that no sharp projections that can cause personnel injury are created.

.6 Remove hazards requiring barriers as soon as possible.

.7 Remove barriers at time of turn-over of the Work to the Owner.

.8 Exterior enclosures shall be constructed to protect the work area from environmental conditions (i.e. weather tight) that may affect schedule.

1.11 Temporary Heating and Ventilation

.1 Provide and maintain supplementary heating as required to maintain sufficient application and curing temperatures.

.2 Provide and maintain supplementary ventilation as required. Ventilation requirements shall conform to Occupational Health and Safety Standards. Do not modify the base building systems without the coordination and approval of the Owner.

.3 Temporary heating and ventilation used during construction -- including the cost of installation, fuel, operation, maintenance, and removal of equipment -- shall be paid for by the Contractor. The use of direct-fired heaters discharging waste products into enclosed work areas will not be permitted.

1.12 Security

.1 Take all necessary precautions to guard site, premises, materials, and the public at all times other than when supervised work is in progress.

1.13 Protection of Work During Close-Down

.1 Should the project be closed down for any cause, assume all responsibility for its proper protection during such period.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Protection of the Work, work in progress, property, and persons.

1.2 Walk-Through Inspection of Site

.1 Prior to start of Work, perform walk-through inspection of site with the Consultant and Owner to document existing conditions.

.2 Provide a written notice to the Consultant that details all damaged property, as well as all items that appear to be of poor working order or appearance (i.e. sign, fixtures, dirt, etc.), including photo documentation. upon receiving this notice, the Consultant and Owner will review the validity of the listed items.

.3 If written notice is not given within five days of commencement of Work, it will be assumed that the Contractor has reviewed the site and has accepted the condition of the property as being free of damage.

.4 Any damages not listed as part of the written notice of clause 1.2.2 that are found after the completion of the work will be the sole responsibility of the Contractor to rectify, except where they can demonstrate damage is not due to their operations. These rectifications shall be completed in a timely and satisfactory manner to the satisfaction of the Consultant.

.5 The project will not be considered substantially performed if the cost to correct these outstanding deficiencies is greater than the limits outlined in the Construction Act.

1.3 The Work, Work In Progress, Property, and Persons

.1 Protect the Work during construction from damage by weather.

.2 Provide protection as required to protect work in progress and other property from damage and to provide suitable conditions for the progress of finishing work.

.3 Provide means for protecting occupied areas below the Work from water leakage between removal and reinstallation of the waterproofing systems.

.4 Take reasonable and required measures, including those required by authorities having jurisdiction, to protect the public and those employed on the Work from bodily harm.

.5 Comply with requirements of Ontario Occupational Health and Safety Act.

.6 Contractor shall be prepared to provide respirators, dust protection, ear protection for those employed by the Consultant and Owner at the site.

.7 Direct all Subcontractors to protect their own work, existing property, adjacent public and private property, and work of other Sections from damage while working.

1.4 Construction Signage

.1 Contractor shall provide all required signage necessary to protect the public from the construction, control pedestrian flow around the work areas and to inform patrons that construction activity is in process.

.2 Additional signs may be required at the discretion of Owner or Consultant as construction progresses. No extras will be entertained for signage requirements after tenders close.

.3 All signage is to be of professional quality and design and consistent with typical construction signage.

.4 Typical signage that may be required are as follows:

.1 This Entrance is Temporarily Under Construction – Sorry for the Convenience

.2 This Entrance/Exit is Closed due to Construction – Please use Other Entrance/Exit (with directional arrow)

.3 Danger – Open Excavation

.5 Signage will be required at all access gates and entrances to the work area. This signage shall consist of the standard “Danger Do Not Enter” sign with an additional sign (special order) indicating that the area is temporarily under construction and we are sorry for the inconvenience.

.6 All non-standard signage is to be of adequate size (discuss with C onsultant prior to ordering) with orange background and large black letters and decals. Plywood backing is sufficient. All signs are to be of professional quality.

.7 All signage is to be securely fastened directly to hoarding or, if signage is required and hoarding is not available, the signs are to be securely fastened to ballasted wood stands. Signs are to be installed without projections and sharp edges that may cause injury.

1.5 Construction Barriers and Enclosures

.1 All work areas are to be completely enclosed by hoarding and dust protection and only accessible to the Contractor, Owner, and Consultant.

.2 Contractor shall supply and construct hoarding, barriers, and enclosures as indicated in these specifications, drawings, and as directed by the Consultant or Owner as the construction progresses.

.3 Protect trees and landscaping in accordance with applicable bylaws and authorities having jurisdiction, including applying for and securing necessary permits required to complete the work.

.4 No extras shall be entertained for hoarding, barriers, and enclosures after bid close unless the scope of work is significantly changed.

.5 Work areas are to be completely enclosed to contain dust and debris so that it does not escape to other site or interior areas.

.6 Contractor shall be responsible to ventilate work area (fresh air in and exhaust out) without allowing dust to escape. The exhaust system must filter dust out of the air before it is released into the atmosphere.

.7 The Contractor is responsible for any damage to mechanical equipment, motors, elevator equipment, fire alarm systems and devices, etc. due to dust contamination.

.8 Hoard areas that require protection and still require access using temporary vestibules. Adjust pressurization by providing necessary fans to prevent dust from entering these areas.

.9 The following types of enclosures/ hoarding systems will be required for this construction project:

.1 Full Height Dust Protection

.1 This system consists of full height poly-weave tarping fastened to slab surface and soffit with 2x4 construction grade wood nailers wedged tight to slab surface and soffit with 2x4 studs or post shores at 4’-0” c.c. Seams of poly-weave tarping, if any, are to be fastened together with duct tape.

.2 The main purpose of this system is to control dust and keep it from escaping from work area, thus it must be dust tight.

.3 This system shall be supplied to enclose all interior areas at which dust-generating activities are to be performed, including areas below through slab and soffit repairs.

.2 Exterior Site Hoarding

.1 Ballasted or anchored 6’ high full fabric chain link fence. Chain link fence to consist of 2” x 9 gauge galvanized chain link mesh with polyethylene privacy stalling, colour to Owner’s approval. Support to be 1-7/8”, 0.090 wall line posts with top and bottom 9 gauge wire rails. Terminal posts to be 3-1/2” OD Schedule 40 pipe.

.2 The main purpose of this system is to deter unauthorized access into exterior areas of work and provide privacy.

.3 This system to be installed around all exterior areas of work as shown in the drawings.

.10 All seams in poly-weave tarping and hoarding are to be taped together to provide dust tight enclosure.

.11 Anchor holes are to be repaired after construction hoarding has been removed. Contractor to repair all finishes and painted surfaces damaged by fastening materials used as part of hoarding and protection systems.

.12 Restrict access for unauthorized personnel by placing barricades or posting guards around areas of the Work. Unauthorized personnel shall mean the public and anyone not directly concerned with the execution, supervision, or inspection.

.13 Exterior locations (areas exposed to weather) are to be protected against weather conditions that may hinder the performance of work in these areas.

1.6 Existing Buildings, Curbs, Roads, Lanes, and Landscaping

.1 Protect existing buildings, structures, curbs, roads, lanes, and hard and soft landscaping. If, during work, any existing items are damaged, repair or replace them.

.2 Provide pavement, curb, and sidewalk protection for public thoroughfares and the Work in progress as required by the authorities, and to protect public property and the Work.

.3 Protect and maintain communications/lighting pole guy-wire anchorage within the area of work.

.4 Pay for the municipal road damage deposit.

1.7 Control of Construction Generated Dust, Debris, Fumes, Etc.

.1 Dust, dirt, construction debris, water, and fumes from the work areas must not be permitted to enter areas of the building or rooms in, or adjacent to, work areas.

.2 Protection shall be provided for all entrance and exit ways, floors, walls, standing fixtures, air intakes, exhaust fan openings, floor drains, etc. against dust, spillage, overspray of materials, and damage during the construction period. The required protection shall consist of but not be limited to the following:

.1 Filter cloth in all floor drains within the work area.

.2 Filter cloth over all intake and exhaust louvers and openings.

.3 Poly-weave tarping over doorways and around the exterior perimeter of work area to prevent the escape of dust and debris from the work area.

.4 Protect sprinkler heads with polyethylene or filter cloth to prevent dust build up.

1.8 Protection of Existing Exposed Facilities

.1 Protect existing lighting system from damage or remove and re-install upon completion of repairs.

.2 If Contractor wishes to use existing lighting system as an alternate to installing temporary light, Contractor shall assume all responsibility for damages incurred.

.3 Protect exposed conduit, fixtures, attached devices, sprinkler fire system plumbing, and other systems against the accumulation of dust, debris, and damage. The Contractor will be responsible to correct any damages to these systems at their own expense. Contractor to promptly report any damage to the Owner and the Consultant.

.4 Inspect materials, equipment, and components to be re-used or turned over to the Owner. Note their condition and advise Consultant in writing of any defects or conditions that would affect their removal and re-use, prior to removal.

.5 Prior to commencing Work, contact the Owner to locate all protective or alarm systems and sensors. All services shall be protected against damage or interruption. All claims resulting from damage shall be the responsibility of the Contractor.

.6 Contractor must notify the Owner of any fault or alarm to the main fire alarm panel immediately. When Contractor's activities result in charges to service the fire alarm panel or alarm system, the Contractor shall bear all costs.

.7 Any damage to existing surfaces or finishes to remain caused by the construction shall be repaired by the Contractor at no cost to the Owner.

1.9 Overloading

.1 Load no part of the structure during construction with a load greater than its designed capacity.

.2 Submit equipment weights and construction procedures to the Consultant for review prior to commencing the Work.

.3 Make every temporary support as strong as the designed permanent support.

.4 Place no load on concrete slabs until they have cured and have achieved sufficient strength to bear the load safely.

1.10 Fire Protection

.1 Take necessary precautions to eliminate fire hazards and to prevent damage to the Work, building materials, equipment, and other property, both public and private, having to do with the Work. Inspect the Work at least once a week for this purpose.

.2 Store and locate products and equipment packed in cardboard cartons, wood crates, and other combustible containers in orderly and accessible manner. Place approved types of firefighting equipment in vicinity of products packed in this type of crate or carton until permanent fire protection and equipment are available.

.3 Do not store flammable products, such as paint or fuel, on site except in Owner-approved locations, if available.

.4 Tarpaulins to be fire-resistant.

.5 Open fires and burning of rubbish or debris are not permitted on site.

END OF SECTION

1.0 GENERAL

1.1 Manufacturer's Instructions

.1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods. Supply copies of these instructions to Consultant prior to commencing work.

.2 Notify Consultant in writing of any conflict between the Contract Documents and manufacturer's instructions.

1.2 Delivery, Storage, and Handling

.1 Deliver, store, and maintain packaged materials with manufacturer's seals and labels intact.

.2 Immediately remove rejected materials from the Place of the Work.

.3 Storage and handling of materials shall conform to Ontario Occupational Health and Safety Act and manufacturer's instructions.

.4 Toxic or hazardous materials shall be secured in a locked storage area.

.5 All containers to be labeled in accordance with WHMIS regulations.

.6 All containers to be labeled with material expiration dates. Materials older than the expiry date shall not be used on the Work and shall be removed immediately from the site.

.7 Provide Owner and Consultant with electronic copies of all Safety Data Sheets (SDS) and maintain hard copies on site.

1.3 Materials

.1 Use new products unless otherwise specified.

.2 Provide electronic copies of maintenance instructions and material literature for finished surfaces prior to Substantial Performance.

END OF SECTION

1.0 GENERAL

1.1 Description of Work Included

.1 Provide all labour, material, equipment, and services necessary to clean the area of the Work, including all surfaces, fixtures, equipment, finishes, landscaping, etc., and dispose of all waste products and debris in the work area as indicated in the Contract Documents.

.2 Provide all labour, material, equipment, and services necessary to clean outside the area of the work if dust, debris, and waste products generated by the Work have affected these areas.

1.2 General Requirements

.1 Conduct cleaning and disposal operations in compliance with local, provincial, and federal regulations and laws, as well as Owner requirements.

.2 Prevent the accumulation of waste that creates hazardous conditions.

.3 Provide adequate ventilation during use of volatile or noxious substances. Obtain approval for ventilation exhaust locations with the Owner prior to installation.

.4 Coordinate requirements for ventilation and waste disposal operations with the Owner and Consultant.

1.3 References

.1 Waste Control Regulation - Ontario Environmental Protection Act

1.4 Materials and Equipment

.1 Use only cleaning materials and equipment that are approved by the manufacturer of the surface to be cleaned, and use the cleaning materials in conformance with manufacturer recommendations.

1.5 Prior to Construction

.1 The Contractor shall examine the Place of the Work prior to mobilization to determine conditions with respect to dust, debris, rubbish, and waste material.

.2 It is the Contractor's responsibility to clean Work areas and all areas affected by the Work free of all debris generated by the construction activity and existing dust, debris, rubbish, and waste material present at the start of Work, unless explicitly otherwise indicated in the Contract Documents or there are significant variations in conditions in comparison to the time of Bid.

.3 Onus is on the Contractor to satisfactorily demonstrate to the Consultant if conditions vary significantly from the time of bid. Significant variations will be resolved by the Owner.

.4 No extras will be entertained for site cleaning after Contract award.

1.6 Waste Removal and Cleaning During Construction

.1 Contractor to perform all required cleaning during the Work.

.2 Maintain the Place of the Work and areas affected by the Work free from accumulations of dust, debris, rubbish, and waste materials generated by the Work.

.3 Provide sufficient on-site containers for collection and disposal of dust, debris, rubbish, and waste material.

.4 Store volatile waste in covered containers. All waste that is volatile or creates a hazardous condition must be removed from the premises daily.

.5 Disposal is to be performed in strict accordance with the product Safety Data Sheet (SDS) and local, provincial, and federal regulation.

.6 Enclose work areas and prevent dust and debris generated by construction from affecting other areas, including areas required for construction access. Any dust and debris that escapes from the Work area is to be cleaned in a timely fashion and, at latest, prior to the end of the work day/ shift.

.7 If the Consultant deems that cleaning has not been performed in a timely fashion, the Owner may seek to resolve the conditions in accordance with the Contract General Conditions.

.8 Flush and clean the drainage system, including buried or hidden drain lines, all the way to sump pits and catch basins to maintain operation of the drainage system throughout the Work.

.9 Cover drains affected by or required for the Work with filter fabric to prevent debris from entering the drainage system.

.10 Do not dispose of project waste and material in the drainage system.

1.7 Drainage System – Cleanliness and Damage

.1 Flush clean all the drainage systems – including all area drains, maintenance holes, sump pits, piping, etc. – within the area of Work. Include for flushing of the stairwell roof drainage system Remove and dispose of silt and debris by manual or suction means without washing it down or through the drainage system.

.2 Maintain the drainage systems in this cleaned state throughout the Work.

.3 Confirm the operation and condition of the sump pits prior to performing work that affects or requires their operation. The existing pumps may be used during construction but the Contractor is responsible to maintain their operation.

.4 Provide additional pumps if existing pumps cannot effectively remove water generated by construction.

.5 Do not discharge water from construction directly into any of the site sewer or storm water management systems. The water is to be treated with proper filtering, stilling basins, and tankage to prevent silt and debris from entering the systems.

.6 All equipment maintenance and refuelling operations shall be controlled to prevent the discharge of petroleum products into the sewer system.

.7 Damage caused to the existing water supply systems, storm water management systems, sewer systems, and surrounding areas by the Contractor’s operations are to be made good to the full satisfaction of the Owner at Contractor cost.

.8 A cleaning contractor specializing in flushing and cleaning drainage systems shall clean and flush the sewer systems after completion of dust and water generating parts of the Work.

1.8 Final Cleaning

.1 Thoroughly clean all areas affected by the Work free of all dust, debris, construction material, waste, and rubbish immediately prior to final review and turn-over of the Work area to the Owner.

.2 Remove all grease, dust, dirt, stains, labels, fingerprints, over-spray, and other foreign materials immediately prior to final review and turn-over of the Work area to the Owner.

.3 Flush and clean free of all silt and debris and provide CCTV inspection of all drainage lines for the Consultant to review to demonstrate the condition of the drainage lines and effectiveness of the cleaning.

.4 Prior to Substantial Performance of the Work being considered, the Contractor shall remove their surplus products, tools, and Construction Equipment not required for the performance of the remaining Work. Leave the area of Work clean and suitable for occupancy.

.5 The Contractor shall remove their remaining products, tools, and Construction Equipment prior to final completion of the Work.

.6 All vertical and horizontal surfaces, systems, fixtures, equipment, etc. shall be cleaned of all dust, grease, or spray accumulations. Power wash exterior surfaces and parking areas affected by the Work. Ensure moisture sensitive equipment (i.e. fire detection sensors and pull stations, CO detectors, exposed electrical, etc.) is removed or protected against moisture ingress and damage prior to, and during, washing.

.7 Return all interior areas and rooms to the Owner in a dust-free condition.

.8 Sprinkler system components, where present, that have been coated with paint, cement paste, or other foreign materials shall be replaced at no additional cost to the Owner.

END OF SECTION

1.0 GENERAL

1.1 Take Over Procedure

.1 Contractor's Review

.1 The Contractor and their Subcontractors shall conduct a review of the work and correct all noted deficiencies.

.2 The Contractor shall notify the Consultant, in writing, of satisfactory completion of the "Contractor's Review" after the correction of all noted deficiencies and shall request a "Consultant's Review".

.2 Consultant's Review

.1 The review team shall consist of the Consultant and the Contractor. The Owner or their representative shall attend at their option.

.2 The Consultant will prepare a list of deficiencies noted during the "Consultant's Review" and will issue the list to the Contractor.

.3 The Consultant will determine the value of work associated with any outstanding deficiencies noted during the Consultant's Review. Payment of these retained funds will be withheld until the deficiencies have been rectified to the satisfaction of the Consultant and Owner.

.4 The Contractor shall correct all deficiencies indicated on the list in a timely and satisfactory manner.

.3 Final Review

.1 The Contractor shall request a "Final Review" when the Contractor is satisfied that all deficiencies have been corrected. The request shall be made in writing.

.2 The "Final Review" shall be conducted by the Consultant and the Contractor. The Owner or their representative will attend at their discretion.

.4 Certificate of **Substantial Performance**

.1 The Contractor must submit a request in writing to the Consultant for a Certificate of Substantial Performance.

.2 The Contractor shall comply with the following during Contract close-out:

.1 The requirements of the Construction Lien Act.

.2 The requirements of the Workers Compensation Act.

.3 All other contractual requirements.

.5 Total Performance

.1 Immediately following the issuance of the Certificate of **Substantial Performance**, the Consultant, in consultation with the Contractor, will establish a reasonable date for the “Total Performance of the Work”.

.2 The Contractor shall supply all guaranties and review certificates in accordance with the requirements of the Contract Documents prior to the date established for “Total Performance of the Work”.

.6 Release of Holdback

.1 The lien holdback amounts will be released pursuant to the Construction Lien Act.

END OF SECTION

1.0 GENERAL

1.1 Bonds

.1 Bonding costs, including expense of getting bonds executed, shall be borne by the Contractor.

.2 Provide the Owner with the following surety bonds within 14 days after Contract award:

.1 A Performance Bond to secure due and proper performance of the Contractor's obligations under the Contract in an amount equal to 100% of the Contract Price.

.1 The performance bonding period commences on date of contract execution and ends two years from date of Substantial Performance.

.2 A Labour & Material Payment Bond in an amount equal to 100% of the Contract Price to secure:

.1 Due and proper payment of those having direct Contracts with the Contractor for labour, material, and/or services.

.2 Full reimbursement to the Owner for all liability and payments to those having direct Contracts with the Contractor for labour, material, and/ or services in connection with the Contract.

.3 Upon Substantial Performance and before Total Performance/Ready-for-Takeover, provide the Owner with a Consent of Surety for a one-year Maintenance Bond that shall take effect upon expiry of the Performance Bond.

.4 Prior to expiry of the Performance Bond, provide the Owner with the one-year Maintenance Bond.

.5 If a lien claim is filed against the title of the lands on which the work or any part thereof is performed in relation to the Contract by an entity other than the Contractor, the Contractor is to provide a Lien Bond to remove the registered lien claims and/ or certificates of action.

.6 Bonds are to be in favour of the Owner in a form satisfactory to the Owner.

.7 Bonds are to name the Owner as Obligee. The Obligors are the Contractor and a Guarantee Surety Company unobjectionable to the Owner and not insolvent, bankrupt, nor in receivership or winding-up proceedings.

.8 Guarantee Surety Company is to be a properly licensed surety company registered and duly authorized to transact the business of suretyship in the Province of Ontario.

1.2 Warranty / Guaranty Period

.1 Provide a three-year minimum warranty for all Work of the Contract, including a guaranty secured by Performance Bond for the first two years, commencing on date of substantial performance.

.2 Extended and/or product warranties beyond the minimum period are outlined below.

1.3 Hot Rubberized Waterproofing System Warranty

.1 Total warranty period of five (5) years as follows:

.1 First two (2) years in the form of a guaranty secured by the Performance Bond and commencing on the date of Substantial Performance.

.2 Third, fourth and fifth years as an extended warranty, unsecured by bond, commencing on expiration of the Performance Bond.

1.4 Remedial Work Under Guaranty/Warranty

.1 Perform any warranty repair work required during the warranty period at no extra cost. Refer to 1.4.3 for additional information on costs.

.2 The Owner will notify the Contractor within 30 days of the discovery of any suspected warrantable defect in the Work. Immediately take necessary steps to protect the area against further damage and take corrective action to bring the defect into conformance with the Contract Documents and rectify any damage incurred. Schedule repair work with the Owner and make every attempt to correct defects within three weeks of notice.

.3 In the event of a valid warranty claim resulting in corrective work, the Contractor and Owner shall contact the Consultant to determine what level of involvement, including but not limited to field review, may be necessary. Should the Consultant determine that field reviews are required during the warranty repair work, the Contractor shall be responsible for Consultant fees.

.4 Remedy be at no cost to the Owner and includes all labour, material, equipment, supervision, and field review necessary to correct defective areas of the Work and any damages incurred to obtain access to defective areas.

.5 Reimburse the Owner for any resulting assessment costs, including fees associated with Consultant involvement, incurred to define the extent of the defect and for testing costs incurred to confirm acceptability of repairs.

.6 Reimburse the Owner for all associated costs incurred due to closure of areas requiring repair under warranty.

.7 Warranty periods for areas requiring repair are to be extended by the amount of time elapsed between issuance of notice and completion of remedial work. Warranty/ guaranty period will re-commence upon completion of remedial work.

.8 Warranties are not to be deemed to restrict any liability of the Contractor arising out of any applicable law.

END OF SECTION

1.0 GENERAL

1.1 Record Drawings

.1 Consultant will provide Contractor two sets of clean white prints for record drawing purposes.

.2 The Contractor shall maintain accurate project record drawings on one set of white prints throughout the course of the Work that indicate deviations from the Contract Documents in red ink.

.3 Record following information:

.1 Field changes of dimensions and details.

.2 Modifications made via Change Order, Change Directive, or Supplemental Instruction.

.3 Deviation from electrical and mechanical installations shown on Drawings.

.4 Other significant deviations that are concealed in construction and cannot be identified by visual inspection.

.5 Type, approximate size, and location of structural repairs, delaminations, etc.

.6 Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.

.4 At completion of the Work and prior to final review, neatly transfer “as-built” records to the second set of white prints using a fine red marker. Neatly print lettering and numbers to match original size. Lines shall be neat and accurate.

.5 Add “AS-BUILT RECORD” at each drawing title block.

.6 Contractor shall submit both sets of “as-built” record drawings to the Consultant prior to submission of the final progress payment application.

.7 Project record drawings shall be available for reference purposes and review by the Consultant at all times. Provide reproducible prints to the Consultant or Owner upon request.

.8 If the Project is completed without significant deviations from the Contract Documents, a written declaration may be submitted to the Consultant in lieu of project record drawings.

1.2 Operation and Maintenance Manuals

.1 Submit electronic copies of manufacturers' printed operation and maintenance manuals where outlined in the technical specifications.

.2 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance as requested within the related Specification sections.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, materials, equipment, supervision, and services necessary to supply, install, and maintain hoarding, dust protection, construction signage, shoring and bracing systems, etc. around the areas of work as indicated on the Drawings and per section 01 56 00 – Protection of Work and Property.

.2 Provide all labour, material, equipment, supervision, and services necessary to remove and dispose of all material and debris resulting from the removal of:

.1 The podium deck slab landscaping (i.e. plantings, grass, topsoil, curbs, pavers, granular material, waterproofing systems, etc.) to expose the podium deck slab surface, upturns at vertical surfaces, and downturns at the foundation walls.

.2 Podium deck perimeter steel guards.

.3 Concrete masonry, brick masonry, and dimensioned stone at building walls, upstands, planter wals, etc.

.4 Skylight structures, planters, and concrete masonry unit walls down to the level of the podium deck slab surface.

.5 Sound and unsound concrete from the surfaces, soffits, etc. of the podium deck and where directed by the Consultant.

.6 Localized interior finishes and deteriorated insulation where directed by the consultant. Work to include temporary capping and relocation of existing fixtures and systems as required to implement the work and reinstatement prior to completion of work.

2.0 PRODUCTS

Not applicable.

3.0 EXECUTION

3.1 Inspection

.1 Visit and examine the site and note all characteristics and features affecting the Work of this Section.

.2 Properly identify all services, whether buried, built-in, or exposed, as to position, type of service, size, and direction of flow.

.3 Inspect materials, equipment, and components to be re-used or turned over to the Owner. Note their condition and advise the Consultant in writing of any defects or conditions that would affect their removal and re-use.

3.2 Preparation

.1 Prevent movement, settlement, or damage of elements of existing building that are to remain. Provide bracing, shoring, and supports as required. Protect existing surfaces not to be restored from damage during removal procedures.

.2 Cut and/or cap existing services within the work area, if any, prior to start of Work as required, but do not affect services of areas not under construction or essential to on-going operation of the building.

.3 In all cases, exercise reasonable care during removal operations to avoid damaging items to be salvaged, re-used, or items that are not part of the Work.

.4 Seal off work areas to prevent dust and debris from affecting other areas outside of work area. Prevent public access to areas being repaired.

.5 Tape and/or seal and provide protection to all mechanical and electrical services and all fire alarm and security devices still functioning adjacent to work areas to prevent damage resulting from dust, water, or impact.

.6 Cover drains as required to prevent any construction-related materials and debris from entering the drains. Ensure that all drains continue to operate as required during construction.

.7 Remove or protect in place all surface-mounted or permanent fixtures not to be demolished from damage during demolition procedure.

.8 Apply filter cloth to all exhaust and ventilation vents within and around work area to prevent construction dust and debris from escaping.

.1 Clean or replace filter cloth if filter cloth becomes unsuitably dirty as determined by Consultant.

3.3 Waterproofing Removal Equipment

.1 Non-water-based and low-impact equipment is to be used to remove the podium deck and foundation wall waterproofing systems where indicated on Drawings or directed by Consultant.

.2 Equipment should be capable of efficiently removing waterproofing while taking reasonable precautions to avoid damaging the concrete surface. Scraping, grinding, and abrasive blast removal and surface preparation will be required.

3.4 Demolition

.1 Remove and dispose of material and debris resulting from the removal of:

.1 The podium deck slab landscaping (i.e. plantings, grass, topsoil, curbs, pavers, granular material, waterproofing systems, etc.) to expose the podium deck slab surface, upturns at vertical surfaces, and downturns at the foundation walls.

.2 Podium deck perimeter steel guards.

.3 Concrete masonry, brick masonry, and dimensioned stone at building walls, upstands, planter walls, etc.

.4 Skylight structures, planters, and concrete masonry unit walls down to the level of the podium deck slab surface.

.5 Sound and unsound concrete from the surfaces, soffits, etc. of the podium deck and where directed by the Consultant.

.6 Localized interior finishes and deteriorated insulation where directed by the consultant. Work to include temporary capping and relocation of existing fixtures and systems as required to implement the work and reinstatement prior to completion of work.

.2 Demolition procedures and equipment shall meet all applicable noise control by-laws and regulations at the Place of the Work.

.3 Provide shoring to support slab when removals reduce its load-carrying capacity, as directed by Consultant. No payment will be made for such shoring, as it is to be included in costs of repair as outlined in these documents.

.4 Take care not to damage the surface of sound material that is to remain through removal operation. Where any such damage is done, it is to be repaired by Contractor at their own expense to Consultant's approval.

.5 Where new concrete is to be applied to existing concrete, leave surface clean and sound.

.6 All required re-painting due to damage overspray, etc. is Contractor's responsibility.

.7 Implement necessary work for fitting and tie-in of new to existing finishes.

.8 At end of each day's work, leave work in safe condition so that no part is in danger of causing injury or damage.

3.5 Waste Disposal

.1 Dispose of waste products and material in strict accordance with product data sheets, Safety Data Sheets, and governing waste control regulations.

.2 Drainage systems are not to be used to dispose of project wastes and materials.

.3 Store volatile wastes or material in covered metal containers. Remove wastes that create hazardous conditions from premises daily.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, material, equipment, and supervision necessary to prepare slab surface, slab soffit, wall surfaces, etc. and place new concrete repair material.

.2 Use of pre-packaged material is to be in targeted structural slab infill or repair locations approved by the Consultant. Prepackaged material is not suitable for podium deck slab concrete topping.

1.2 Repair Quantity Determination

.1 Length and width for unit rate repairs will be measured to the nearest 25 mm (1”).

1.3 References

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 Ontario Building Code

.3	CSA A23.1/CSA A23.2	Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete
.4	CSA A3000	Cementitious Materials Compendium
.5	CSA S413	Parking Structures
.6	ASTM C260/C260M	Standard Specification for Air-Entraining Admixtures for Concrete
.7	ICRI 310.2R	Selecting and Specifying Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair

1.4 Performance Requirements

.1 Repaired concrete surfaces shall not scale or crack excessively.

.2 Concrete repair materials shall not spall or debond from existing substrates.

.3 Concrete repair materials shall achieve a minimum compressive strength of 20 MPa within 24 hours.

1.5 Submittals

.1 Submit manufacturer's product specifications and data sheets for the following products:

.1 Cement slurry bonding agent

.2 Rapid cure delamination repair concrete material

.3 Top surface patch material

.4 Vertical/Overhead patch materials

.2 Submittals to be provided for review by the Consultant a minimum of two weeks prior to placement or use of products.

.3 Do not commence placement of repair products until review is complete and proposed products and procedures are accepted by Consultant.

1.6 Qualifications

.1 Use only qualified concrete placers and finishers, with a minimum of two years' experience in similar work.

2.0 PRODUCTS

2.1 Materials

.1 Portland Cement: Type GU to CSA A3000.

.2 Aggregate: Natural stone to CSA A23.1.

.3 Water: Potable and to CSA A23.1.

.4 Air Entraining Agents: To ASTM C260/C260M.

.5 Chemicals Admixtures: To CSA A3000. Calcium chloride is not permitted.

.6 Pozzolanic Mineral Admixtures: To CSA A3000.

.7 Curing Materials: To CSA A23.1.

.8 Blended Hydraulic Cementing Material: Type 10SF to CSA A3000.

.9 Supplementary Cementing Material: To CSA A3000.

.10 Superplasticizing Admixture: To CSA A3000.

2.2 Cement Slurry Bonding Agent

.1 Cement slurry grout consisting of a mixture of one part cement to one part fine aggregate and enough water to make a heavy cream consistency. Aggregate to conform to CSA A23.1 Clause 4.2.3.

.2 Contractor to provide written confirmation of manufacturer's recommended slurry bonding agent prior to placement of repair material.

2.3 Surface Repair Materials

.1 Proportion patch materials with specially graded aggregate to give the following properties in accordance with CSA A23.2:

	Description	Requirements
.1	Compressive Strength (24 hours)	20 MPa minimum
.2	Compressive Strength (7 days)	30 MPa minimum
.3	Flexural Strength (7 days)	5 MPa minimum
.4	Slant/Shear Bond Strength (7 days)	5 MPa minimum
.5	Linear Shrinkage	0.08% maximum
.6	Rapid Chloride Permeability	less than 1,000 coulombs

.7 Thermally compatible with concrete substrate under all applicable service conditions.

.2 The patch materials listed below may conform to the specified properties and linear shrinkage requirements. Manufacturer's latest product data sheets for proposed patch materials shall demonstrate that the patch material conforms to the specified requirements. Where product data is incomplete, manufacturer is to provide supplementary independent test data that demonstrates conformance.

.3 Patch Materials:

	Product Name	Manufacturer
.1	MasterEmaco T1060	Master Builders Solutions
.2	MasterEmaco T1061	Master Builders Solutions
.3	CPD Rapidcrete	CPD

	Product Name	Manufacturer
.4	Eurocrete	Euclid Chemical
.5	Versaspeed	Euclid Chemical
.6	HP-S6	King
.7	HP-S10	King
.8	MS-S6	King
.9	MS-S10	King
.10	Structuroc H	Solhydroc

2.4 Vertical Repair Materials

.1 Patch materials shall be polymer-modified, cementitious, fast setting, and formulated especially for the repair of vertical concrete surfaces.

.2 Patch materials to have the following properties:

	Description	Requirements
.1	Compressive Strength (7 days)	30 MPa minimum
.2	Flexural Strength (7 days)	5 MPa minimum
.3	Slant/Shear Bond Strength (7 days)	5 MPa minimum
.4	Linear Shrinkage	0.10% maximum
.5	Rapid Chloride Permeability	less than 1,000 coulombs
.6	Thermally compatible with concrete substrate under all applicable service conditions.	

.3 The patch materials listed below may conform to the specified properties and linear shrinkage requirements. Manufacturer's latest product data sheets for proposed patch materials shall demonstrate that the patch material conforms to the specified requirements. Where product data is incomplete, manufacturer is to provide supplementary independent test data that demonstrates conformance.

.4 Patch Materials:

	Product Name	Manufacturer
.1	MasterEmaco S 440MC (form)	Master Builders Solutions
.2	MasterEmaco S 466CI (form, vertical only)	Master Builders Solutions
.3	MS-S6 Concrete	King

	Product Name	Manufacturer
.4	MS-S6 Self-Consolidating Concrete	King
.5	MS-S10 Self-Consolidating Concrete	King
.6	Structuroc V	Solhydroc

2.5 Admixtures

.1 Use only compatible admixtures and add to mix in strict accordance with manufacturer's written instructions.

.2 Use of calcium chloride not permitted.

3.0 EXECUTION

3.1 Concrete Surface Preparation

.1 All concrete surfaces to receive new concrete repair material shall have a minimum No. 6 CSP per ICRI 310.2R and be thoroughly abrasive-blast, sandblast, or shot-blast prior to concrete placement to remove laitance, debris, and loose aggregate.

.2 Clean all existing concrete surfaces to receive new concrete of foreign material, dust, debris, grease, and oil as directed by Consultant. Emulsifiers shall be required for surfaces containing grease or oil.

.3 Contractor to notify Consultant to review surfaces prior to concrete placement.

3.2 Concrete Placement – Surface Repairs

.1 Prepare patch surface, mix patch material, and apply, finish, and cure in strict accordance with the more stringent requirements of the Contract Specifications and manufacturer’s written instructions.

.2 The patch area shall be thoroughly wetted as required to achieve a saturated surface dry (SSD) state prior to placing concrete repair material.

.3 Puddles of free water shall be blown from the patch area and the surface is to be permitted to dry to a saturated surface dry (SSD) state prior to application of cement slurry.

.4 Apply a cement slurry bonding agent to the surface of the concrete just prior to placing new concrete.

.5 The cement slurry bonding agent shall be broomed or scrubbed into the deck to fully saturate the surface but not allowed to puddle.

.6 Pre-wet filter fabric, burlap, or cotton mats shall be available on site prior to placement of concrete to allow for immediate placement overtop of new concrete patches after their initial set.

.7 Prepare pre-packaged concrete mix per manufacturer's specifications.

.8 Contractor to confirm the minimum and maximum application lift thickness prior to placement of concrete. If required and permitted by the manufacturer, the concrete repair material can be extended with aggregate to increase permissible application thickness.

.9 Contractor to submit proposed aggregate extension mix design to the Consultant prior to proceeding with Work.

.10 On slab top surfaces, place new dense concrete thoroughly compacted and vibrated into place to ensure good bond.

.1 Ensure reinforcing steel is secured in place and is not disturbed during placement.

.2 Vibrators are to be used for consolidation purposes only and are not to be used to an extent that causes segregation of the concrete.

.3 Internal vibrators shall conform to CSA A23.1 Clause 7.2.5.2 and Table 19: Internal Vibrators for Various Applications.

.4 Vibrators shall be inserted into concrete perpendicular to concrete surface.

.5 Vibrators shall be inserted such that zones of consolidation always overlap.

.11 Concrete surfaces to be flush with existing surfaces, free of voids and cracks, and have a uniform surface and transition to the existing surface.

.12 Finish concrete in accordance with CSA A23.1/A23.2. Initial finish shall be completed before any bleeding or free water is present on the surface of the concrete. Final finishing shall commence after the bleed water has disappeared and when the concrete has stiffened sufficiently to prevent the working of excess mortar to the surface. Do not add water to finish.

.13 Do not overwork concrete surface. Wood float finish is acceptable.

.14 Do not use steel trowels with air-entrained concrete. For air-entrained concrete, the surface can be further levelled and consolidated with a magnesium bull float for larger repairs or a magnesium trowel for smaller repairs. One or more passes shall be made at suitable time intervals to obtain a level finish free of float marks. Do not work bleed water on the concrete surface into the concrete during finishing.

.15 Cure in accordance with the more rigorous requirements of this Section and manufacturer's written instructions.

.16 Areas of concrete repair completely through the thickness of the slab shall be patched with concrete, well consolidated, and vibrated into place on to steel decking as detailed on Drawings.

.17 Do not allow traffic on newly placed repair patches until 75% of the specified 28-day strength has been reached.

3.3 Concrete Placement – Vertical Surfaces (Gravity Grouting)

.1 Ensure formwork is secure and free of debris.

.2 Thoroughly wet the patch area and forms prior to concrete placement.

.3 Place new concrete into forms by gravity method and thoroughly consolidate concrete in forms using vibrators or other Consultant-approved method.

.4 Remove all formwork and support brackets to leave a smooth and flush concrete finish after curing. Formwork to remain in place for seven days minimum for curing or longer until concrete has attained 75% of its specified 28-day strength.

.1 Apply approved curing compound as recommended by grout manufacturer as alternative to seven-day cure by formwork if 75% of concrete strength is achieved.

.5 Edges of repair areas are to be ground, hand patched, etc. as required to produce a smooth (form-like) transition from the new patch surface to the existing slab to the approval of the Consultant once forms have been removed.

.6 Concrete repair material that is sagged, debonded, porous, honeycombed, or cracked shall be replaced.

3.4 Concrete Mixing and Placing

.1 Concrete shall be machine mixed unless otherwise stipulated by the manufacturer. Mixing and placing shall be in accordance with CSA A23.1.

.2 Concrete shall be conveyed from the mixer to the place of deposit by methods that will ensure the required quality of concrete. Equipment for conveying the concrete shall be of such size and design as shall ensure a practically continuous flow of concrete at the delivery end without separation of materials.

.3 Concrete shall be deposited in the forms as near as practicable to its final position to avoid re-handling.

.4 Depositing shall be continuous throughout each division and the concrete shall be placed and worked so that a uniform texture will be produced.

.5 No concrete shall be placed later than one half hour after leaving the mixer. No re-tempered concrete shall be allowed.

.6 Mix concrete in accordance with the manufacturer’s written instructions.

3.5 Compaction and Vibration

.1 Concrete shall be consolidated by means of sufficient vibrators of adequate size operated by competent workers.

.2 The use of vibrators to transport concrete shall not be allowed.

.3 Concrete shall be thoroughly worked around reinforcement, around embedded items, and into corners.

.4 Compaction and vibration is to eliminate all air and stone pockets that may cause honeycombing, pitting, or planes of weakness.

3.6 Concrete Curing

.1 Ensure manufacturer's recommended curing conditions are maintained over the patch area. The more stringent curing conditions between the manufacturer’s written instructions and those outlined in this section will govern unless otherwise agreed upon by the Consultant in writing.

.2 Initiate surface concrete repair wet curing as soon as possible after the concrete has sufficiently set, and no later than 30 minutes after finishing.

.1 Minimum acceptable wet curing method on slab surfaces is installation of pre-saturated filter fabric, burlap, or cotton mats that are covered with plastic sheeting. Overlap wet-curing mats 150 mm and ballast in place without marring the concrete surface.

.2 Wet curing procedures to be in accordance with manufacturer's written requirements and shall be implemented for at least 24 hours at a minimum temperature of 10°C. Water shall not be permitted to fully evaporate from the concrete surfaces. Rewet as required.

.3 Prevent airflow in the space between the wet-curing mats and the plastic sheeting. Protect wet-curing assembly from freezing during cold weather.

.3 Vertical repair patches are also to be wet cured for at least 24 hours by either:

.1 Maintaining formwork in place with pre-saturated filter fabric, burlap, or cotton mats installed on all formed and exposed sides and covered by plastic sheeting.

.4 The use of chemical curing compounds is not permitted for surfaces to receive waterproofing systems.

.5 Protect concrete from the harmful effects of heat, cold, running or surface water, and mechanical shock.

.6 Do not place concrete when air temperature is below 10°C, or without implementing provisions to ensure proper curing of concrete when, in the opinion of the Consultant, there is a possibility of air temperature falling below 10°C. These provisions shall be reviewed by the Consultant and conform to the requirements of CSA A23.1.

.7 Maintain concrete material and forms between 15°C and 32°C until concrete placement whenever the surrounding air is below 5°C. No frozen material or material containing ice shall be used. All existing concrete, reinforcement, forms, and ground that the concrete will contact is to be free from frost.

.8 Maintain a curing temperature above 10°C for until the repair materials have reached 75% of their 28-day strength.

.9 Do not allow traffic onto patch until material has adequately cured to its specified 24-hour compressive strength.

.10 The Consultant will have cause to not certify payment for repairs undertaken without adequate wet-curing procedures or that become surface dry during the specified curing period.

3.7 Inspection and Testing

.1 Testing is to conform to CSA A23.2.

.2 Inspection and testing to be conducted by a testing agency designated by the Owner. The Owner will pay costs of inspection and testing described in this section.

.3 Contractor to inform Consultant min. 48 hours in advance of concrete placement to permit Consultant coordination with testing agency.

.4 Testing may include:

.1 Preparation and testing of concrete grout cubes or cylinders for compressive strength.

.2 Bond testing of concrete repair patches to existing concrete where designated by the Consultant.

.3 Submission of test results to the Owner, the Consultant, and the Contractor.

.4 Compressive strength testing of concrete grout cubes (9 cubes) or cylinders (4 cylinders). Concrete test samples are to be placed in an area with similar curing conditions to that of the cast concrete.

.5 Testing procedures for concrete shall conform to the following requirements:

.1 Compression tests on concrete shall be carried out in accordance with CSA A23.1 and A23.2. Strength test on approved grout shall consist of nine grout cubes with three cubes tested at seven days and the remainder tested at 28 days. For cylinders, strength tests shall be undertaken on one cylinder each at 3 and 7 days with the remaining two tested at 28 days.

.6 The Contractor shall provide at no additional costs to the Owner:

.1 Samples of all material required for testing.

.2 Cooperation with the execution of concrete testing. which shall include protection against injury or loss of grout cubes or cylinders.

.3 Access for the testing agency to test and/ or inspect materials.

.4 Site storage facilities meeting requirements of CSA A23.2 for concrete test specimens prior to removal to laboratory.

.7 Bond Strength:

.1 After the concrete or grout has cured, the testing agency may perform bond strength tests if requested by Consultant.

.2 These cores are to be used for the evaluation of the bond strength of the new concrete to the existing by direct tensile force. The testing agency will drill through patches selected by Consultant.

.3 Failure to achieve a minimum tensile bond strength of 0.9 MPa shall constitute failure of patches.

.4 Contractor to fill all core holes with non-shrink cementitious grout upon completion of the tests.

.8 Contractor shall pay for costs of additional testing as follows:

.1 If Contractor fails to notify testing agency in event of pour cancellation.

3.8 Field Quality Control

.1 The Consultant shall evaluate bonding of fresh patch material to existing concrete after the fresh patch material has cured sufficiently.

.2 The evaluation shall be performed by sounding, using a "chain-drag" or other techniques.

.3 Hollow sounds detected in repair area provide reason to suspect inadequate bonding. Contractor to core these areas to determine bonding adequacy where requested by the Consultant.

.4 Coring shall be through the new concrete and into the existing concrete. Core diameter shall be 75 mm, or as required by the Consultant. Length of cores shall be twice the core diameter or twice the thickness of new concrete, unless otherwise requested by the Consultant.

.5 Scanning is to be completed prior to coring to avoid coring through embedded reinforcing, conduit, or other embedded items.

.6 Cores will be visually inspected after removal and any further testing that is required will be determined by the Consultant.

.7 Contractor to patch core holes.

3.9 Rejection of Defective Work

.1 The Consultant shall have the right to order additional concrete testing of any portion of repairs in accordance with CSA A23.1 if previous testing demonstrates non-conformance with specified requirements. The testing agency shall be selected by the Consultant and shall deal directly with the Consultant. Payment for costs associated with the additional concrete testing will be at the Contractor's expense.

.2 Where it is the Consultant's opinion that material or workmanship fails to meet the specified requirements, the work shall be replaced or repaired to the approval of the Consultant at no additional cost to the Owner.

.3 Bond failure between repair material and the existing concrete, or failure to meet compressive strength requirements based on compression testing of concrete cylinders, will result in drilling of additional core samples at the Contractor's expense. Failure of these additional samples will require the work to be replaced or repaired to the approval of the Consultant at no additional cost to the Owner.

3.10 Record Drawings

.1 Maintain accurate records of the location, size, and concrete placement date for each repair area.

.2 Records to be kept up-to-date and made available to Consultant throughout the duration of the Work.

.3 Prior to Substantial Performance of the Work, provide a plan showing location, size, and date of concrete repairs.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, materials, equipment, and supervision necessary to prepare slab surface and foundation wall infill and localized repair areas and place new concrete repair material.

.2 Podium deck surface concrete topping requirements are outlined in Section 03 53 01.

1.2 Repair Quantity Determination

.1 Length and width shall be measured to the nearest 25 mm (1”).

1.3 References

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not reference by Code.

.2 Ontario Building Code

.3	CSA A23.1/CSA A23.2	Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete
.4	CSA A3000	Cementitious Materials Compendium
.5	CSA S413	Parking Structures
.6	ASTM C260/C260M	Standard Specification for Air-Entraining Admixtures for Concrete
.7	ICRI 310.2R	Selecting and Specifying Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair

1.4 Performance Requirements

.1 Concrete repair surfaces shall not scale or crack excessively.

.2 Concrete repair materials shall not spall or debond from existing concrete.

1.5 Submittals

.1 Submit all mix designs, product specifications, and manufacturer's recommendations for Consultant review a minimum of two weeks prior to placement or use of products.

.2 Submit details of proposed methods of concrete curing and provisions for weather protection for Consultant review a minimum of two weeks prior to placement.

.3 Submit manufacturer's product data sheets for proposed curing compounds, admixtures, and corrosion inhibitors.

.4 Do not commence placement of concrete until review is complete and proposed products and procedures are accepted by Consultant.

1.6 Qualifications

.1 Use only qualified concrete placers and finishers, with a minimum of two years' experience in similar work.

2.0 PRODUCTS

2.1 Materials

.1 Portland Cement: Type GU to CSA A3000.

.2 Aggregate: Natural stone to CSA A23.1.

.3 Water: Potable and to CSA A23.1.

.4 Air Entraining Agents: To ASTM C260/C260M.

.5 Chemicals Admixtures: To CSA A3000. Calcium chloride is not permitted.

.6 Pozzolanic Mineral Admixtures: To CSA A3000.

.7 Curing Materials: To CSA A23.1.

.8 Blended Hydraulic Cementing Material: Type 10SF to CSA A3000.

.9 Supplementary Cementing Material: To CSA A3000.

.10 Superplasticizing Admixture: To CSA A3000.

2.2 Surface Repair, Through-Slab Repair, and Curb Concrete Mix

.1 Normal weight “ready mixed” Portland cement concrete mixed in accordance with CSA A23.1, class of exposure C-1 with the following requirements:

	Description	Requirements
.1	Compressive Strength (28 days)	35 MPa minimum
.2	Air Content	6.0% to 9.0%
.3	Aggregate Size	13 mm
.4	Slump	
	- Prior to Superplasticizer	50 mm maximum ± 20 mm
	- After Superplasticizer	125 mm maximum ± 25 mm
.5	Water/Cementing Materials Ratio	0.40 maximum
.6	Cement Content	335 kg/m^3 minimum
.7	Cement – Type GU	Normal Portland Cement
.8	Concrete Density	Normal weight (2,360 kg/m^3)

.2 The intent of this mix design is to provide a low permeability, low-shrinkage concrete mix.

.3 Non-chloride based plasticizers shall be used to facilitate concrete placement. Costs associated with the use of such materials shall be included in the contract price. Plasticizer shall be compatible with the air entrainment agent.

.4 The use of fly ash shall not be permitted.

.5 Note that although a maximum slump is specified, the Contractor shall endeavour to provide concrete at the minimum slump that permits placement and handling.

.6 Mix design is the responsibility of the Contractor.

.7 Ready mix concrete is to be used unless otherwise approved by Consultant.

.8 No concrete shall be placed later than two hours (120 min) after leaving mixer. No re-tempered concrete shall be allowed.

.9 The Contractor shall use superplasticizers to facilitate concrete placement and must demonstrate to the satisfaction of the Consultant that such admixtures will have no deleterious effect on the durability or strength of the proposed concrete mix (i.e. freeze/thaw durability).

2.3 Air Entrainment

.1 Air entraining chemical admixtures shall be according to ASTM C260. Ensure chemical admixtures are compatible with each other and that they will not negatively impact performance of the concrete.

.2 The total fresh air content of air entrained concrete will be tested via the pressure method with an air meter prior to the placement of concrete in accordance with CSA A23.2.

.3 Air content in hardened concrete shall meet the requirements of CSA A23.1 and this specification and, if directed by the Consultant, will be tested and determined in accordance with ASTM C457 as outlined in CSA A23.1.

2.4 Cement Slurry Bonding Agent

.1 Cement slurry grout consisting of a mixture of one part cement to one part fine aggregate and enough water to make a “heavy cream” consistency. Aggregate to conform to CSA A23.1 Clause 4.2.3.

3.0 EXECUTION

3.1 Concrete Surface Preparation

.1 All concrete and masonry surfaces to receive new concrete shall have a minimum No. 6 CSP per ICRI 310.2R and be thoroughly abrasive-blast, sandblast, or shotblast prior to concrete placement.

.2 Clean all existing concrete surfaces to receive new concrete of foreign material, dust, debris, grease, and oil as directed by Consultant. Emulsifiers shall be required for surfaces containing grease or oil.

.3 Notify Consultant to review surfaces prior to concrete placement.

3.2 Concrete Placement - Ready-Mixed Concrete

.1 Detail cracks and seal forms to protect against water and concrete leakage to the interior.

.2 The patch area shall be thoroughly wetted in a controlled manner to achieve a saturated surface dry (SSD) state without promoting interior leakage, prior to placing concrete.

.3 Puddles or free water shall be blown from the patch area and the surface permitted to dry to a saturated surface dry (SSD) state prior to application of cement slurry.

.4 Apply a cement slurry bonding agent to the surface of the concrete just prior to placing new concrete.

.5 The cement slurry bonding agent shall be broomed or scrubbed into the deck to fully saturate the surface but not to be allowed to puddle.

.6 Pre-wet fabric, burlap, cotton mats, or pre-approved alternative shall be available on site prior to placement of concrete to allow for immediate placement overtop of new concrete patches after their initial set.

.7 Addition of water shall conform to CSA A23.1. Do not add water after the initial introduction of mixing water at the plant unless the measured slump tested at the onset of discharge is less than specified requirements and less than 60 minutes have elapsed from the time of batching. Water may only be added in this circumstance under the on-site direction of the producer's Quality Control Inspector. In no instance shall more than 16 L of water be added per cubic metre of concrete. The resulting concrete must satisfy specified requirements. The responsibility for the product will remain with the Contractor.

.8 On slab top surfaces, place new dense concrete thoroughly compacted and vibrated into place to ensure good bond.

.1 Ensure reinforcing steel is secured in place and is not disturbed during placement.

.2 Vibrators are to be used for consolidation purposes only and are not to be used to an extent that causes segregation of the concrete.

.3 Internal vibrators shall conform to CSA A23.1 Clause 7.2.5.2 and Table 19: Internal Vibrators for Various Applications.

.4 Vibrators shall be inserted into concrete perpendicular to concrete surface.

.5 Vibrators shall be inserted such that zones of consolidation always overlap.

.9 Concrete surfaces to be flush with existing surfaces, free of voids and cracks, and have a uniform surface and transition to the existing surface.

.10 Finish concrete in accordance with CSA A23.1/A23.2. Initial finish shall be completed before any bleeding or free water is present on the surface of the concrete. Final finishing shall commence after the bleed water has disappeared and when the concrete has stiffened sufficiently to prevent the working of excess mortar to the surface. Do not add water to finish.

.11 Do not overwork concrete surface. Wood float finish is acceptable.

.12 Do not use steel trowels with air-entrained concrete. For air-entrained concrete, the surface can be further leveled and consolidated with a magnesium bull float for larger repairs or a magnesium trowel for smaller repairs. One or more passes shall be made at suitable time intervals to obtain a level finish free of float marks. Do not work bleed water on the concrete surface into the concrete during finishing.

.13 If mechanical floats are to be used for final finishing of larger air entrained concrete surfaces, the mechanical floating of the concrete surface shall commence as soon as the concrete surface has reached initial set and will support the weight of a power float machine equipped with magnesium float blades and the operator.

.14 Tool crack control joints in curbs in line with topping control joints indicated on Drawings.

.15 Cure concrete as outlined in this section.

.16 Areas of concrete repair completely through the thickness of the slab shall be patched with concrete that is well consolidated and vibrated into place onto steel decking as shown on the Drawings.

.17 Do not allow traffic on newly placed repair patches until 75% of the specified 28-day strength has been reached.

3.3 Bonded Topping Installation

.1 Install sloped bonded concrete topping in localized areas outlined by the Consultant to improve slopes to drain.

.2 The minimum topping installation thickness is to be 32 mm.

.3 Prepare concrete surface of existing slabs by light jackhammering or scarification followed by abrasive blasting, including up vertical surfaces to the height of the new overlay thickness. All concrete surfaces to receive new concrete shall have a minimum No. 6 CSP per ICRI 310.2R.

.4 Preparation includes removal and unsound and delaminated concrete, and all oil, grease, paint, and surface contaminants.

.5 In the event of excessive concrete removal beyond that required to achieve the desired concrete surface profile, the Contractor is responsible for the cost of additional concrete overlay material, repairs to damaged reinforcing steel, and delamination repairs at areas with sound concrete and exposed reinforcing.

.6 Protect the prepared and cleaned surfaces. If the prepared substrate surfaces become contaminated after surface preparation, the Contractor shall repeat the preparation and cleaning procedures at his own expense.

.7 The prepared concrete surfaces shall be thoroughly wetted down to achieve a saturated surface dry (SSD) state prior to concrete placement.

.8 Just prior to concrete placement, excess water shall be blown clear of the concrete surface and the surface shall be permitted to reach a saturated surface dry (SSD) state.

.9 Apply a cement slurry bonding agent, scrubbed into the substrate surfaces, immediately prior to concrete placement, and in accordance with CSA A23.1. In no case shall the cement slurry bonding agent be permitted to pond or dry prior to concrete placement.

.10 Place and consolidate plastic patch material on prepared surfaces in accordance with CSA A23.1 to ensure full bonding of new concrete topping/overlay. Placement of concrete shall be continuous for the duration of the pour.

.11 Surfaces shall be bull floated, trowelled and light broom finished perpendicular to traffic direction to provide a non-slip surface suitable for vehicle and pedestrian traffic. Light broom finish may be omitted where the topping is to be coated with a waterproofing system.

.12 Location and detail of construction pour joints not indicated on the drawings shall be submitted to the Consultant for review.

.13 Protect and cure bonded concrete toppings in accordance with requirements of this section.

.14 Do not allow traffic on topping unit concrete has reached 75% of its design strength.

3.4 Concrete Mixing and Placing

.1 Concrete shall be machine mixed. Mixing and placing shall be in accordance with CSA A23.1.

.2 Concrete shall be conveyed from the mixer to the place of deposit by methods that will ensure the required quality of concrete. Equipment for conveying the concrete shall be of such size and design as shall ensure a practically continuous flow of concrete at the delivery end without separation of materials.

.3 Concrete shall be deposited into patch repairs as near as practicable to its final position to avoid re-handling.

.4 Depositing shall be continuous throughout each division and the concrete shall be placed and worked so that a uniform texture will be produced.

.5 No concrete shall be placed later than one half hour after leaving the mixer. No re-tempered concrete shall be placed.

3.5 Compaction and Vibration

.1 Concrete shall be consolidated by means of sufficient vibrators of adequate size operated by competent workers.

.2 The use of vibrators to transport concrete shall not be allowed.

.3 Concrete shall be thoroughly worked around reinforcement, around embedded items, and into corners.

.4 Compaction and vibration is to eliminate all air and stone pockets that may cause honeycombing, pitting, or planes of weakness.

3.6 Concrete Curing

.1 Initiate surface concrete repair wet curing as soon as possible after the concrete has sufficiently set, and no later than 30 minutes after finishing.

.1 Minimum acceptable wet curing method on slab surfaces is installation of pre-saturated filter fabric, burlap, or cotton mats that are covered with plastic sheeting. Overlap wet-curing mats 150 mm and ballast in place without marring the concrete surface.

.2 Wet curing procedures are to keep the concrete surfaces continuously wet for a period of at least 7 consecutive days at a minimum temperature of 10°C. Do not permit water to evaporate completely from the concrete surfaces at any time within the wet cure period. Apply additional water as required.

.3 Prevent airflow in the space between the wet-curing mats and the plastic sheeting.

.2 Vertical repair patches are also to be wet cured for the duration of the 7-day wet-curing period by:

.1 Maintaining formwork in place with installation of pre-saturated filter fabric, burlap, or cotton mats that are covered with plastic sheeting over formwork and exposed sides.

.3 Provide the Consultant with proposed wet-curing procedures at least 2 weeks prior to concrete placement. Any revisions to the proposed procedures must be submitted to the Consultant for review a minimum of one week prior to concrete placement.

.4 The use of chemical curing compounds is not permitted.

.5 Protect concrete from the harmful effects of heat, cold, running or surface water, and mechanical shock.

.6 Do not place concrete when air temperature is below 10°C, or without implementing provisions to ensure proper curing of concrete when -- in the opinion of the Consultant -- there is a possibility of air temperature falling below 10°C. These provisions shall be reviewed by the Consultant and conform to the requirements of CSA A23.1.

.7 Maintain concrete material and forms between 15°C and 32°C until concrete placement whenever the surrounding air is below 5°C. No frozen material or material containing ice shall be used. All existing concrete, reinforcement, forms, and ground that the concrete will contact is to be free from frost.

.8 Maintain a curing temperature above 10°C for 7 days or longer to ensure proper concrete curing. Under no circumstances may dry heat be used. Provide means to humidify the air within the heated enclosure and ensure that moisture requirements for curing are maintained.

.9 Do not allow traffic onto patch until material has adequately cured to 75% of its specified 28-day compressive strength.

.10 The Consultant will have cause to not certify payment for repairs undertaken without adequate wet-curing procedures or that become surface dry during the specified curing period.

3.7 Inspection and Testing

.1 To conform to CSA A23.2.

.2 Inspection and testing to be conducted by a testing agency designated by the Owner. The Owner will pay costs of inspection and testing described in this section.

.3 Contractor to inform testing agency 24 hours in advance of concrete placement.

.4 Testing may include:

.1 Preparation and testing of concrete cylinders for compressive strength.

.2 Establishment of slump and the percentage of entrained air for each concrete truck, unless otherwise directed by Consultant.

.3 Review of concrete mix designs submitted by the Contractor.

.4 Bond testing of concrete repair patches to existing concrete where designated by the Consultant.

.5 Submission of test results to the Owner, Consultant, and Contractor.

.6 Preparation and compressive strength testing on sets (4 cylinders) of concrete cylinders. Concrete cylinders are to be placed in an area with similar curing conditions to that of the cast concrete.

.5 Testing procedures for concrete shall conform to the following requirements:

.1 Compression tests on concrete shall be carried out in accordance with CSA A23.2 and A23.1 except that a Strength Test shall consist of four test cylinders and one cylinder shall be tested at the age of 3 days, the second cylinder shall be tested at the age of 7 days, and the remaining two at an age of 28 days.

.2 Slump and air entrainment test shall be conducted at the time of sampling concrete for compressive tests and shall be conducted in conformity with CSA A23.2. Slump and air entrainment tests shall be performed on all loads used each day.

.6 The Contractor shall provide at no additional costs to the Owner:

.1 Samples of all material required for testing.

.2 Cooperation with the execution of concrete testing, which shall include protection against injury or loss of cylinders.

.3 Access for the testing agency to test and/ or inspect materials.

.4 Site storage facilities meeting requirements of CSA A23.2 for concrete test specimens prior to removal to laboratory.

.7 Bond Strength:

.1 After the concrete repairs have cured, the testing agency may perform bond strength tests where requested by the Consultant.

.2 These cores are to be used for the evaluation of the bond strength of the new concrete to the existing by direct tensile force. Testing agency will perform the required drilling through patches selected by Consultant.

.3 Failure to achieve a minimum tensile bond strength of 0.9 MPa shall constitute failure of patches.

.4 Contractor to fill all core holes with non-shrink cementitious grout upon completion of the tests.

.8 Contractor shall pay for costs of additional testing as follows:

.1 Additional standby time required due to late delivery by concrete supplier.

.2 Additional slump and/or air tests if first tests indicate that concrete properties are outside of specified requirements and the Contractor wishes to modify the mix and retest. All modifications are to be approved by the Consultant.

.3 If the Contractor fails to notify the testing agency of pour cancellation.

3.8 Field Quality Control

.1 The Consultant shall evaluate bonding of fresh patch material to existing concrete after the fresh patch material has cured sufficiently.

.2 The evaluation shall be performed by acoustical sounding, using a "chain-drag" or other techniques.

.3 Hollow sounds detected in repair area provide reason to suspect inadequate bonding. Contractor to core these areas to determine bonding adequacy where requested by the Consultant.

.4 Coring shall be through the new concrete and into the existing concrete. Core diameter shall be 75 mm, or as required by the Consultant. Length of cores shall be twice the core diameter or twice the thickness of new concrete, unless otherwise requested by the Consultant.

.5 Scanning is to be completed prior to coring to avoid coring through embedded reinforcing, conduit, or other embedded items.

.6 Cores will be visually inspected after removal and any further testing that is required will be determined by the Consultant.

.7 Contractor to patch core holes.

3.9 Rejection of Defective Work

.1 The Consultant shall have the right to order additional concrete testing of any portion of repairs in accordance with CSA A23.1 if previous testing demonstrates non-conformance with specified requirements. The testing company shall be selected by the Consultant and shall deal directly with the Consultant. Payment for costs associated with the additional concrete testing will be at the Contractor’s expense.

.2 Where it is the Consultant’s opinion that material or workmanship fails to meet the specified requirements, the work shall be replaced or repaired to the approval of the Consultant at no additional cost to the Owner.

.3 Bond failure between repair material and the existing concrete, or failure to meet compressive strength requirements based on compression testing of concrete cylinders, will result in drilling of additional core samples at the Contractor’s expense. Failure of these additional samples will require the work to be replaced or repaired to the approval of the Consultant at no additional cost to the Owner.

3.10 Record Drawings

.1 Maintain accurate records of the location, size, and concrete placement date for each repair area.

.2 Records are to be kept up-to-date and made available to the Consultant for review throughout the duration of the Work.

.3 Prior to Substantial Performance of the Work, provide a plan showing location, size, and date of concrete repairs.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, materials, equipment, supervision, and services necessary to supply, install, maintain, and remove shoring and bracing systems as required to support the structure during repairs.

.2 Structural shoring costs are included in delamination repair unit prices.

1.2 Submittals

.1 Provide shoring shop drawings that include a shoring design and layout designed by a specialty Professional Engineer licensed to practice in Ontario a minimum of two weeks prior to starting demolition Work. Specialty Professional Engineer is to be retained by the Contractor at no additional cost to the Owner.

.1 Shoring shop drawings are to include shoring layouts for randomly located surface, soffit, through-slab, vertical concrete delamination repairs, and lateral wall bracing if required.

.2 Shoring layout and shop drawings shall depict arrangement of equipment for shoring, showing installation details, timber cribbing, member types, and spacing of connections.

.3 Shoring layout and shop drawings shall be designed, sealed, and signed by specialty Professional Engineer.

.2 Shoring shop drawings are to be reviewed by the Consultant for the effect on the base structure and accepted prior to installation of shoring.

.3 Submit documentation of field inspections and certifications required from specialty Professional Engineer, as specified by this Section, and Contract Documents.

1.3 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 CSA S269.1 Falsework and Formwork

.3 CSA S269.2 Access Scaffolding for Construction Purposes

.4 CSA S350 Code of Practice for Safety in Demolition of Structures

2.0 PRODUCTS

2.1 Equipment and Materials

.1 Unless otherwise specified by Contract Documents, use only commercially manufactured shoring and bracing systems.

.2 Minimum capacity of commercially manufactured equipment as follows:

.1 Post shores with a minimum capacity of 24 kN at 2.5 m height

.2 Standard scaffold frames with a minimum capacity of 22 kN per leg.

.3 Heavy-duty scaffold frames with a minimum capacity of 44 kN per leg.

.3 Manufactured shoring systems shall consist of pre-engineered steel or aluminium components, designed and produced specifically for structural shoring, and installed in accordance with manufacturer's recommendations.

.4 Shoring members need not be new materials. Previously used materials are acceptable, provided that they are in good repair, unbent, and undamaged.

.5 Use of "scaffolding" equipment (i.e. where not specifically intended for use as structural shoring of heavy loadings), wood shoring or bracing members, or tube-and-coupler assemblies require preapproval by the Consultant or Specialty Professional Engineer

.1 Use of wood materials shall be limited to wedges and shims, where not supporting vertical loading and where not subject to shrinkage or potential deterioration in wet conditions or long-term application.

.6 Design of shoring members or structural steel members and components that are not of a pre-manufactured system shall be in accordance with provisions of governing Building Code and Standards for specific material of member.

.7 Slabs are to be shored for a minimum of two levels or to the slab-on-grade level unless otherwise indicated on the approved shoring shop drawings or the Drawings.

3.0 EXECUTION

3.1 Structural Slab Shoring

.1 Support the structure during the Work. Supply and install all shoring and bracing necessary to prevent movement, settlement, or damage to the structure, services, and property.

.2 Specialty Professional Engineer who designed shoring systems shall inspect installation and provide written certification that shoring and bracing systems and components, as installed, meets intent of their design and compliance with project criteria.

.3 Provide additional shoring prior to concrete removal where the Consultant or specialty Professional Engineer deems it necessary to prevent movement, settlement, or damage to the structure, services, and property based on identified concrete delamination repair locations.

.4 Provide additional shoring to support suspended sprinkler, piping and mechanical systems during the Work.

.5 Provide additional shores at the Contractor’s expense where it is necessary to support stockpiled rubble and equipment.

.6 Formwork shoring requirements are in addition to structural shoring requirements.

.7 Install and arrange slab shoring in a manner that prevents sharp projections that may cause personnel injury.

.8 Modify the position of shores if requested by the Consultant or specialty Professional Engineer at no additional cost to Owner.

.9 Manage and maintain shoring by regularly inspecting and checking installed shoring and bracing components to ensure that supports, fastenings, wedges, ties, and parts are secure.

.10 Tighten all shores below the level being repaired prior to placement of new concrete repair material.

.11 Do not strip shores until concrete repair material has reached 75% of design strength, and not sooner than seven days after concrete placement for full-depth slab repairs or three days for top surface delamination repairs.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, material, equipment, supervision, and services necessary to remove sound and unsound concrete from slab surfaces, soffits, columns, and walls, where directed by the Consultant, indicated on the Drawings, and as described herein.

2.0 PRODUCTS

2.1 Equipment

.1 Provide hand-held jackhammers for concrete removal that are capable of efficiently removing sound and unsound concrete without causing excessive or unwanted removal.

.2 Maximum jackhammer size is 15 kg. Light chipping hammers are to be used where the Consultant deems it necessary to reduce the amount of concrete breakage. Maximum light chipping hammer size is 7 kg. The use of light chipping hammers is at no additional cost to the Owner.

.3 Equipment located outside shall be mufflered or placed within an acoustic enclosure to produce maximum operating noise levels of 70 dBa at 3.0 m. Noise levels are also to be in accordance with all local and municipal by-laws and regulations.

.4 Use "silenced" compressors.

.5 Compressors and all diesel-powered equipment are to be fitted with a diesel exhaust scrubber.

3.0 EXECUTION

3.1 Preparatory Work by Contractor

.1 Approximate locations and extents of concrete delamination repairs are shown on the Drawings, and are provided as general guidelines only. Actual concrete removal areas to be designated on site by the Contractor.

.2 Contractor shall chain-drag suspended slab surfaces and chalk the perimeter outlines of all deteriorated and delaminated areas to be repaired. Includes delaminations, spalls, and unsound surfaces that may adversely affect the structure or performance of the traffic deck coating system. Contractor's chalked outlines shall not extend onto sound concrete at patch edges or between adjacent patches.

.3 Contractor shall determine, by visual inspection and hammer-sounding, the locations and extent of deteriorated, delaminated, and unsound soffit or full-depth slab removal areas to be repaired. The perimeter outlines of the soffit and full-depth slab repair areas shall be marked in chalk by the Contractor. Mark perimeter outlines of full-depth slab delaminations on slab surface, using measurements and a different colour of chalk. Coordinate locations of full-depth slab repair areas with results of surface chain-drag testing.

.4 Notify the Consultant to review and comment on the areas identified for repair. Consultant will review Contractor's chalk-marked outlines, adjust as required, and mark perimeters of actual repair areas using paint. Do not proceed with concrete removal or demolition until Consultant's review has been completed.

3.2 Surface Concrete Removal

.1 Remove concrete in areas that are already spalled or that produce a hollow sound under a hammer test, which indicates the presence of concrete delaminations. The areas shall be initially located by the Contractor and marked on the concrete surface with a durable red-coloured paint. The Consultant will then review the markings and mark out the actual area of concrete to be removed.

.2 Take precautions to avoid punching through the slab.

.3 Remove concrete within designated areas to obtain a minimum of 25 mm clearance around all exposed reinforcement within delamination repair. Minimum removal depth shall be 50 mm, which may include sound concrete.

.4 Upon exposure of visibly corroded or debonded reinforcement, additional concrete removal shall be performed until bars appear to be rust-free and well bonded for a distance of 75 mm and perimeter of designated area is sound, or until otherwise directed by the Consultant.

.1 This concrete removal shall not proceed until authorized by Consultant.

.2 Contractor shall not receive payment for concrete removals not authorized by nor considered necessary to Consultant.

.5 Excess or unnecessary concrete removal to be at no extra cost to the Contract.

.6 Outline patch area with a 13-mm deep vertical sawcut as close as possible to limits of concrete already removed. Reduce sawcut depth if necessary to avoid cutting reinforcement. Remove concrete to sawcut taking precautions to avoid damaging sawcut edge. Edges with spalls or chips will be rejected and shall be re-sawcut at Contractor's expense.

.7 Call for review by Consultant to confirm acceptability of patch preparation prior to cleaning of reinforcement. After concrete removal has been complete, a final check adjacent to the areas shall be made by the Contractor to determine any additional spalling or delamination which may have occurred. Contractor shall mark out these areas and notify Consultant to make a review.

.8 Remove additional concrete required to provide adequate development and/or lap for new reinforcing steel required as directed by the Consultant.

.9 Where the Consultant deems that required concrete removal is excessive adjacent to vertical surfaces, a key is to be chipped into existing columns and walls prior to concrete placement. The key is to have a minimum depth of 40 mm into the vertical element. Install shoring and bracing as required.

3.3 Vertical Surface Concrete Removal

.1 Remove concrete in areas that are already spalled or that produce a hollow sound under a hammer test, which indicates the presence of concrete delaminations. The areas shall be initially located by the Contractor and marked on the concrete surface with a durable red-coloured paint. The Consultant will then review the markings and mark out the actual area of concrete to be removed.

.2 Take precautions to avoid punching through the slab.

.3 Use light chipping hammers for all soffit and vertical concrete removal.

.4 Remove concrete within designated areas to obtain a minimum of 25 mm clearance around all exposed reinforcement within the delamination repair. Minimum removal depth shall not be less than 50 mm, which may include sound concrete.

.5 Upon exposure of visibly corroded or debonded reinforcement, additional concrete removal shall be performed until bars appear to be rust-free for a distance of 75 mm around the perimeter of a patch or until otherwise directed by the Consultant.

.6 Excess or unnecessary concrete removal to be at no extra cost to the Contract.

.7 Outline patch area with a 13-mm deep vertical sawcut as close as possible to limits of concrete already removed. Reduce sawcut depth if necessary to avoid cutting reinforcement. Remove concrete to sawcut taking precautions to avoid damaging sawcut edge. Edges with spalls or chips will be rejected and shall be re-sawcut at Contractor's expense.

.8 Call for review by Consultant to confirm acceptability of patch preparation prior to cleaning of reinforcement. After concrete removal has been complete, a final check adjacent to the areas shall be made by the Contractor to determine any additional spalling or delamination which may have occurred. Contractor shall mark out these areas and notify Consultant to make a review.

3.4 Concrete Topping Removal

.1 This method of concrete removal is limited to the removal of concrete toppings.

.2 Remove concrete topping in areas that are already spalled or that produce a hollow sound under a hammer test, indicating concrete delamination. These areas shall be initially located by the Contractor and marked on the concrete surface with a durable red-coloured paint. These markings will be reviewed and spot-checked by the Consultant who will then mark out the area of concrete topping to be removed.

.3 Outline concrete topping repair areas with a full depth vertical sawcut. Remove concrete topping in whole sections; do not jackhammer to demolish concrete topping. Take precautions to avoid damaging vertical sawcut edge. Edges with spalls or chips will be rejected and shall be re-sawcut at Contractor’s expense.

.4 After concrete removal has been complete, a final check adjacent to the areas shall be made by the Contractor to determine any additional spalling or delamination that may have occurred. Contractor shall mark out these areas and notify Consultant to make a review.

.5 Remove and replace underlying insulation.

.6 Ensure all reasonable precautions are taken to prevent damage to the underlying structural slab and membrane system. Inspect and repair as required.

3.5 Existing Exposed Electrical Services

.1 The Contractor shall perform temporary removal, replacement, or relocation of existing electrical wiring, conduit, equipment, fixtures, or hardware in designated concrete delamination repair areas as required for completion of the Work.

.2 All exposed conduit, fixtures, attached devices, wet-sprinkler fire system piping, heads and pull stations, fire extinguishers, mechanical system components, louvers and ducts are to be protected or Contractor to correct damages at their own expense. The Contractor shall promptly report any damage to the Owner and the Consultant.

.3 Prior to commencing the Work, the Contractor shall contact the Owner to locate all protective or alarm systems and sensors. All services shall be protected against damage or interruption. The Contractor shall provide the Owner with minimum 48 hours advance notice of any necessary interruption. All claims resulting from damage shall be the responsibility of the Contractor.

3.6 Existing Embedded Electrical Services

.1 It is the Contractor's responsibility to ensure that all potential areas of buried conduit be identified and that all high voltage systems located in the area of work are switched off to prevent possible injury. Coordinate requirements with Owner.

.2 The Contractor shall take the utmost caution during concrete removal operations in order to prevent damage to embedded conduits. Any damage caused to such conduits will be immediately reported to the Owner and Consultant. In no instance will damaged or deteriorated conduits be covered up by the Contractor without specific approval from the Owner.

.3 Contractor to repair or abandon damaged conduit within the slab at the discretion of the Consultant. Owner to pay for repairs provided that damage did not result from Contractor's negligence.

.4 Contractor to coordinate required repairs with designated Electrical Sub-Contractor. Owner shall designate Electrical Sub-Contractor for the Work.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, material, equipment, supervision, and services necessary to clean and prepare existing reinforcement exposed within concrete repairs and where otherwise designated by the Consultant.

.2 Supplement corroded or damaged reinforcement with new reinforcing steel and accessories, including supply, fabrication, handling, and placing.

1.2 Reference Standards

.1 All Reference Standards are latest editions referenced by the building code in the Place of the Work, or latest editions if not referenced by Code.

.2 Ontario Building Code

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

.4 CSA G30.18 Carbon Steel Bars for Concrete Reinforcement

.5 ACI Manual of Standard Practice for Detailing – 28th Edition

.6 CSA W186 Welding of Reinforcing Bars in Reinforced Concrete Construction

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

.8 SP-71 (08) ASTM Standards in 318-08

1.3 Product Handling

.1 Protect reinforcement in a manner that prevents excessive rusting and fouling with dirt, grease, form oil, and other bond-breaking coatings.

.2 Reinforcement shall be free from excessive corrosion, mud, oil or other coatings that adversely affect its bonding capacity at the time concrete is placed.

2.0 PRODUCTS

2.1 New Concrete Reinforcement and Accessories

.1 Refer to Section 03 20 00 – Concrete Reinforcement.

3.0 EXECUTION

3.1 Preparation - Reinforcement in Place

.1 Exposed reinforcement and steel shall be completely cleaned of cement paste, corrosion, oil, and contaminants. Dry abrasive-blast clean to near-white blast, completely cleaned of all grease, oil, dirt, mill scale, cement paste, debonded epoxy, etc. Additional cleaning shall be performed if subsequent corrosion occurs after initial cleaning.

.2 Wire brush, grinding, and similar hand-cleaning methods shall not be permitted in lieu of abrasive-blast cleaning of reinforcement, unless approved by the Consultant.

.3 The Contractor may elect to cut, remove, and replace damaged or corroded reinforcement with new reinforcement in lieu of cleaning existing exposed reinforcement, subject to approval of the Consultant. Provide required tension lap splices with existing cleaned reinforcement at no additional cost to the Owner and Consultant’s approval.

3.2 Installation

.1 Replace or supplement damaged or severely corroded reinforcement exposed in concrete delamination repair patches with new plain reinforcement where existing reinforcing steel has a section loss of 20% or greater.

.2 Replace or supplement damaged or severely corroded reinforcement where otherwise directed by the Consultant.

.3 Replacement or supplemental reinforcing bars shall be the same bar size or greater than the original bar.

.4 Additional concrete removal may be required to allow for placement of supplemental reinforcing bars. The length of the supplemental bars shall be equal to the length of the deteriorated segment of the existing bars, plus the required lap splices at each end. Splicing requirements shall be in accordance with indicated Reference Standards. Supplemental bars shall be placed parallel to, and approximately 20 mm from, the existing bars.

.5 Additional concrete removal required for supplemental reinforcement placement will be paid by Owner except where Contractor elects to replace bars in lieu of abrasive-blast cleaning.

.6 Reinforcement that is fully exposed in repair areas for the entire bar length shall be removed and replaced with new reinforcement of the same bar size or greater at no additional cost to the Owner.

.7 Accurately place supplemental reinforcement and secure existing reinforcement exposed in the delamination repair patches to maintain original design layout.

.8 Reinforcement shall be firmly tied and supported by bar supports and side form spacers to ensure proper concrete cover and spacing within allowable tolerances before and during concrete placement.

.9 Bar supports shall be sufficient in number and strength to carry the reinforcement they support and prevent displacement by workers or equipment before and during concrete placement.

.10 Bars shall be tied at all intersections where spacing is greater than 250 mm in each direction and at alternate intersections where spacing is less than 250 mm in each direction.

.11 Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits, and embedded items. If bars are moved more than one bar diameter, or enough to exceed specified tolerances, the resulting arrangement of bars shall be subject to Consultant’s approval.

3.3 Welding

.1 Any welding of reinforcing steel shall be in accordance with CSA W186.

.2 Copies of the Canadian Welding Bureau approved welding procedure and certificate of current operator qualification shall be submitted to the Consultant prior to commencement of welding.

3.4 Inspection and Testing

.1 No concrete shall be placed until Consultant has reviewed reinforcing in-place. Provide minimum 24 hours of notice of time when reinforcement will be substantially in place and ready for Consultant’s review.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, materials, equipment, and services necessary to supply and install new reinforcing steel work shown on indicated in all the Contract Drawings and Specifications, including accessories such as hanger bars, spirals, wire ties, support bars, chairs, spacers, supports, or other devices required to position reinforcing properly.

1.2 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not reference by Code.

.2 Ontario Building Code

.3	CSA A23.1/CSA A23.2	Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete
.4	CSA A23.3	Design of Concrete Structures
.5	CSA G30.5	Welded Steel Wire Fabric for Concrete Reinforcement *(Withdrawn)*
.6	CSA G30.18	Carbon Steel Bars for Concrete Reinforcement
.7	ASTM A767/A767M	Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
.8	ASTM A775/A775M	Standard Specification for Epoxy-Coated Steel Reinforcing Bars

.9 American Concrete Institute (ACI) Manual of Standard Practice for Detailing Reinforced Concrete Structures

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

.11	CSA S413	Parking Structures
.12	SP-71	ASTM Standards in 318-08
.13	CSA W186	Welding of Reinforcing Bars in Reinforced Concrete Construction

1.3 Submittals

.1 Mill Tests:

.1 Upon request, provide the Consultant with a certified copy of mill tests of steel supplied, showing physical and chemical analysis, minimum two weeks prior to commencing reinforcing work.

1.4 Product Delivery, Storage, and Handling

.1 Store and protect reinforcement in a manner to prevent excessive rusting and fouling with dirt, grease, form-oil, and other bond-breaking coatings.

.2 Reinforcement at the time concrete is placed shall be free from excessive rusting, mud, oil, or other coatings that adversely affect its bonding capacity.

2.0 PRODUCTS

2.1 Materials

.1 Reinforcing steel bars shall conform to CSA G30.18 (grade 300 MPa) unless otherwise specified herein or on the drawings. Galvanized finish.

.2 Reinforcing bars to be welded shall conform to CSA G30.18.

.3 Welded wire fabric shall conform to CSA G30.5. Sizes and gauges as shown on the drawings.

.4 Bar supports shall conform to ACI 316 unless otherwise approved by the Consultant.

.5 Chairs, bolsters, bar supports, and spacers shall be epoxy coated or plastic. The use of pebbles, pieces of broken stone or brick, pipe, or wooden blocks will not be permitted.

.6 Tie wire for coated reinforcing shall be plastic-coated.

.7 Mechanical splices to Consultant’s approval.

2.2 Fabrication

.1 Fabricate reinforcing to CSA A23.1 and reviewed shop drawings.

.2 Fabricate reinforcing steel within the following tolerances:

.1 Sheared length plus or minus 25 mm

.2 Outside dimension of stirrups, ties and spirals, plus or minus 10 mm

.3 Other bends plus or minus 25 mm

.3 Colour-code each bar to correspond with code mark appearing on bar list.

.4 Ship bundles of bar reinforcement clearly identified in accordance with bar lists.

.5 Bars shall not be field bent, straightened, or re-bent, except where indicated or authorized by the Consultant. When field bending is authorized, bend without heat, applying slow and steady pressure. Replace bars that develop cracks or splits.

.6 Splicing of reinforcing bars, unless indicated on the drawings, is prohibited except with the written approval of the Consultant. Such splices shall conform to the splice length for that class of splice according to CSA A23.3. Splices, where possible, shall be staggered.

3.0 EXECUTION

3.1 Installation

.1 Reinforcement shall be accurately placed in the positions shown on the drawings, firmly tied, and supported by bar supports and side form spacers to assure proper concrete cover and spacing within allowable tolerances before and during placing of concrete.

.2 Bar supports shall be sufficient in number and strength to carry the reinforcement they support and prevent displacement by workers or equipment before and during concreting. Bars shall be tied at all intersections, except where spacing is less than 250 mm in each direction, when alternate intersections shall be tied.

.3 Bars shall be placed to the following tolerances unless noted otherwise.

.1 Clear concrete protection of reinforcement 5 mm ±.

.2 Where the depth of a flexural member, thickness of a wall or smallest dimension of a column is:

.1 200 mm or less 5 mm ±.

.2 larger than 200 mm but less than 600 mm 10 mm ±.

.3 600 mm or larger 20 mm ±.

Lateral spacing of these bars shall be within 30 mm ± of the specified spacing.

.3 For longitudinal location of bends and ends of bars 50 mm ±.

.4 As Item 3 at discontinuous ends of members 20 mm ±.

.5 Specified spacing between bars 10 mm ±.

.4 Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits or embedded items. If bars are moved more than one bar diameter or enough to exceed the specified tolerances, the resulting arrangement of bars shall be subject to approval of the Consultant.

3.2 Welding

.1 Any welding of reinforcing steel shall be in accordance with CSA W186.

.2 Copies of the Canadian Welding Bureau approved welding procedure and certificate of current operator qualification shall be submitted to the Consultant prior to commencement of welding.

3.3 Inspection and Testing

.1 No concrete shall be placed until the Consultant has completed their review of reinforcing in place. The Contractor shall provide a minimum of 24 hours notice of the time when the reinforcement will be substantially in place and ready for the Consultant’s review.

.2 Inspection and testing of factory-coated reinforcement to be conducted by a testing agency designated by the Consultant. The Owner will pay cost of inspection and testing described in this Section.

.3 Inspection and testing of reinforcement coated in place shall include visual inspection with flashlight and mirror.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Cast-in-place concrete materials, including production, mixing, handling, testing, transporting, placement, and curing of concrete.

.2 Unbonded cast-in-place concrete topping podium deck surface finishes.

1.2 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 Ontario Building Code

.3	CSA A23.1/CSA A23.2	Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete
.4	CSA A3000	Cementitious Materials Compendium
.5	ASTM C1202	Standard Test Method for Electrical Indication of Concrete’s Ability to Resist Chloride Ion Penetration
.6	ACI 305R	Guide to Hot Weather Concreting
.7	ACI 306R	Guide to Cold Weather Concreting

1.3 Work Installed but Furnished by Others

.1 Any anchor bolts and other inserts for casting into concrete shall be supplied by applicable trades. Build in and/ or set these items and assume full responsibility for correct positioning.

1.4 Performance Requirements

.1 Surfaces shall not crack outside of control joints, scale, pit, dust, or unduly deteriorate or wear.

.2 Cracks away from control joints in toppings are to be repaired via full replacement of the cracked panel at Contractor's expense.

1.5 Submittals

.1 Concrete Mix Design:

.1 Submit proposed concrete mix designs to the Consultant a minimum of 2 weeks prior to placement for Consultant review. Do not place concrete unless the concrete mix design has been reviewed and accepted by the Consultant.

.2 Concrete mix design is to meet the minimum structural design and durability requirements indicated herein and as defined in CSA A23.1. The most severe exposure requirement governs.

.2 Concrete Test Results:

.1 Testing Agency shall submit electronic copies of test results to the Consultant. The Consultant will distribute results to the Contractor and Owner.

.3 Transit-Mix Delivery Slips and Placing Records:

.1 Keep a record of the time and place for each concrete placement with the corresponding transit mix delivery slip that indicates the concrete contents, batch time, and general design criteria. The record is to be provided to the Owner or Consultant for review, upon request, and a copy is to be submitted on completion of concrete placement.

.4 Curing Procedures:

.1 Submit proposed concrete curing methods and details, including weather protection provisions, to the Consultant for review.

.5 Construction Joints:

.1 Submit plan locations and details of construction joints not shown on the Drawings for the Consultant’s review.

2.0 PRODUCTS

2.1 General

.1 Cast-in-place concrete shall satisfy the requirements of the Reference Standards unless specified otherwise herein or on the Drawings.

2.2 Materials

.1 Materials shall conform to the following requirements:

.1 Portland Cement: To CSA A3000.

.2 Aggregate: Natural stone to CSA A23.1.

.3 Water: Potable and to CSA A23.1.

.4 Air Entraining Agents: To CSA A3000.

.5 Chemicals Admixtures: To CSA A3000.

.6 Pozzolanic Mineral Admixtures: To CSA A3000.

2.3 Podium Deck Surface Concrete Topping Mix

.1 Concrete shall be homogeneous and when hardened shall have the required strength, resistance to deterioration, durability, resistance to abrasion, water-tightness, appearance, and other specified properties.

.2 Mix design is the responsibility of the Contractor. Concrete mixes shall be proportioned by the supplier to meet the requirements for cement type, compressive strength, class of exposure, maximum aggregate size, slump, air content, and admixtures specified herein. All concrete shall be normal weight. Proportioning mixing and delivery to the site shall meet the requirements of CSA A23.1.

.3 Concrete Properties:

	Description	Requirements
.1	Compressive Strength (28 days)	32 MPa minimum
.2	Class	C2 Exposure
.3	Air Content	5.0% to 8.0%
.4	Aggregate Size	20 mm maximum
.5	Slump	
	- Prior to Superplasticizer	50 mm maximum
	- After Superplasticizer	125 mm maximum
.6	Water/Cementing Materials Ratio	0.45 maximum
.7	Cement Content	335 kg/m^3 minimum

	Description	Requirements
.8	Cement	Type GU - Normal Portland Cement
.9	Concrete Density	Normal weight (2,400 kg/m^3)

.4 Plasticizers are to be non-chloride based.

.5 Fly Ash: Type F or Type C. Maximum 15% by mass of cement (45 kg/m^3 max) for Type F and 10% by mass of cement (30 kg/m^3 max) for Type C.

.6 Although a maximum slump is specified, endeavour to provide concrete at the minimum slump that permits placement and handling.

.7 Concrete requirements specified may require the use of superplasticizers, set retardants. Costs associated with the use of such materials shall be included in the contract price.

2.4 Admixtures

.1 Use only compatible admixtures and add to mix in strict accordance with manufacturer's recommendations.

.2 Use of calcium chloride not permitted.

2.5 Evaporation Reducer

.1 Monomolecular film applied to the surface of screeded concrete to combat rapid drying conditions. Apply to silica fume concrete placed in direct sunlight, high winds, heated interiors, and interior or exterior low humidity conditions. Conform to manufacturer's recommended procedures and application rates.

.2 Approved Product:

	Product Name	Manufacturer
.1	MasterKure ER 50	Master Builders Solutions

3.0 EXECUTION

3.1 General

.1 All phases of concrete work shall be in accordance with the standard unless otherwise specified herein or on the Drawings. The work shall be done by workers who are skilled and experienced in their trade.

3.2 Formwork

.1 Contractor shall be responsible for design and construction of formwork.

.2 Build forms sufficiently strong and rigid to sustain weight or fluid pressure of concrete without noticeable deflection. Ensure forms are sufficiently tight to prevent mortar leaks.

.3 Construct forms so they may be installed, dismantled and removed without damaging concrete or waterproofing systems.

.4 Treat forms with approved form release agent or keep untreated forms wetted down to prevent shrinkage prior to placing concrete. Untreated forms shall be surface wetted at time of placing.

.5 Loosen and remove forms carefully, and in a method that will prevent spalling and other damage to concrete surfaces or edges. Do not use wedge pry bars, hammers, or tools against exposed concrete finish surfaces.

.6 Finished concrete surfaces to be smooth and regular, free of voids, and honeycombing. Repair concrete damage, mortar spillage, and uneven surfaces. Repair damage caused to adjacent surfaces during by formwork or concrete placement.

3.3 Inserts and Embedded Items

.1 The Contractor shall notify all trades sufficiently in advance to ensure that provision is made for casting anchor bolts and other embedded items into the concrete topping. Ensure that all of inserts and embedded items are secure and not displaced during the placing of concrete.

.2 All inserts, embedded items, and related components must be of corrosion-resistant materials **[**or protected against corrosion**]**.

3.4 Concrete Mixing and Placing

.1 Concrete shall be machine mixed. Mixing and placing shall be in accordance with CSA A23.1.

.2 Concrete shall be conveyed from the mixer to the place of deposit by methods that will ensure the required quality of concrete. Equipment for conveying the concrete shall be of such size and design as shall ensure a practically continuous flow of concrete at the delivery end without separation of materials.

.3 Concrete shall be deposited as nearly as practicable to its final position to avoid re-handling.

.4 Depositing shall be continuous throughout each division and the concrete shall be so placed and worked that a uniform texture will be produced.

.5 No concrete shall be placed later than one half hour after leaving the mixer. No re-tempered concrete shall be permitted.

.6 Cement slurry used to prime a concrete pump shall be discarded and not placed into the structure.

3.5 Addition of Water

.1 To conform to CSA A23.1.

.2 No water shall be added after the initial introduction of the mixing water for the batch except when, at the start of discharge, the measured slump of the concrete is less than that specified and no more than 60 minutes have elapsed from the time of batching to the start of discharge. In this case water may be added only under the direction of the producer's Quality Control Inspector who shall be dispatched from the plant to the site. In no case shall an amount of water exceeding the lesser of 16 L/cu. m or 10% of the mixing water be added. The resulting concrete must satisfy the specified requirements. The responsibility for the product will remain with the producer.

3.6 Compaction and Vibration

.1 All concrete shall be thoroughly consolidated during and immediately after depositing, by internal vibration. Concrete shall be consolidated by means of sufficient vibrators of adequate size operated by competent workers that have been instructed in their use.

.2 The use of vibrators to transport concrete shall not be permitted.

.3 Concrete shall be thoroughly worked around reinforcement, around embedded items, and into corners, eliminating all air or stone pockets that may cause honeycombing, pitting, or planes of weakness.

3.7 Finishing

.1 Concrete topping surface shall be bull floated, trowelled, and light broom finished parallel with building exterior wall to provide a non-slip surface suitable for pedestrian traffic.

3.8 Construction Joints

.1 Contractor shall establish pour breaks to permit tooled control joint installation in conformance with requirements outlined on Drawings.

.2 Construction joints shall be at control joint locations. The reinforcement shall continue through the joint.

.3 The existing concrete surface at construction joints shall be wetted thoroughly prior to placement of new concrete.

.4 Seal all control joints.

3.9 Curing

.1 As soon as possible after the concrete has sufficiently set, and no later than 30 minutes after finishing, wet curing with pre-saturated mats shall be initiated on the concrete surfaces.

.1 Wet curing procedures shall ensure that the concrete surfaces shall be kept continuously wet for a period of at least seven consecutive days at a minimum temperature of 10°C. Water shall not be permitted to completely evaporate from the concrete surfaces at any time within the wet cure period.

.2 Minimum acceptable wet curing method on topping surfaces is pre-saturated filter fabric, burlap, or cotton mats; covered with soaker hoses and plastic sheeting. Wet-curing mats shall be overlapped 150 mm and held in place without marring the surface of the concrete. Use of chemical curing compounds shall not be permitted.

.3 Prevent airflow in the space between the wet-curing mats and the plastic sheeting. Protect wet-curing assembly from freezing during cold weather.

.2 When the air temperature is below 5°C or when, in the opinion of the Consultant, there is a possibility of its falling below 5°C, no concrete shall be placed until after the Consultant has approved the provisions made to ensure proper curing of concrete. These provisions shall conform to the requirements of CSA A23.1, Section 7.

.3 Adequate equipment shall be provided for heating the concrete materials and protecting the concrete from freezing or near freezing temperatures. No frozen materials or materials containing ice shall be used. All concrete materials and all reinforcement, forms, existing concrete and ground with which the concrete is to come into contact, shall be free from frost. Whenever the temperature of the surrounding air is below 5°C all concrete placed shall have a temperature of between 15°C and 32°C and adequate means shall be provided for maintaining a temperature of not less than 21°C for 3 days of 10°C for 5 days except when high early strength concrete is used, the temperature shall be maintained at not less than 32°C for 2 days or 10°C for 3 days or for as much more as is necessary to ensure proper curing of the concrete. Under no circumstances may dry heat be used. Means shall be taken to humidify the air within the enclosure and to ensure that the moisture requirements for curing are maintained. No dependence shall be placed on calcium chloride or other chemicals for the prevention of freezing.

.4 In extreme weather conditions, either hot, windy, or freezing, all topping surfaces shall receive a protective covering to prevent, respectively, excessive evaporation or freezing.

3.10 Patching and Cutting

.1 Honeycomb, exposed reinforcement, deviations in formwork, and other defects of a minor nature that have occurred as a result of poorly consolidated concrete may be patched by the Contractor, at their cost, using materials and procedures pre-approved by the Consultant. Cut out defective area for full panel between control joints and fill with same concrete mix.

.2 Grind off or otherwise remove fins, ridges, and other imperfections immediately after removal of forms. Remove segregated concrete aggregate to sound material. Repair as directed by the Consultant.

.3 Holes shall not be permitted to be drilled or cored through in-place concrete unless specifically directed by the Consultant. Care shall be taken to ensure that no embedded components or reinforcement are cut.

3.11 Topping Cracks - Repair

.1 Remove cracked concrete topping panels full depth from control joint to control joint and recast. Provide 1” deep sawcut at extents of removal and use percussive removal. Retain min. 6” width of light reinforcement around perimeter for lap. Prepare exposed concrete surfaces in accordance with requirements of Section 03 01 30.

3.12 Testing

.1 Concrete testing will be as required by CSA A23.1 unless noted otherwise. Testing methods shall conform to CSA A23.2.

.2 Testing agency shall be selected and paid for by the Owner. The Contractor shall arrange with the testing agency for performing all required testing.

.3 The Contractor shall notify the Consultant at least 24 hours before any concrete is placed to allow the Consultant to review the Work.

.4 Contractor shall provide casual labour to the testing agency's field personnel for the purpose of obtaining and handling sample materials. Provide suitable access to the Work for obtaining samples. Provide and maintain facilities for storage of concrete test cylinders for the first 24 hours.

.5 Take at least one concrete test set consisting of a slump test, air entrainment test, and casting of three concrete cylinders for compressive strength testing for each 60 cu. M or fraction thereof placed in any one day. Test one moist-cured cylinder in 7 days and two in 28 days.

.6 Forward concrete test results to the Consultant, Owner, and Contractor. Include the following information:

.1 Project name

.2 Sampling date

.3 Supplier

.4 Delivery truck identification number

.5 Sampling and testing technician names

.6 Precise installation location of the sampled concrete batch

.7 Air and concrete temperatures

.8 Concrete design strength

.9 Admixtures,

.10 Cement type

.11 Maximum aggregate size.

.7 Testing agency personnel are not authorized to revoke, relax, enlarge, or release any requirements of the Specification, nor to approve or disprove any portion of the Work.

.8 If additional testing is required to demonstrate the adequacy of any concrete not meeting the requirements for strength or which has been placed before formwork and reinforcement have been reviewed by the Consultant, the Contractor shall pay the cost of such testing.

3.13 Rejection of Defective Work

.1 In the event that concrete tests do not conform to the requirements of the Specifications, or when conditions are such to cause doubt about the safety of the structure, test that portion of the structure in accordance with CSA A23.1. Such test shall be made at the expense of the Contractor and to the satisfaction of the Consultant.

.2 Where, in the opinion of the Consultant, material or workmanship fails to meet the requirements of the Specification, such work may be rejected. Work rejected shall be replaced or repaired to the approval of the Consultant and at no additional cost to the Owner.

.3 Minimum standard of finish to match approved mock-up or to Consultant approval.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, materials, equipment, and services to supply and erect structural steel required and/or indicated on the drawings to support new podium deck slab opening infills.

1.2 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 Ontario Building Code

.3	CSA S16	Design of Steel Structures
.4	CSA S136	North American Specification for the Design of Cold-Formed Steel Structural Members
.5	CSA W47.1	Certification of Companies for Fusion Welding of Steel Structures
.6	CSA W59	Welded Steel Construction (Metal-Arc Welding)
.7	CSA G40.20/G40.21	General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel

1.3 Qualifications

.1 Structural steel fabricator shall have not less than five years experience in the fabrication of structural steel.

.2 Erector shall have not less than five years experience in erection of structural steel.

.3 Steel fabricators and erectors must be certified under the requirements of CSA W47.1 as required by CSA S16.

.4 Welding procedures, welders, and welding operations shall be qualified in accordance with the Canadian Welding Bureau Standards.

.5 All connections shall be designed by a CISC-approved Fabricator unless otherwise noted.

1.4 Examination

.1 All dimensions taken from the Drawings are to be confirmed on site prior to fabrication. Contractor is to be responsible for the correctness of such measurements and report to the Consultant in writing all discrepancies between measurements at building and those shown on drawings prior to commencing work. Verify location of anchor bolts and embedded steel and ensure that work prepared by other trades is at a proper elevation, on-line, level, and true.

.2 Expose and confirm all connection points for new slab infill framing. Report to the Consultant in writing all discrepancies between building conditions and drawings.

.3 Contractor to locate all mechanical/electrical openings required in structural members for existing systems prior to fabrication.

.4 Contractor responsible for all costs associated with site location of existing reinforcing and embedded conduits.

1.5 Shop Drawings

.1 Drawings, which accompany these specifications, are to be used for estimating purposes only, and show in general the type of construction that shall be followed, but must not be considered as fabrication drawings.

.2 Fabricator to provide full shear connection for slab infill framing at existing building beams. Where welding is not feasible, provide 10”x10”x1/2” wall plate and provide required wall anchorage. Connections to account for 28 kPa factored loading across the slab infill.

.3 Submit detailed shop drawings prepared under the supervision of a Registered Professional Engineer in accordance with the General Requirements. Where pre-engineered or fabricator designed elements are part of the shop drawings, the shop drawings shall be stamped by a Professional Engineer licensed in Ontario.

.4 The shop drawings shall clearly show all shop and erection details, including cuts, copes, wall plates, anchors, connections, holes, threaded fasteners, splices, and welds. All welds, both shop and field, shall be indicated by AWS welding Symbols as specified in CSA W59 Appendix D and E.

.5 Shop drawings shall be submitted in an orderly sequence and sufficiently in advance of the work proceeding so as to not affect the schedule of the Work. The Contractor and the Consultant shall jointly determine the schedule for which the shop drawing submissions shall occur.

.6 The Consultant's review of the shop drawings is for general conformance only and does not relieve the Contractor of the responsibility for errors or omissions that may be present in the shop drawings.

.7 Upon request by the Consultant, the Contractor shall revise and resubmit the shop drawings.

.8 Provide setting drawings, templates and directions for the installation of anchor bolts, plates and other devices.

.9 Structural drawings are not prepared to be used in sepia form as erection drawings.

.10 Shop drawings shall show complete details necessary for fabrication and erection of the component parts of the structure, including location, type, size and extent of all welds, as well as all mechanical/electrical openings required.

.11 Prior to starting erection work, submit a description of the methods, sequence of erection and type of equipment proposed for use in erecting structural steel.

1.6 Inspection and Testing

.1 The Owner will engage and pay for the services of a welding Engineer and a testing agency.

.2 Allow free access to all parts of the work area for the purposes of inspection at all times.

.3 Prior to commencement of work, provide a schedule of shop fabrication.

.4 Submit certified results of testing in accordance with CSA G40.20 properly correlated to the elements being fabricated.

.5 High tensile bolts will be tested in accordance with Section 23 of CSA S16.

.6 For the purpose of bidding, assume all welds will be examined by a non-destructive testing method.

.7 Testing of all connections and splices not indicated on the design drawings shall be undertaken by the Owner's testing agency and will be to the Contractor's account.

.8 The Contractor shall advise the testing agency of the scheduling of all shop and field work pertaining to this Project. The Contractor shall permit the testing agency full access to the fabrication shop and the site for the purpose of carrying out their work and he shall provide assistance required to aid in the performance of the inspection and testing.

.9 If more than 5% re-inspection is required due to faulty workmanship, the Contractor will be required to pay for this re-inspection.

.10 The Engineer may reject at any time during the progress of the work a piece of material for any member found defective or not in accordance with the detailed drawings. This material may be rejected notwithstanding any previous acceptance and components so rejected shall be replaced at no expense to the Owner. In case of dispute, the decision of the Engineer shall be final.

1.7 Storage and Handling

.1 The Contractor shall be responsible for the protection of all steel work during fabrication, shipping, storage, and construction. All small bends and damage shall be reported to the Engineer for instruction. Steel work that is bent, broken, or otherwise damaged shall be replaced by the Contractor prior to erection, to the satisfaction of the Engineer, at no cost to the Owner.

.2 The Contractor shall be responsible for proper scheduling of delivery and erection for the structural steel, all in accordance with the construction schedule.

.3 Structural steel members shall be stored at the site above ground on platforms, skids, or other devices.

.4 Steel shall be protected from corrosion.

.5 Other material shall be stored in a weather tight and dry place until ready for use in the Work.

.6 Package materials shall be stored in their original unbroken packages or container.

1.8 Supply of Alternate Products

.1 Should the rolled sections shown on the drawings not be procurable from Canadian Mills, or should substitution for those sections be desired, sections of equivalent strength may be substituted if approved by the Consultant. In each case, full particulars thereof must be submitted prior to the closing of Bid. Material substitutions after the closing of Bid, if accepted, will be at the Contractor's cost.

1.9 Coordination with Other Trades

.1 Supply all necessary instructions and drawings to other trades for setting bearing plates, anchor bolts, and other members that are built in with the work of other trades. Supply the necessary material in accordance to the construction schedule.

2.0 PRODUCTS

2.1 Materials

.1 Rolled shapes, rolled plate, and welded wide flange sections to CSA G40.21 300W.

.2 Hollow structural sections shall be to CSA G40.21 350W Class C.

.3 High strength bolts shall be to ASTM F3125/F3125M.

.4 Welding material shall be in accordance with CSA W59.

.5 Anchor bolts and nuts to ASTM A307.

.6 Embedment anchors shall be Nelson headed anchors with fluxed ends or approved equal conforming to ASTM A108.

.7 Bar anchors shall be Nelson deformed bar anchors or approved equal conforming to ASTM A1064/A1064M.

.8 Structural steel (exterior exposure) not to receive shop or field paint shall be hot-dip galvanized to Z275 G90 designation.

.9 Touch-up primers for exterior exposure not to receive a shop or field paint finish shall be zinc chromate Type 1, conforming to CGSB 1-GP-40D.

.10 Primers used in a multi-coat system where a final shop or field paint finish is to be applied shall be selected and pre-approved based on surface preparation, exposure conditions, and compatibility with subsequent coatings.

2.2 Design

.1 All connections and beam web openings shall be designed by the fabricator to the reference standards unless otherwise noted.

3.0 EXECUTION

3.1 Fabrication

.1 Verify all dimensions and take necessary field measurements before fabrication.

.2 All fabrication shall be to CSA S16.

.3 All welding shall be to CSA W59.

.4 All fabricated units shall be straight and true and without sharp kinks or bends.

.5 All hollow structural sections shall be closed airtight with end plates sealed with welds.

.6 All plates and shapes shall be inspected visually for laminations. Repair plates or shapes that contain laminations in a manner approved by the Consultant.

.7 Provide punched holes for the convenience of other trades in attaching wood blocking or other materials. Coordinate with drawings of other disciplines for location and details.

.8 Obtain Consultant’s approval for holes required through structural steel that are not shown on the drawings.

3.2 Cleaning and Priming

.1 All steel shall be thoroughly cleaned of loose mill scale, loose rust, oil, or dirt.

.2 All steel shall be primed (exterior exposure) except for steel to be encased in concrete, steel to be fireproofed, steel that will receive shear studs, and faying surfaces of friction connections.

.3 Structural steel to be primed for exterior exposure or to receive a shop or field paint finish shall be cleaned in accordance with SSPC-SP6 “Commercial Blast Cleaning”.

.4 All primers shall be applied strictly in accordance with the manufacturer’s instructions. Apply one coat of primer thoroughly and evenly and work well into the joints and other open spaces.

.5 After erection and after connections are completed, provide a field touch-up coat of primer to all surfaces that had no shop coat, or have been chipped or scraped.

3.3 Shop Painting

.1 Steel shall be painted with shop primer meeting the requirements of CSA S16 unless noted otherwise.

3.4 Connections

.1 Use connections of type and detail shown on the Drawings. Modifications to the specified connection types and details will not be permitted without prior approval from the Consultant.

.2 Connections designed by the fabricator shall be in accordance with CSA S16.1 and stamped and sealed by a Professional Engineer registered in the Province of Ontario.

.3 All connections shall be designed to carry the loads specified on the Drawings. If loads are not given, the connection shall have the capacity not less than the members being connected.

.4 Structural steel members spliced for ease of fabrication or transportation shall have splices designed to develop the full strength and stiffness of the member. Splices shall be subject to non-destructive testing as directed by the Consultant. The cost for such testing shall be borne by the Contractor.

.5 Use standard connection types where possible.

.6 Provide stiffeners in beam webs at all locations of beam continuity. Unless noted otherwise web stiffeners shall be 1/2” minimum.

.7 All bolted connections may be snug tight except connections for:

.1 Bracing, trusses, and drag struts.

These shall be designed as slip connections and pretensioned.

3.5 Erection

.1 Supervise the setting of bases, anchor bolts, and other steel to concrete connections. Cutting of base plates to accommodate anchor bolts shall be cause for rejection of base plates.

.2 Install all temporary bracing that is required to stabilize the work against wind, earthquake, and construction loads. Keep structure true and plumb until completion of the building.

.3 As erection progresses, the work shall be securely bolted up to take care of all dead loads, wind, and erection stresses. Any failure to make proper and adequate provisions for stresses during erection shall be solely the responsibility of the Contractor.

.4 The structural steel erector shall be responsible for the design of all hooks, erection connections, and handling gear.

.5 Whenever piles of materials, erection equipment, or other loads are carried during erection, proper provision shall be made to take care of stresses resulting from it.

.6 All structural steel shall be assembled and erected in accordance with the approved erection drawings and specified reference standards.

.7 Structural steel work shall be carefully located at the proper grade and rigidly secured in place using steel shims. All spaces under the steel shall then be filled with non-shrink pre-mix grout.

.8 Plumb, level, and align individual members of steel work as specified in CSA S16.

.9 Bearing surfaces and surfaces that will be in permanent contact shall be cleaned before the members are assembled.

.10 Temporary bolts, clips, angles, etc. used to facilitate the erection shall be removed unless noted otherwise on the drawing.

3.6 Temporary Flooring

.1 Provide all temporary flooring, planking, and scaffolding necessary in connection with erection of structural steel, or support of erection machinery in accordance with governing regulations or by-laws.

3.7 Completion

.1 The Registered Professional Engineer responsible for the shop drawings, or their representative shall visit to review in place connections and components designed by that Registered Professional Engineer as required to substantiate compliance with their sealed shop drawings. He shall then submit a letter of compliance provide a seal and signed letter to the Consultant and Engineer.

.2 On completion of the work of this section, all protection erected in conjunction with the structural steel work shall be removed, all damage to this work and adjoining work shall be made good, and all surplus materials, debris, tools, and equipment shall be removed from the site.

3.8 Welding

.1 All welding shall be done by the shielded metal-arc method in accordance with the requirements CSA W59. The welding operators shall have passed, within the preceding six months, the qualifications test as set forth in CSA W47.1.

.2 Submit welding procedures prepared and sealed by a Professional Engineer registered in Ontario and familiar with this discipline to the Consultant for their examination and comments.

.3 Surface to be welded shall be free from loose scale, rust, paint, or other foreign matter. Where weld material is deposited in two or more layers, each layer shall be cleaned before the next layer is deposited. Take care to minimize stresses due to heat expansion, contraction, and distortion by using proper sequence in welding and by approved methods.

.4 Welding consumables for all processes shall be fully approved by the Canadian Welding Bureau and certified by the manufactures as complying with the requirement of this specification. Such certificates shall be not more than two years old.

.5 Electrode strengths to be equal to E480XX (E70xx) or better.

.6 Embedment anchors, shear stubs, and deformed bar anchors shall be automatically end welded with suitable stud welding in accordance to the manufacture’s recommendations. Fillet welding of anchors will be rejected.

3.9 Field Quality Control

.1 Structural steel work (material and workmanship) shall be subject to review and tested by a testing agency retained by the Owner.

.2 Construction review by the testing agency or the Consultant does not relieve the Contractor of their responsibility to furnish materials and workmanship in accordance with the Drawings and Specifications.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, materials, closures, equipment, and services necessary to design, supply, fabricate, erect, and install the steel deck as indicated on the drawings and as hereinafter specified. Provide gauge metal formwork at all deck edges for composite deck or concrete filled deck and reinforcement for deck openings as required herein.

1.2 Reference Standards

.1 Structural steel deck shall conform to the requirements of the following standards unless otherwise required by the specification:

.1	Ontario Building Code	
.2	CSA W47.1	Certification of Companies for Fusion Welding of Steel Structures
.3	CSA W59	Welded Steel Construction (Metal-Arc Welding)
.4	CSA S136	North American Specification for the Design of Cold-Formed Steel Structural Members
.5	ASTM A653/A653M	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process
.6	CSSBI 10M	Standard for Steel Roof Deck

.2 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.3 Where the standard is referenced in this specification, it shall mean the documents specified in this clause and their referenced documents.

1.3 Qualifications

.1 All steel deck welders must possess current Canadian Welding Bureau Certificates of Qualification for light gauge structural welding.

.2 Deck erectors must be certified under the requirements of CSA W47.1.

1.4 Examination

.1 Examine and verify all necessary measurements and dimensions of previously executed work that may affect the work of this contract.

.2 Examine surfaces that the work is to be placed on or against to ensure that they are square, true, level, plumb, of correct slope or shape, and of proper surface to receive such work.

.3 Report any discrepancies to the Consultant and Engineer immediately so that instructions may be given for the necessary remedial work.

.4 Commencement of work shall be construed as acceptance of all conditions and surfaces.

1.5 Shop Drawings

.1 Submit shop drawings prepared under the supervision of a Specialty Structural Engineer. Drawings of components designed by the Contractor shall be sealed and signed by this Specialty Structural Engineer.

.2 Shop drawings shall show the position, extent, type, and arrangement of the units, their relationship to other materials, depth, core thickness, coating thickness, connections, openings, accessories, closures, light gauge formwork and reinforcement for openings.

.3 Calculations and/or test data may be requested with the shop drawings to justify deck design and shear connector design.

.4 Show deck load capacities, including point load capacities, and for composite deck confirm that these load capacities are compatible with the zinc coating.

2.0 PRODUCTS

2.1 General

.1 Products shall satisfy the requirements of the standard unless otherwise specified herein or on the drawings.

2.2 Materials

.1 Steel deck units shall be formed of zinc-coated sheet steel minimum Grade A with a base steel Nominal Thickness of 0.76 mm or greater. Unless noted otherwise, zinc coatings shall be:

.1 Exterior Exposure Z275.

.2 Cover plates, cell closures, etc. shall be of the same material as the deck with a minimum nominal thickness of 0.76 mm.

.3 Steel deck to receive concrete topping shall be composite deck unless noted otherwise.

2.3 Fabrication

.1 Composite steel deck shall be formed with integral locking lugs to provide mechanical lock between concrete and steel.

.2 Steel deck shall have interlocking male and female side laps.

.3 Provide cell closures where required by the architectural drawings and specifications at the open ends of all cell runs at columns, openings, walls, etc., and where cells change direction.

.4 For deck with concrete topping, provide necessary metal gauge formwork at the deck edges for full deck and concrete depth to prevent leaking of concrete topping. This includes, all infill openings framed by structural steel.

2.4 Design

.1 All steel deck shall be designed by the Contractor to the reference standards unless otherwise noted.

.2 Deck thickness, spacing of puddle welds, and type and extent of side connections shall be proportioned to resist forces and loads shown on the drawings, or be as designated on the Drawings.

.3 Unless noted otherwise, the deflection under live load alone shall be limited to span/360 for floors.

.4 Decking to be used as formwork shall conform to formwork requirements of all applicable governing safety standards.

3.0 EXECUTION

3.1 Erection

.1 Erection of the steel deck shall be carried out by personnel experienced in the installation of steel deck.

.2 Steel deck shall be placed on the supporting steel framework and adjusted to final position before being permanently fastened. Each section shall be brought to proper bearing. If the supporting framework is not in proper alignment or at the proper level, the Contractor shall so advise the Consultant and Engineer of such irregularities and shall not make final placement until corrections are made.

.3 The Contractor shall accommodate the erection and welding sequence of the structural steel as required.

3.2 CLEAN UP

.1 All steel deck cuttings, strappings, packaging material, and other debris pertaining to steel deck units shall be cleaned up.

.2 Remove all debris and excess material at completion of erection of steel deck and leave work ready for other trades.

.3 Repair any defects. Leave steel deck free of all oil, grease, paint, and dirt.

END OF SECTION

1.0 GENERAL

1.1 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 Ontario Building Code

.3	ASTM A53/A53M	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
.4	ASTM A269	Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
.5	ASTM A307	Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength
.6	CAN/CGSB-1.40	Anticorrosive Structural Steel Alkyd Primer (Withdrawn)
.7	CAN/CGSB-1.108	Bituminous Solvent Type Paint (Withdrawn)
.8	CAN/CGSB-1.181	Ready-Mixed Organic Zinc-Rich Coating (Withdrawn)
.9	CSA G40.20/G40.21	General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel
.10	CSA G164	Hot Dip Galvanizing of Irregularly Shaped Articles
.11	CSA S16	Design of Steel Structures
.12	CSA W48	Filler Metals and Allied Materials for Metal Arc Welding
.13	CSA W59	Welded Steel Construction (Metal-Arc Welding)

1.2 Design Criteria

.1 Design is based on Limit States Design principles using factored loads and resistances.

.2 Loads and load factors are determined in accordance with the referenced Building Code and bylaws of the local municipality.

.3 Resistances and resistance factors are determined in accordance with the National Building Code and CSA S136.

.4 Conform to the requirements of specified fire rated assemblies.

.5 Install components or assemblies to accommodate specified erection tolerances of the structure.

.6 Design and install handrails, railings, landings, and stairs to conform to loading and safety requirements of the referenced Building Code, Occupational Health and Safety Act, and W47.2, as may be applicable.

.7 Maximum deflection for individual members shall not exceed 1/360th of the span.

.8 Work of this Section that will support other items or will be required to support structural loads of any nature shall be designed by a Professional Structural Engineer registered in Ontario, who shall affix their professional seal and signature to the shop drawings for such items.

1.3 Submittals

.1 Submittals to be made in accordance with Section 01 33 00.

.2 If requested, submit three certified copies of mill reports covering chemical and mechanical properties, and coating designation of steel used in this work.

.3 Submit samples of framing and fastener components to Consultant if requested.

.4 Product Data

.1 Submit product data for mechanical fasteners, indicating sizes, shear, and pull-over loading capacity where applicable. Provide data indicating thickness and type of corrosion protection coating.

.2 Submit product data indicating suitability of explosive powder actuated fasteners for application.

.5 Shop Drawings:

.1 Submit shop drawings indicating materials, core thickness, finishes, connections, joints, methods of anchorage, number of anchors, supports, reinforcement, details, and accessories.

.6 Submit evidence of welder qualifications specified in this Section.

1.4 Quality Assurance

.1 Provide proof of manufacturer training for installation of proprietary fastener systems.

.2 Welding shall be by company certified by the Canadian Welding Bureau to CSA W47.1.

1.5 Delivery, Storage, and Handling

.1 Deliver and store material undamaged in original wrapping or containers, with manufacturer's labels intact.

.2 Prevent damage to materials during handling and storage. Any damaged materials will be rejected by the Consultant.

1.6 Site Conditions

.1 Maintain temperature and ventilation conditions for various components and materials of the system, as required by manufacturer.

.2 Protect work of other sections and sub-trades from damage resulting from work of this section.

.3 Take necessary care to avoid damage of adjacent surfaces.

.4 Examine the underlying visible surfaces and adjoining work, and report defects at time of installation that might impair the work of this section to the Consultant, in writing.

.5 Commencement of work implies acceptance of surfaces.

.6 Cooperate with other trades to accommodate fixtures and attachments in the system.

1.7 Inspection

.1 The Design Engineer responsible for the production of the shop drawings shall provide periodic field review during construction and submit reports to the Consultant.

.2 Additional inspection and testing of materials workmanship may be carried out by a qualified independent Inspection Agency appointed by the Consultant.

.1 The cost of this additional inspection shall be paid by the Owner.

.2 Any testing or inspection required by the Consultant because of an error by the Contractor, or due to departure from the contract documents by the Contractor, shall be paid for by the Contractor.

.3 Inspection shall include:

.1 Checking that mill test reports are properly correlated to materials.

.2 Sampling fabrication and erection procedures for general conformity to the requirements of the specification.

.3 Checking that the welding conforms to the requirements of this specification.

.4 Checking fabricated members against specified member shapes.

.5 Visual inspection of all welded connections including sample checking of joint preparation and fit-up.

.6 Sample checking of screwed and bolted joints.

.7 Sample checking that tolerances are not exceeded during fit-up or erection.

.8 Additional inspection and testing of welded connections as required by CSA W59.

.9 General inspection of field cutting and alterations required by other trades.

.10 Submission of reports to the Consultant, Contractor, and authorities having jurisdiction covering the work inspected with details of deficiencies discovered.

.4 The Contractor shall provide the necessary cooperation for the inspection to proceed.

.5 The inspection provided in this section does not relieve the Contractor of their responsibility for the performance of the contract. The Contractor is solely responsible for quality control and shall implement their own supervisory and quality control procedures.

.6 Materials or workmanship not conforming to the requirements of the contract documents may be rejected at any time during the progress or work.

2.0 PRODUCTS

2.1 Materials

.1 Steel Sections and Plates: To CSA G40.21, Grade 300W, galvanized.

.2 Steel Pipe: To ASTM A53/A53M standard weight, galvanized. Formed to shape and sizes as indicated. Shop painted finish.

.3 Welding Materials: To CSA W59.

.4 Welding Electrodes: To CSA W48 Series.

.5 Bolts and Anchor Bolts: To ASTM A307.

.6 Shop Primer: To CGSB 1-GP-40M.

.7 Grout: Non-shrink, non-metallic, flowable, 15 MPa at 24 hours, pull-out strength 7.9 MPa.

2.2 Fabrication

.1 Fabricate work square, true, straight, and accurate to required size, with joints fitted closely and secured properly.

.2 Fabricate items from steel and use galvanized steel for exterior items, unless indicated otherwise.

.3 Where possible, fit and shop assemble items ready for erection.

.4 Exposed joints and connections shall be tight, flush, and smooth unless otherwise indicated.

.5 Where work of other Sections is to be attached to work of this Section, prepare work by drilling and tapping holes as required to facilitate installation of such work.

.6 Exposed welds are to be continuous and nonporous for length of each joint. File or grind exposed welds smooth and flush.

.7 Insulate contact surface to prevent electrolysis due to metal-to-metal contact or between metal and masonry or concrete. Use bituminous paint, butyl tape, building paper, or other approved means.

2.3 Anchoring Devices

.1 Drilled Inserts: Steel, cadmium plated or hot-dip galvanized; sizes as indicated on drawings.

.2 Bolts and Nuts: To ASTM A307, sizes as indicated on drawings, with large flat-type steel washers sized to suit fasteners, hot-dip galvanized.

.3 Explosive Powder Actuated Fasteners: As recommended by manufacturer for the application, subject to approval by Consultant.

2.4 Framing Connection Devices

.1 Screws: Self-tapping and self-drilling, and as follows:

.1 Case hardened, non-corrosive screw, #10 or heavier with pan type washer heads, 1/2-inch diameter.

.2 Sheet metal screws shall be stainless steel or steel with a minimum coating thickness of 0.008 mm of zinc or cadmium. Other coatings providing equal or better corrosion protection may be used.

.3 Length: Adequate to penetrate not less than three fully exposed threads beyond joined materials.

.4 Thread types and drilling capability shall conform to manufacturer's recommendations.

.5 Screws covered by sheathing materials shall have low profile heads.

.2 Welding Electrodes: Minimum tensile strength series of 480 MPa, suitable for material being welded.

2.5 Surface Preparation

.1 Thoroughly clean and suitably pre-treat steel prior to finishing.

.2 Remove loose mill scale, rust, oil, grease, dirt, and other foreign matter using one or more of the following methods:

.1 Solvent cleaning

.2 Wire brushing

.3 Power wire brushing

.4 Sandblasting

.3 Grind smooth sharp projections.

2.6 Steel Finishes

.1 Galvanizing: Hot-dipped galvanizing with zinc coating 600 g/sq. m to CSA G164.

.2 Shop Coat Primer: To CAN/CGSB-1.4.

.1 Prime with one shop coat of paint to a 2 mil (0.05 mm) thickness. Do not paint when temperature is lower than 7°C.

.2 Exterior steel shall be commercially sandblasted in accordance with SSPC-SP6 to remove mill scale prior to application of primer.

.3 Do not prime the following surfaces:

.1 Steel to be encased in concrete.

.2 Non-ferrous metals.

.3 Surfaces and edges to be field welded. If painted, remove paint for field welding for a distance of at least 2" (50 mm) in all sides of the paint.

.1 Zinc Primer: Zinc rich, ready mix to CAN/CGSB-1.181. Apply one coat of zinc rich paint to all surfaces exposed or damaged after erection to minimum dry film thickness of 60 µm. Apply coating immediately after cleaning. Touch up welds.

.2 Bituminous Paint (Isolation Coating): To CAN/CGSB-1.108. Apply an isolation coating to contact surfaces of following components in contact with cementitious materials and dissimilar metals except stainless steel: (1)

exterior components (2) interior components exposed to high humidity conditions.

3.0 EXECUTION

3.1 General

.1 Fabrication and erection shall conform to shop drawings. Modifications required to accommodate as-built conditions, other than minor dimensional changes, must be submitted for approval.

3.2 Erection

.1 Erect items square, plumb, straight, and true, fitted accurately, with tight joints and intersections.

.2 Make all field measurements necessary for the proper fit of all members.

.3 Provide suitable means of anchorage acceptable to the Consultant by dowels, anchor clips, bar anchors, expansion bolts and shields, toggles.

.4 Exposed fastening devices to match finish and be compatible with material through which they pass.

.5 Make field connections with high tensile bolts to CSA S16 or weld.

.6 Welding to be in accordance with CSA W59 as follows:

.1 Companies engaged in welding shall be certified by the Canadian Welding Bureau to CSA W47.1. Companies shall have welding procedures approved and welders qualified for the base material types and thicknesses that are to be welded.

.2 For material less than 3.0 mm thick, shop drawings may show nominal weld leg sizes. For such material, the effective throats of welds shall not be less than the thickness of the thinnest connected part.

.3 Touch-up welds with zinc-rich paint.

.7 Connections to the post-tensioned concrete slabs must be by power-driven fasteners. Refer to drawings for embedment and clearances.

3.3 Touch Up and Cleaning

.1 Touch-up rivets, field welds, bolts, and burnt or scratched surfaces after completion of erection using zinc-rich paint for galvanized components to match original finish.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, materials, equipment, supervision, and services necessary to prepare the podium deck slab and vertical surfaces, detail all cracks and joints, patch perimeter and voids, and install a 2-ply hot rubberized waterproofing system (membrane, protection board, and drainage board) to areas designated on the Drawings.

1.2 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 Ontario Building Code

.3	CSA S413	Parking Structures
.4	CAN/CGSB-37.50	Hot-Applied, Rubberized Asphalt for Roofing and Waterproofing (Withdrawn)
.5	CAN/CGSB-37.51	Application of Hot-Applied Rubberized Asphalt for Roofing and Waterproofing (Withdrawn)
.6	CGSB 37-GP-9Ma	Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing (Withdrawn)
.7	CGSB 37-GP-15M	Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing (Withdrawn)
.8	ASTM D4263	Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
.9	ASTM D5957	Standard Guide for Flood Testing Horizontal Waterproofing Installations

1.3 Site Examination

.1 Bidders shall visit the site and examine the slab and wall surfaces to receive membrane. Rough surfaces may require additional surface preparation after cleaning. Bid shall include all costs of surface preparation and patching of rough surfaces. No extras for surface preparation or additional material will be entertained after bid closing.

.2 If desired, bidders may remove sections of the existing waterproofing materials in order to evaluate surface roughness. Bidders must agree to accept existing surface condition at time of bid.

1.4 Submittals

.1 For details of waterproofing system that have not already been indicated in these documents, submit manufacturer's drawings identifying installation specifications and material thicknesses to the Consultant prior to starting work.

.2 Submit installation procedures, including slab preparation requirements, for Consultant review prior to starting work.

.3 Prior to start of the work, submit a description of the products to be used to patch rough surfaces suitable for membrane application.

.4 The waterproofing system manufacturer shall confirm the following in writing:

.1 Waterproofing systems applicator is presently a manufacturer-approved applicator of the waterproofing system.

.2 Applicator has a minimum three years of directly applicable waterproofing installation experience, or has installed a minimum of 5,000 sq. m (55,000 sq. ft.) of the specified waterproofing system.

.5 Provide written confirmation by the applicator and system manufacturer certifying the following:

.1 Surfaces to receive waterproofing systems were inspected and found to be satisfactory to receive the waterproofing system in accordance with the manufacturer's requirements.

.2 In the event of inclement weather after the application of primer and before the application of membrane, that the primer application was inspected and appropriate action was taken to ensure that the primer will meet the more stringent requirements of the manufacturer's recommendations.

.3 The waterproofing system was applied in accordance with manufacturer's recommendations and has been inspected and approved by the manufacturer's technical representative. The inspection is to proceed, and written documentation forwarded to the Consultant, prior to the installation of overburden.

.4 The completed waterproofing system conforms to the system described.

.6 Prior to covering the membrane with overburden, notify the Consultant in writing that the installation has been inspected and approved by the inspection company and the manufacturer's technical representative.

.1 Waterproofing system was applied in accordance with manufacturer's recommendations.

.2 Completed waterproofing system conforms to system described.

.7 Installation of the waterproofing system shall not be permitted until surface preparation has been reviewed and approved by the manufacturer in writing. Contractor to submit the manufacturer's surface preparation review letter to the Consultant prior to commencing installation of waterproofing system.

.8 Any existing conditions that may adversely affect bonding or performance of the membrane shall be brought to the attention of the Consultant, in writing, for resolution prior to installation of membrane. Application of waterproofing implies acceptance of surfaces.

.9 Confirm in writing the compatibility of the proposed waterproofing system with the existing waterproofing prior to application.

1.5 Environmental Requirements

.1 Do not install waterproofing system when ambient air temperature or substrate temperature is less than that specified in manufacturer specifications.

.1 If this temperature is not reached, installation of temporary heaters is required.

.2 Maintain air temperatures and substrate temperature at installation area in accordance with manufacturer's specifications.

.3 Protect materials from moisture damage or contamination until adequately cured.

.4 All working conditions shall meet the requirements of the Occupational Health and Safety Act of the Province of Ontario.

.5 During application of waterproofing system, work area must be well ventilated so that odours from waterproofing system do not disturb users of the surrounding buildings.

.1 Provide forced air circulation during installation period for enclosed applications. All costs associated with the air circulation equipment are Contractor's responsibility. No extras will be entertained after bid closing.

1.6 Performance Requirements

.1 Waterproof membrane system is comprised of a hot rubberized waterproof membrane. Performance requirements and warranty requirements apply to the total system and are the responsibility of the waterproofing system applicator and manufacturer.

.2 The waterproofing system shall satisfy the following requirements for the duration of the warranty:

.1 System shall be totally waterproof, flexible and thermally compatible with the substrate under applicable service conditions.

.2 System shall not allow moisture penetration at termination details, drains, upturns, or splices.

.3 System shall be free of visible pinholes or blisters.

.4 System shall exhibit zero chloride permeability.

.5 System shall withstand active cyclical crack movements to a minimum of 1.5 mm and remain waterproof. Locations where cracks have been reinforced with rubber sheets shall withstand movements to a minimum of 3.0 mm and remain waterproof. Membrane shall comply with crack bridging requirements of CGSB-37-GP-50-M89.

.6 Membrane, primer, or surface patching shall fully adhere to the concrete substrate.

.7 System layers shall fully adhere to each other.

.8 System shall not debond, crack, or wear excessively.

1.7 Project Conditions

.1 Do not apply membrane nor proceed during inclement weather. Ensure all surfaces to receive membrane are free of water, dew, frost, snow, ice, and other contaminants.

.2 Do not apply material when substrate temperature is below installation guidelines for the specific product.

.3 All adjacent parts of the building shall be protected from damage caused by operations. Any damage caused by this contract shall be repaired to match the original materials and appearance.

.4 Locate kettles, equipment, and materials well away from the building, in areas designated by the Consultant and/or Owner.

.5 Conduct operations so as to leave slab exposed for the minimum period of time. Protect, as required, to prevent water infiltration or environmental damage to underlying spaces. All costs associated with the environmental damage to the interior spaces and/or tenant property (i.e. storage locker contents, cars, etc.) will be responsibility of the Contractor.

.6 Take measures necessary to ensure that water leakage does not occur into occupied spaces below at any time during the work. All damage resulting from water leakage will be the responsibility of the Contractor to repair at their cost.

1.8 Delivery, Storage, and Handling

.1 Deliver materials in original unopened packaging in undamaged condition, sealed with labels intact clearly identifying manufacturer’s name, brand name, weight, instruction for use and all identifying references to standards as required.

.2 Deliver and store all materials susceptible to damage from moisture on a dry base off ground and protected from damp, wet, freezing, or contact with non-compatible materials. Any materials damaged and/or exposed to the elements and/or moisture shall be removed from the worksite at the discretion of the Consultant.

.3 Remove damaged materials and materials exposed to the elements or moisture at the discretion of the Consultant.

.4 Arrange material deliveries at non-peak times to minimize site operational impact and store in a location agreeable to the Owner in a neat, safe manner that does not exceed the allowable structural capacity of the storage area.

1.9 Warranty

.1 Remedy all defects in the membrane system and related membrane installed hereunder that appear within the warranty period.

.2 Make all necessary repairs and replacements within 48 hours of receipt of written notification.

.3 Nothing contained in this article shall be construed as in any way restricting or limiting the liability in common law and statutory liability of the Contractor.

.4 Obtain from the membrane manufacturer a material warranty stating that the membrane shall be free of manufacturing defects and premature deterioration and will not leak for the duration of warranty period.

2.0 PRODUCTS

2.1 Waterproofing Membrane

.1 Surface conditioner (primer) shall be an asphalt cut-back, meeting or exceeding requirements of CGSB-37-GP-9MA and CGSB-37-GP-15M.

.2 Liquid waterproofing membrane shall be a hot poured rubberized asphalt, meeting or exceeding requirements of these Contract Documents, CAN/CGSB-37.50, and CAN/CGSB-37.51.

.3 Polyester Fabric Reinforcing

.1 Henry Polyester Reinforcement

.2 Hydrotech Flex Flash F

.3 Tremco 2014 Reemay.

.4 Multiseal 2016 Polyester Fabric Reinforcing

.5 Approved alternative

.4 Elastomeric (Butyl, Neoprene, etc.) Reinforcing Sheet

.1 Henry 9990-25 Elastomeric Flashing (47 mil/63 mil)

.2 Hydrotech Poly 500 or Hydroflex 30

.3 Tremco Elastomeric Sheeting (60 mil)

.4 Multiflex 6300 (63 mils)

.5 Approved alternative

2.2 Protection Board

.1 Approved products:

.1 3 mm Coroplast

.2 3 mm asphalt impregnated protection board

.3 IKO Protection Board

.4 Soprema – 3.2 mm Sopraboard

.5 Henry 990.31

.6 Approved alternative

2.3 Flashing

.1 Flashing to be 0.5 mm galvanized steel, to ASTM 653 with G90 zinc coating paint.

2.4 Surface Patch Materials

.1 Products used to patch rough surfaces shall be 100% solids epoxy with no additives or fillers. Membrane material may be used to fill rough areas if approved by Consultant and manufacturer. Alternate products may be suggested for approval but must be suitable for installation below hot applied waterproofing.

.2 No extras will be entertained for surface preparation or additional membrane material after bid closing.

2.5 Slab Waterproofing Systems for Landscaped Decks and Below Concrete Toppings

.1 Approved Hot Rubberized Waterproofing Systems – 2-Ply Systems:

.1 Hydrotech 6125 membrane as supplied by Hydrotech Membrane Corporation of Canada

.2 Henry 790-11 membrane as supplied by Henry Company

.3 Multiseal 2000 hot applied rubberized asphalt membrane as supplied by Multiseal Inc.

.4 Tremproof 6100 membrane as supplied by Tremco

.5 Bemalastic 1213 BDM as supplied by McAsphalt Industries Ltd.

2.6 Aluminum Fastener Bars

.1 All fastener bars to be aluminum 6 mm x 25 mm (0.25” x 1”) in size and fastened to wall with 6 mm x 50 mm long (0.25” x 2”) countersunk anchors at 450 mm (18”) centres and covered with an additional layer of membrane.

2.7 Drainage Board

.1 Drainage board to be used below concrete driveway and soft landscaping areas. Approved products:

.1 CCW MiraDrain 9000

.2 TREMdrain 6600

.3 Hydrodrain 700

.4 Sopradrain 18-G

3.0 EXECUTION

3.1 Surface Preparation

.1 Preparation of slab and vertical surfaces is to be in strict accordance with the more stringent requirements of the membrane manufacturer's recommendations and these Contract Documents including the following: preparation and smoothing of rough surfaces, and detailing of slab cracks, joints, and voids as required. No extras for surface preparation will be entertained after bid closing.

.2 Slab cleaning shall be abrasive-blast, leaving slab surfaces free of all laitance and previous membranes.

.3 Surfaces shall be cleaned of all grease and oil with an emulsifier where required.

.4 The minimum standard for preparation of vertical surfaces for membrane application shall be abrasive blast, including removal of existing paint and/or existing waterproofing upturn, hand patching voids or depressions in concrete surfaces, and re-pointing masonry block wall joints as required. No extras shall be entertained for this item after the award of Contract. This applies to all walls, columns, and curbs.

.5 Surface preparation is to produce surfaces to be covered with waterproofing membrane that are smooth with an even finish, free of excess moisture, ridges, rough patches, holes, hollows, and sharp corners.

.6 Repair surface voids, defects, and rough areas in existing concrete substrate surfaces with materials acceptable to membrane manufacturer and Consultant prior to membrane application. Materials must adhere to the surface to be coated, stable, and compatible with waterproofing system and installation procedures, and must not deform under applied loads.

.7 New concrete surfaces shall be allowed to air dry a minimum of 14 days after moist curing and not exhibit any condensation under plastic sheet test prior to the placement of the waterproof membrane.

.8 Ensure substrate patching materials are adequately cured prior to primer and membrane application. Deck surfaces shall be clean, dry, and free of contamination by materials that could affect adhesion or physical integrity of waterproofing system.

.9 No primer or membrane shall be applied until the surface preparation has been reviewed by the Consultant and inspected and accepted in writing by a representative of the system manufacturer.

.10 Ensure environmental and site conditions, as recommended by the membrane manufacturer, are suitable for installation of work of this section.

.11 Commencement of work implies acceptance of the previously prepared concrete surfaces and assumption of full responsibility for the surfaces prepared to receive the primer and membrane.

.12 Application procedures that result in toxic fumes or flammable solvent collecting or endangering workers or building occupants are not permitted.

.13 Paint and finishes damaged by Contractor must be repaired to match existing.

3.2 Membrane Application

.1 Prior to application of the waterproof membrane apply surface conditioner (primer) as a fine spray evenly at a rate of 0.1 to 0.2 L/m^2 depending on the condition of the concrete surface. Before application of the waterproof membrane, concrete surface condition shall be dry and frost free. Allow adequate time to cure.

.1 Should the primer be exposed to inclement weather, Contractor to review with manufacturer if primer is to be reapplied.

.2 Apply a two-ply hot rubberized waterproof membrane system as follows:

.1 Apply first coat of hot rubberized waterproofing with squeegees, within 48 hours of primer placement, evenly to provide a continuous coating to give minimum and maximum dry thicknesses as below.

.2 While membrane is still hot, embed a continuous polyester fabric reinforcing sheet into the first coat of hot-rubberized membrane ensuring that the fabric is completely embedded without wrinkles, fish mouths, voids, irregularities, etc. Polyester fabric reinforcing sheets are to be overlapped at joints a minimum of 50 mm (2”).

.3 Apply the second coat of membrane to the same thickness requirements as the first coat.

.4 While membrane is still hot, embed protection board sheeting into second coat of hot-rubberized membrane, ensuring that protection board is completely embedded without irregularities. Protection board sheets are to be overlapped at joints a minimum of 25 mm (1") in the direction of the drainage slope.

.1 Minimum Dry Thicknesses:

Hot Rubberized Waterproofing System Membrane		First Coat mm (mils)	Second Coat mm (mils)	Total System mm (mils)
.1	Hydrotech 6125	2.3 (90)	3.2 (125)	5.5 (215)
.2	Henry 790-11	2.3 (90)	3.2 (125)	5.5 (215)
.3	Multiseal 2000	2.5 (100)	2.5 (100)	5.0 (200)
.4	Tremproof 6100	2.3 (90)	2.3 (90)	4.6 (180)
.5	Bemalastic 1213 BDM	2.0 (80)	2.0 (80)	4.0 (160)

.2 Maximum Dry Thickness:

Hot Rubberized Waterproofing System Membrane		First Coat mm (mils)	Second Coat mm (mils)	Total System mm (mils)
.1	Hydrotech 6125	2.8 (110)	3.7 (145)	6.5 (255)
.2	Henry 790-11	2.8 (110)	3.7 (145)	6.5 (255)
.3	Multiseal 2000	3.0 (120)	3.0 (120)	6.0 (240)
.4	Tremproof 6100	3.2 (125)	3.2 (125)	6.4 (250)
.5	Bemalastic 1213 BDM	3.0 (120)	3.0 (120)	6.0 (240)

.3 Carry waterproof membrane up junction of horizontal deck and vertical surfaces to height specified on Drawings. Mask top of upturn to ensure neat straight finish to coating. All vertical surface irregularities to be patched prior to coating application.

.1 Contractor to sawcut a 16 x 16 mm (5/8" x 5/8") reglet at finished elevation for termination of waterproofing system.

.4 Carry waterproof membrane down junction of horizontal deck and vertical surfaces a minimum 600 mm (2'-0") unless otherwise indicated in Drawings. Mask edge of downturn to ensure neat straight finish to coating. All vertical surface irregularities to be patched prior to coating application.

.1 Contractor to saw cut reglets prior to application and to provide fastener bars as indicated on Drawings.

.2 Contractor to embed a 450 mm (24”) wide elastomeric reinforcing sheet at junction between horizontal deck and vertical surface.

.5 Cracks greater than 1.0 mm but less than 3.0 mm wide shall be reinforced by pressing 200 mm wide polyester fabric reinforcing centred in 300 mm wide stretch coat of membrane centred over crack. Stretch coat of membrane to be 1.5 mm thick minimum. After cooling, full membrane application shall be carried over top.

.6 Where cracks exceed 3.0 mm, a 1.5 mm first layer of waterproofing membrane shall be applied and reinforced with an elastomeric reinforcing sheet completely covered with a second layer of membrane 1.5 mm thick.

.7 At drains, install elastomeric reinforcing sheet between membrane plies extending 150 mm around perimeter of drain.

.8 Heat waterproof membrane in a double-shell indirect fired melter (kettle) using a high flash point oil as the heat transfer medium.

.1 Melter shall be equipped with a positive mechanically operated agitator and thermometers.

.2 Under no circumstances shall waterproof membrane material be heated in a roofing or direct-fired heating kettle.

.3 Melter shall be equipped with two temperature gauges clearly marked to indicate which gauge is for oil and which is for material temperature.

.9 Equipment used for preparation and melting of waterproof membrane material shall be approved for use by the waterproof membrane manufacturer.

.10 Membrane application temperature shall not be less than 190°C and not greater than 205°C. Temperature requirements shall apply from kettle to point of application.

.11 Drainage board installation to conform to manufacturer requirements. Provide cut-outs at buried drains and reverse installation directly over grates with poly sheet extending min. 2” beyond joints. Remove buried drain sediment buckets, if present, prior to installation.

3.3 Flood Testing

.1 Completed membrane installation to be flood tested by the Contractor in advance of overburden installation. Consultant shall be present during testing.

.2 Plug drains on horizontal surfaces and restrict run-off.

.3 Maintain surfaces continuously wet for at least one hour.

.4 Repair leaks and re-test.

3.4 Inspection and Testing

.1 Testing may be conducted by a testing agency designated by the Consultant. Unless testing is performed due to the Contractor not following the Contract Documents, Owner will pay costs of inspection and testing described in this Section.

.2 Contractor shall inform Consultant and designated testing agency 24 hours in advance of work to be performed under this Section.

.3 Test moisture content of concrete mass prior to primer installation by taping down a 450 mm x 450 mm (18” x 18”) polyethylene sheet for a minimum period of 16 hours to detect evaporation. Test in a minimum of two locations up to 5,000 square feet of surface, plus one additional test per additional 5,000 sq. ft. Locations to be reviewed by the Consultant.

.4 The Consultant may perform cut tests to confirm membrane thickness. Number of tests will be at Consultant discretion and based on one test per 550 sq. ft. of membrane.

.5 To evaluate bonding of membrane to substrate, and/or interlayer bonding, pull-off adhesion tests may be performed by the Consultant or a testing agency at the discretion of Consultant.

.6 Additional tests may be performed at the discretion of the Consultant to confirm in-situ material thickness and bond.

.7 Repair waterproofing system test locations at no additional cost.

.8 Consultant may withhold certification of 25% of waterproofing value until flood test is completed.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, materials, equipment, and supervision to prepare slabs and vertical surfaces, detail all cracks and joints, patch perimeter and voids, and install a pedestrian deck coating system where hot rubberized waterproofing is not feasible, and where directed by the consultant.

.2 Crack detailing to include crack face surface preparation and installation of a flexible waterproof sealant.

.3 Work to include preparation, patching, and membrane upturn at all vertical surfaces including columns, walls, cast-in-place curbs, islands, etc.

.4 Specified material thicknesses are minimum thicknesses, not average. Contractor shall grind down or patch rough surfaces to ensure minimum thickness of membrane is applied everywhere; or if approved by manufacturer, additional membrane may be applied to achieve minimum thickness.

1.2 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 Ontario Building Code

.3	AASHTO T 277	Standard Method of Test for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration
.4	ASTM C957/C957M	Standard Specification for High-Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with Integral Wearing Surface
.5	ASTM D412	Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension
.6	ASTM D4541	Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
.7	ASTM D7234	Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers

.8	ASTM E96/E96M	Standard Test Methods for Water Vapor Transmission of Materials
.9	ICRI 310.2	International Concrete Repair Institute. Selecting and Specifying Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair

1.3 Site Examination

.1 Bidders shall visit the site and determine the slab surfaces to receive coating. Rough surfaces may require additional surface preparation after abrasive blast cleaning. Bid shall include all costs of surface preparation and patching of rough surfaces. No extras for surface preparation or additional material will be entertained after bid closing.

.2 If desired, bidders may remove sections of the existing coating materials to evaluate surface roughness. Bidders must agree to accept existing surface conditions at time of bid.

1.4 Performance Requirements

.1 The pedestrian deck coating system shall satisfy the following requirements for the duration of the warranty:

.1 System shall be totally waterproof, flexible, and thermally compatible with the substrate under applicable service conditions.

.2 System shall not allow moisture penetration at termination details, drains, upturns, or splices.

.3 System shall remain slip resistant under its intended use: wet, dry, or under snow.

.4 System shall exhibit zero chloride permeability when tested in accordance with AASHTO T 277 test procedure for rapid determination of the chloride permeability of concrete.

.5 System shall withstand active cyclical crack movements to a maximum of 1.5 mm and remain waterproof.

.6 Adhesion of coating, primer, or surface patching to the concrete substrate shall meet or exceed 0.7 MPa.

.7 Adhesion of all system layers to each other shall meet or exceed 0.7 MPa.

.8 System shall not debond, crack, or wear excessively. Loss of aggregate in any area will constitute failure.

.9 Coating system shall not support combustion.

1.5 Submittals

.1 Submit details of coating system not indicated in these documents including material specifications, thicknesses, details at joints, cracks, upstands, walls, drains, and termination points for Consultant review prior to starting work.

.2 Submit installation procedures, including slab preparation requirements, for Consultant review prior to starting work.

.3 If choosing to patch rough surfaces to accommodate pedestrian deck coating, submit a description of products to be used to patch rough surfaces suitable for coating application.

.4 Provide a certificate signed by the Contractor and system manufacturer certifying the following:

.1 Surfaces to receive systems were acceptable and found satisfactory to receive the system as per the manufacturer's requirements and these Specifications. Application of coating implies acceptance of surfaces.

.2 Pedestrian deck coating was applied in accordance with manufacturer's recommendations and these Specifications.

.3 Completed system conforms with system described herein.

.5 Any existing conditions not specified that may adversely affect bonding or performance of the coating shall be brought to the attention of the Consultant, in writing, for resolution prior to installation of the coating.

.6 Provide electronic copies of maintenance instructions for finished surfaces prior to Substantial Performance. Hard copies shall also be provided if requested by the Consultant.

1.6 Environmental Requirements

.1 Do not install coating when ambient air temperature or substrate temperature is less than 10°C. If this temperature is not reached, installation of temporary heaters is required.

.2 Maintain air temperatures and substrate base temperature of installation area above 10°C for 12 hours before, during, and 72 hours after installation, or until materials have adequately cured.

.3 Protect materials from moisture damage or dust contamination until adequately cured.

.4 All working conditions shall meet the requirements of local, provincial, and federal health and safety regulations in effect at the Place of the Work.

.5 Provide forced air circulation during period for enclosed applications.

.6 During application of system, Work area must be well ventilated such that odours from the system do not disturb users of the garage or building above.

2.0 PRODUCTS

2.1 Pedestrian Deck Coating Systems

.1 Approved Pedestrian Traffic Deck Coating Systems for Exterior Applications:

.1 Peda-Gard as manufactured by Neogard, a part of Hempel. Provide samples of standard product colours. Owner will select colour.

.2 Vulkem 350/351 as manufactured by Tremco. Provide samples of standard product colours. Owner will select colour.

.3 Sikalastic Resoflex as manufactured by Sika. Two coat system with base coat and wearing surface. Provide samples of standard product colours. Owner will select colour.

.4 MasterSeal Traffic 1500 as manufactured by Master Builders Solutions Canada Inc. Provide samples of standard product colours. Owner will select colour.

.2 Base Coat and Wearcourse Thickness

.1 Minimum dry film thickness of base coat for pedestrian deck coating systems shall be 24 Mils (0.61 mm).

.2 Minimum neat dry film thickness of wearing surface for pedestrian deck coating systems shall be 18 Mils (0.46 mm) with aggregate loadings as per manufacturer’s recommendation. Wearing surface is to be non-slip and be easily cleaned.

.3 Pedestrian deck coating systems are to include a primer.

2.2 Surface Patch Materials

.1 Products used to patch rough surfaces shall be 100% solids epoxy and contain no additives or fillers. Coating material may be used to fill rough areas if approved by manufacturer.

.2 No extras will be entertained for surface preparation or additional coating material after bid closing.

3.0 EXECUTION

3.1 Preparation

.1 All guards, bollards, cages, etc. shall be removed and re-installed as required for application of coatings to slab surfaces unless otherwise noted on Drawings.

.2 Preparation of horizontal and vertical surfaces is to be in strict accordance with the requirements of the system manufacturer’s recommendations and these Contract Documents, including preparation and smoothing of rough surfaces and detailing of slab cracks, joints, and voids as required.

.3 Minimum standard of slab cleaning shall be abrasive blast, shot-blast or equivalent, leaving slab surfaces free of all laitance with a Level 3 Concrete Surface Profile (CSP) per ICRI 310.2.

.4 Minimum standard of vertical surface cleaning shall be dry abrasive-blast cleaning. The surface preparation is to provide a Level 3 Concrete Surface Profile (CSP) per ICRI 310.2.

.5 Where required, surfaces shall be cleaned of all grease and oil with an emulsifier that will not affect performance of the coating.

.6 New concrete surfaces shall be allowed to air dry a minimum of 14 days after moist curing and not exhibit any condensation under plastic sheet test prior to the placement of the waterproof membrane. Refer to clause 3.3.3 regarding plastic sheet test.

.7 All rough surfaces, vertical amplitude exceeding 40 mils (1.0 mm), must be ground or filled to provide a smooth surface.

.8 Sawcut cracks or joints shall be straight sided and follow the extent of the crack. Locations of crack sealing shall be as directed by Consultant. Do not overcut beyond actual extent of crack. Abrasive-blast sawcut surfaces.

.9 Remove all existing crack sealants and abrasive-blast exposed surface.

.10 Fill sawcut cracks and joints with approved sealant materials flush with slab surface. Application to be in strict conformance to the manufacturer's recommendations and these Contract Documents.

.11 Install a continuous 20 mm fillet bead of compatible caulking at the base of vertical surfaces to receive coating prior to application of coating system's basecoat.

.12 Provide double application of membrane at all vertical surfaces and at cracks and joints up to 1.6 mm wide.

.1 Joints greater than 1.6 mm wide to be specially detailed. Submit details for Consultant review.

.13 The preparation of vertical surfaces for membrane application shall include removal of existing paint and existing coating upturn by abrasive-blasting or water-blasting, hand patch voids or depressions in concrete surfaces and re-pointing masonry block wall joints as required. No extras shall be entertained for this item after award of Contract. This applies to all walls, columns, and curbs.

.14 The coating shall be turned up all vertical surfaces a minimum of 150 mm. Mask top of upturn to provide a neat and straight finish to coating. All vertical surface irregularities to be patched prior to coating application.

.15 No primer or first coat shall be applied until surface preparation has been reviewed by Consultant and inspected and accepted in writing by a representative of the system manufacturer per clause 1.5.4.1.

.16 Commencement of work implies Contractor's acceptance of the previously prepared concrete surfaces and assumption of full responsibility for the surfaces prepared to receive the primer and membrane.

.17 Application procedures that result in toxic fumes or flammable solvent collecting or endangering workers or building occupants are not permitted.

.18 Paint and finishes damaged by Contractor must be repaired to match existing.

3.2 Installation

.1 Prior to application of primer and membrane, test the substrate moisture content to confirm the moisture content does not exceed the coating manufacturer's and specified requirements. The Contractor may perform and pay for whatever additional tests they feel are required. Test results shall be submitted to Consultant prior to coating application.

.2 System applications shall be in strict accordance with more stringent requirements of manufacturer's specifications and these Contract Documents.

.3 Application of coatings along slab edge and soffit shall include additional applications at a lower application rate than used on horizontal surfaces. Additional applications shall result in minimum specified thickness of coating. Any areas of sagging and dripping coating shall be cut out and surfaces recoated in such a manner as to ensure repairs are not visible and specified thicknesses are achieved.

.4 Material quantities and placement procedures are to be strictly monitored. Areas to receive a typical material batch or container volume shall have their perimeters clearly marked prior to application to ensure uniform thickness of materials.

.5 Finished surfaces shall be of uniform appearance, with no variations in light reflection, surface roughness, or ridges in sloped areas. Profiles shall not impede slab drainage.

.6 Ensure environmental and site conditions are suitable, as outlined by the manufacturer and Contract Documents, are installation of work of this Section.

.7 Wearcourse aggregate type, size, and distribution to be in strict conformance with manufacturer's requirements.

3.3 Inspection and Testing

.1 Testing to be conducted by a testing agency designated by Consultant. Owner will pay costs of inspection and testing described in this Section.

.2 Contractor shall inform Consultant and testing agency 24 hours in advance of work to be performed under this Section.

.3 Prior to application of membrane, test moisture content of concrete mass in accordance with ASTM 4263 by taping down a 600 mm x 600 mm polyethylene sheet for 16 hours minimum to detect evaporation from slab surface Provide a heat source where required to maintain application temperatures. Minimum number of tests to be one test per 500 sq. m. Test locations shall be as designated by the membrane manufacturer or Consultant. Additional tests may be located by Contractor. Manufacturer to review results and approve application of membrane.

.4 Consultant may perform wet film thickness tests and dry-film cut tests to confirm membrane and wearcourse thicknesses. Number of tests to be at Consultant's discretion.

.5 Adhesion tests will be performed to evaluate the bond of the membrane to the substrate and the wearcourse to the membrane per ASTM D4541. Adhesion tests will consist of direct tensile pull tests a minimum of 7 days after installation of the system. Testing will be performed by the designated testing agency. Number of tests will be at the Consultant's discretion. Adhesion of membrane layers to each other and the substrate shall exceed 0.7 MPa.

.6 Additional tests may be performed at the discretion of the Consultant to confirm in-situ material thickness and bond.

.7 Repair coating system at test locations at no extra cost.

END OF SECTION

1.0 GENERAL

1.1 Section Includes

.1 Board insulation on podium deck surface beneath new concrete topping.

1.2 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 Ontario Building Code

.3	ASTM C423	Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
.4	ASTM D2842	Standard Test Method for Water Absorption of Rigid Cellular Plastics
.5	ASTM E90	Standard Test Method for Laboratory Measurement of Airborne-Sound Transmission Loss in Building Partitions and Elements
.6	ASTM E336	Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings
.7	ASTM E413	Classification for Rating Sound Insulation
.8	CSA B149.1	Natural Gas and Propane Installation Code
.9	CAN/ULC-S704.1	Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced
.10	CAN/CGSB-51.33	Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction (Withdrawn)
.11	CAN/CGSB-51.34	Vapor Barrier, Polyethylene Sheet for Use in Building Construction (Withdrawn)
.12	CAN/CGSB-51.38	Cellular Glass Thermal Insulation (Withdrawn)
.13	CGSB 71-GP-24M	Adhesive, Flexible, for Bonding Cellular Polystyrene Insulation (Withdrawn)

.14	CAN/ULC-S706.1	Standard for Insulating Wood Fibre Boards for Buildings
.15	CSA B111	Wire Nails, Spikes and Staples (Withdrawn)
.16	CAN/ULC-S101	Standard Methods of Fire Endurance Tests of Building Construction and Materials
.17	CAN/ULC-S102	Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
.18	CAN/ULC-S102.2	Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies
.19	CAN/ULC-S114	Standard Method of Test for Determination of Non-Combustibility in Building Materials
.20	CAN/ULC-S604	Standard for Factory-Built Type A Chimneys
.21	CAN/ULC-S770	Standard Test Method for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams
.22	CAN/ULC-S701.1	Standard for Thermal Insulation, Polystyrene Boards
.23	CAN/ULC-S702.1/S702.2	Standard for Mineral Fibre Thermal Insulation for Buildings

1.3 Submittals

.1 Submit product data and manufacturer's installation instructions of materials under provisions of Section 01 33 00.

.2 Product Data

.1 Include product characteristics and performance criteria: RSI values (aged values for extruded polystyrene insulations to CAN/ULC-S770), fire performance characteristics, moisture vapour permeance, water absorption ratings, compressive strengths, sound transmission ratings, evaluation reports showing conformance to applicable)

.3 Test Reports: Submit copies of fire test reports from ULC or UL of product indicating conformance to:

.1 CAN/ULC-S101 for fire resistance rating.

.2 CAN/ULC-S102 for surface burning characteristics.

.3 CAN/ULC-S114 for non-combustibility.

.4 Manufacturer's Installation Instructions: Indicate procedures for preparation and installation.

.5 Manufacturer's Certificate: Submit certificate stating that products meet or exceed specified requirements.

1.4 Quality Assurance

.1 Obtain each type of insulation material from a single manufacturer.

.2 Polystyrene insulation shall be tested, certified, and labelled for conformance with CAN/ULC-S701, in accordance with CGSB, ULC, or other certification program accredited by Standards Council of Canada.

1.5 Regulatory Requirements

.1 Conform to applicable code for combustibility, flame spread and smoke developed performance requirements.

1.6 Delivery, Storage, and Handling

.1 Minimize time insulation products are stored or exposed to sunlight at project site by covering with opaque polyethylene film or light coloured tarpaulins until permanent covering is installed.

.2 Store products away from construction activity and sources of ignition.

.3 Protect products from damage during handling, installation, and at point of installation.

1.7 Ambient Conditions

.1 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

2.0 PRODUCTS

2.1 Extruded Polystyrene Board

.1 Insulation: To CAN/ULC-S701, Type 4, rigid, closed cell type, with integral high density skin.

.1 Styrofoam HIGHLOAD 40 Insulation by DuPont de Nemours, Inc.

.2 FOAMULAR 400 by Owens Corning

.2 Thermal Resistance: 5 year aged RSI value of 0.87/25 mm for specified thickness.

.3 Board Size: sizes to be as large as feasible for installation. Thicknesses indicated on the Drawings.

.4 Compressive Strength: Minimum 275 kPa.

.5 Water Absorption: To ASTM D2842, 0.7% by volume maximum.

.6 Edges: Shiplap.

.7 Flame Spread/Smoke Developed Values: CAN/ULC-S102 or CAN/ULC-S102.2].

3.0 EXECUTION

3.1 Examination

.1 Verify that building substrate surfaces, adjacent materials, and installation conditions are ready to accept the work of this Section. Ensure insulation materials and surfaces are dry.

.2 Verify that substrate is flat, sound, clean, and free of objectionable fins, irregularities, and materials or substances that may impede installation.

.3 Beginning of installation means acceptance of existing surfaces.

3.2 Preparation

.1 Clean substrates of substances harmful to insulation material. Remove projections that could puncture sheet materials.

3.3 Installation

.1 Install materials in accordance with manufacturer's recommendations.

.2 Install insulation after building substrate materials are dry.

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

.4 Fit insulation tight around electrical boxes, plumbing and other protrusions.

.5 Keep insulation minimum distance required from heat-emitting devices.

.6 Use boards of largest possible dimensions to reduce number of joints. Boards with chipped and broken edges are unacceptable.

.7 Offset both vertical and horizontal joints in multiple layer applications.

.8 Do not enclose insulation until it has been reviewed by Consultant.

3.4 Protection

.1 Protect insulation under provisions of Section 01 56 00.

.2 Do not permit work to be damaged prior to covering insulation. Protect from harmful weather exposures and physical abuse.

.3 Provide temporary coverings or enclosures when insulation will be subject to damage and cannot be protected by permanent construction immediately after installation.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, material, equipment, and supervision necessary to prepare concrete surfaces and install elastomeric acrylic coatings as shown on the Drawings and as described herein.

.2 Prior to coating application, patch all voids and surface imperfections, grind rough surfaces smooth, and detail cracks and joints. Patching to be completed using manufacturer-approved cementitious coating.

.3 Specified material thicknesses are minimum thicknesses, not average. Grind down or patch rough surfaces to ensure minimum coating thickness is applied everywhere. Alternatively, if approved by the manufacturer, additional coating may be applied to achieve the minimum thickness.

1.2 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 Ontario Building Code

.3	ASTM D412	Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
.4	ASTM D822	Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings
.5	ASTM D1653	Standard Test Methods for Water Vapor Transmission of Organic Coating Films
.6	ASTM D2240	Standard Test Method for Rubber Property—Durometer Hardness
.7	ASTM D3274	Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Fungal or Algal Growth, or Soil and Dirt Accumulation
.8	ASTM D3359	Standard Test Methods for Rating Adhesion by Tape Test

.9	ASTM E96/E96M	Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials
.10	ASTM G153	Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
.11	FED TT-C-555B	Coating, Textured (for Interior and Exterior Masonry Surfaces)

1.3 Site Examination

.1 Visit the site and review surfaces to receive coating prior to submission of bid. Rough surfaces require additional surface preparation after cleaning. No extras for surface preparation and patching of rough surfaces and voids or additional material will be entertained.

.2 Report unsatisfactory surface conditions to the Consultant prior to start of coating work.

.3 Starting work of this Section implies acceptance of existing conditions.

1.4 Performance Requirements

.1 The wall coating system shall satisfy the following requirements for the duration of the warranty:

.1 System shall be totally waterproof, flexible, and thermally compatible with the substrate under applicable service conditions.

.2 System shall not allow moisture penetration at termination details or splices.

.3 System shall meet moisture vapour transmission criteria when tested in accordance with ASTM E96.

.4 System shall withstand active cyclical crack movements to a minimum of 1.5 mm and remain waterproof.

.5 Adhesion of surface patching, primer, and coating to concrete substrate shall meet or exceed an adhesion rating of 4A required on 0 to 5 scale when tested in accordance with ASTM D3359.

.6 Adhesion of all system layers to each other shall meet or exceed an adhesion rating of 4A required on 0 to 5 scale when tested in accordance with ASTM D3359.

.7 System shall not de-bond, crack, discolour, or chalk. System shall meet accelerated weathering criteria (3000 hr) of ASTM D822.

.8 Coating system shall be UV stable and not support combustion.

.9 System shall resist fungus and mildew growth in accordance with ASTM D3274.

.10 System shall have no loss of adhesion due to thermal shock under alternating heat/ cold testing.

.11 Minimum tensile strength of system is to be 125 psi under ASTM D412 testing.

.12 System elongation at break is to meet or exceed 300% at 75°F under ASTM D412 testing.

.13 System shall have Shore A hardness of 68 to 75 per ASTM D2240.

1.5 Submittals

.1 Submit proposed detailing of coating system not indicated in Contract Documents - including material specifications, thicknesses, details at joints, cracks, upstands, walls, and termination points, etc. - for Consultant review prior to starting work.

.2 Submit installation procedures and surface preparation requirements for Consultant review prior to starting coating work.

.3 Submit a 215 mm x 280 mm product sample demonstrating the proposed finish and material thicknesses to be obtained for each specific application under the Contract. These samples will represent the quality of finish of completed installation.

.4 Submit technical data sheets for products to be used to patch rough surfaces for Consultant review prior to application.

.5 If requested by Consultant, submit certificates confirming the following:

.1 Wall coating system applicator is presently a licensed applicator of the coating system.

.2 Applicator has minimum three years of directly applicable wall coating installation experience or has installed a minimum of 55,000 sq. ft. (5,000 sq. m) of specified wall coating system.

.3 That a minimum of 80,000 sq. ft. (7,500 sq. m) of system has been installed of similar exposure and has performed satisfactorily.

.4 System will meet warranty requirements specified in this Section.

.6 Provide a certificate signed by the Contractor and coating system manufacturer certifying the following:

.1 Prepared surfaces were reviewed and found satisfactory to receive coating per manufacturer's requirements and these Specifications. Application of coating shall imply acceptance of surfaces.

.2 Wall coating was applied in accordance with manufacturer's recommendations and these Specifications.

.3 Completed wall coating system conforms to system described herein.

.7 Provide electronic copies of maintenance instructions for finished surfaces prior to Substantial Performance of the Work.

1.6 Environmental Requirements

.1 Do not install coating when ambient air or substrate temperature is less than 10°C. If this temperature is not reached, installation of temporary heated enclosures is required.

.2 Maintain air temperatures and substrate temperatures at installation areas above 10°C for 12 hours before, during, and for 72 hours after installation. Maintain temperatures longer if materials have not adequately cured.

.3 Protect materials from moisture damage or dust contamination until adequately cured.

.4 Provide forced air circulation during curing period for enclosed applications.

.5 Ventilate work areas so that odours from the system do not disturb building users or the public.

1.7 Protection

.1 Provide adequate protection of material and work of this Section to prevent damage by weather or other trades. Protect work of other trades from damage resulting from work of this Section. Make good all damage to the satisfaction of the Consultant at no extra cost to the Owner.

.2 Cover surrounding surfaces that are not to receive coating and mask termination points to provide neat, clean, true lines. Prevent over-spray and fouling of adjacent surfaces.

2.0 PRODUCTS

2.1 Wall Coating Systems

.1 The following systems are approved for this project. Alternatives may be submitted for review in accordance with Section 01 25 13.

.1 Neoflex– by Neogard

.2 MasterProtect EL 750 – by Master Builders Solutions Canada Inc.

.3 Perma-Crete Pitt-Flex 4-110XIC Series by PPG

.4 Sikigard-550W Elastic – By Sika Inc.

.2 Systems are to be installed in accordance with manufacturer’s written instructions.

.3 Colour and finish texture (smooth, fine, course) to be confirmed by Owner from standard colour charts and samples prior to installation.

2.2 Coating Systems for Overhead Surfaces

.1 Install high-build acrylic coating to consistent finish, colour, and gloss/sheen of associated elastomeric acrylic wall coating in conformance with manufacturer requirements.

2.3 Surface Patch Materials

.1 Products used to patch rough concrete surfaces shall be a manufacturer approved cement-based patching compound.

3.0 EXECUTION

3.1 Preparation

.1 Surface preparation to be in strict accordance with requirements of system manufacturer's recommendations and these Contract Documents including preparation, grinding, and/or re-surfacing of rough surfaces, and detailing of cracks, joints, and voids.

.2 Minimum standard of vertical surface cleaning shall be dry abrasive-blast or high-pressure waterblast providing a Level 3 Concrete Surface Profile (CSP) per the ICRI scale. After preparation, surfaces are to be free of all laitance, grease, and foreign material.

.3 Clean surfaces free from all grease and oil with an emulsifier that will not affect the performance of the coating, where required.

.4 Concrete repairs shall be allowed to air dry after moist curing and not exhibit any condensation under plastic sheet test prior to application of coating.

.5 All rough surfaces with a vertical amplitude exceeding 40 mils (1.0 mm) must be ground and/or filled to provide a smooth surface.

.6 Treat cracks and joints in accordance with manufacturer recommendations and provide an additional application of coating at all cracks and joints up to 1.6 mm wide.

.7 Fill cracks and joints greater than 1.6 mm wide with approved sealant materials flush with surface. Application to be in strict conformance to manufacturer's recommendations and these Contract Documents.

.8 Remove existing finishes by abrasive blasting or water blasting and patch voids and depressions in concrete surfaces prior to coating. No extras shall be entertained for this item after the award of Contract.

.9 Terminate coatings as shown on Drawings or as directed by Consultant. Mask ends of all terminations to ensure neat straight finish to coating. All surface irregularities are to be patched prior to coating application.

.10 Do not apply primer or coating until surface preparation has been reviewed by Consultant and inspected and accepted in writing by a representative of the system manufacturer.

.11 Commencement of work shall imply Contractor's acceptance of previously prepared concrete surfaces and assumption of full responsibility for the surfaces prepared to receive the primer and coating.

.12 Application procedures that result in toxic fumes or flammable solvent collecting or endangering workers or building occupants are not permitted.

.13 Paint and finishes damaged by Contractor must be repaired to match existing.

3.2 Installation

.1 Prior to application of coating material, test moisture content of substrate by concrete mass to confirm that substrate moisture content does not exceed coating manufacturer instructions.

.2 System applications shall be in strict accordance with more stringent requirements of manufacturer's specifications and these Contract Documents.

.3 Material shall not be spray applied unless approved in writing by the Consultant.

.4 Material quantities and placement procedures are to be strictly monitored. Areas to receive a typical material batch or container volume shall have their perimeters clearly marked prior to application to ensure uniform thickness of materials.

.5 Finished surfaces shall be of uniform appearance with no readily discernable variation in light reflection and surface roughness, and with no ridges, runs, or other imperfections.

.6 Ensure environmental and site conditions are suitable for installation of work of this Section as recommended by coating manufacturer and as indicated in Contract Documents.

.7 Do not apply elastomeric acrylic wall coating to overhead surfaces. Install appropriate high build acrylic coating to equivalent dry film thickness to overhead surfaces.

3.3 Inspection and Testing

.1 Testing to be conducted by testing agency designated by the Consultant. Owner will pay costs of inspection and testing described in this section.

.2 Inform Consultant and testing agency 24 hours in advance of work to be performed under this section.

.3 Prior to application of membrane, test of moisture content of concrete mass shall be made by taping down an 18” x 18” (450 mm x 450 mm) polyethylene sheet for a period of 16 hours (minimum) to detect evaporation from the surface. Number of tests shall be designated by the manufacturer or Consultant. Minimum number to be one test per 5,000 sq. ft. Locations to be determined by Consultant. Additional tests may be located by manufacturer or Contractor.

.4 The Consultant will perform wet film thickness tests and dry-film cut tests to confirm coating thickness. Number of tests to be one test per 550 sq. ft. of coating minimum.

.5 To evaluate bonding of coating to substrate, and/or interlayer bonding, adhesion tests may be conducted by means of ASTM D3359 a minimum of seven days after installation of the system. Testing will be performed by the Designated Testing Agency. Number of tests shall be one test per 2,500 sq. ft. of membrane, minimum. Adhesion of coating layers to each other and to concrete substrate shall exceed a 4A rating in accordance with ASTM D3359.

.6 Additional tests may be performed at the discretion of the Consultant to confirm in-situ material thickness and bond.

.7 Contractor to repair coating system at test locations at no extra cost.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, material, equipment, and supervision to supply and install new area drains to replace existing and to provide additional drainage where directed by the Consultant. Include elbow, cleanout, and all piping required to tie-in to existing system in pricing for each new drain.

.2 Provide required drain piping and accessories necessary to replace corroded or damaged piping and to connect new floor drains to existing drainage system.

.3 Visit the Place of the Work to ascertain existing conditions and allow for all conditions that will affect the new installation.

1.2 Performance Requirements

.1 The floor drains and floor drain piping supplied and installed under this Contract shall satisfy the following:

.1 Be fully operational and not unduly damage or deteriorate under normal traffic use or hinder the flow of water.

.2 All connections and hardware shall remain securely fastened without leaks.

2.0 PRODUCTS

2.1 Materials

.1 Floor drains are to comply with CSA S413M.

.2 Floor drains and grates shall be of galvanized cast iron or ductile iron construction. They shall be equipped with a surface grate suitable to resist applied loads and a removable sediment basket. Drains shall be equipped with bi-level drainage suitable to drain at the slab and overburden or top surface.

.3 Approved Floor Drains – Landscaped Decks:

.1 Zurn Z-610-H-ADJ-Y (12.5” / 317 mm square) Watts FD-460-AF-5-9 (12” / 305 mm square)

.3 Jay R. Smith 1459Y-EPSS (11” / 280 mm square)

.4 Heat tracing to be Pyrotenax.

.5 Drain pipe insulation to match existing thickness, where present, complete with metal jacket.

.6 Pipe hangers to be clevis type, Grinnell #G652 or to match existing.

.7 Risers and all penetrations through floor slabs to be 100 mm M.J. cast iron pipe.

.8 Provide all traps and clean-outs in new drain lines as necessary to conform to plumbing and drainage act regulations.

3.0 EXECUTION

3.1 Drain Installation

.1 Install drains and associated piping in accordance with this specification and relevant building code and plumbing code requirements.

.2 Flood test slabs to determine optimum locations for new drains. Consultant to review flood test and mark locations for new drains prior to concrete removal.

.3 Confirm that no embedded reinforcing is located at proposed drain and riser locations prior to concrete removal. Suspended slabs are to be scanned using suitable non-destructive testing equipment, or x-rayed, to locate embedded reinforcement. Exercise care and caution during removals to avoid damage embedded elements. Any damage that results from concrete removal is to be repaired at the Contractor’s expense. Testing is to be included in drain installation price.

.4 Remove concrete using jackhammers to accommodate drain installation per installation details provided on Drawings. Do not damage embedded reinforcing.

.5 Recess drains as shown on the Drawings.

.6 Connect drains to existing drainage system.

.7 On suspended slabs, coordinate drain installation with application of waterproofing system to maintain positive drainage flows and a complete waterproof seal at the drain.

3.2 Handling and Storage

.1 Use a forklift to unload System XFR 15-50 crates directly from the delivery vehicle. Do not use wire ropes, chains, or slings.

.2 Take care during handling to prevent damaging the pipe.

.3 Store System XFR 15-50 pipe on level surface. If placed on the ground, support the pipe by timbers spaced no more than 900 mm apart.

.4 When storing pipe on a flat smooth surface, place smaller diameter pipe on top of larger pipe.

.5 Do not store pipe close to sources of heat such as boilers, steam lines, engine exhaust outlets, etc.

3.3 Pipe Run Installation

.1 Space hangers in accordance with the plumbing code, including seismic restraint.

.2 Confirm that no electrical conduit is located at proposed hanger locations.

.3 Provide cleanouts at maximum intervals of 9.0 m.

.4 Maintain adequate invert slopes and headroom. All drainage pipes to maintain a minimum 2% slope to drain.

.5 Clearance beneath drain pipes to satisfy minimum parkade clearance at entrance. Coordinate pipe runs with existing lights and sprinkler pipe locations. Review conditions at the Place of the Work prior to submitting bid and allow for necessary offsets, etc. as required.

.6 Install CSA-certified expansion joints, CSA-certified mechanical joint couplings, and designed offsets (including change of direction expansion loops) as required to accommodate thermal expansion and contraction of System XFR 15-50 drain system. Review conditions at the Place of the Work prior to submitting Bid to confirm pipe run lengths, locations and quantity of expansion fittings, etc.

.7 Use System XFR 15-50 approved fittings and System XFR 15-50 cement solvents for pipe installations. Refer to IPEX’s Solvent Cementing Guide.

3.4 Field Quality Control

.1 Confirm acceptability of drainage system installations prior to casting concrete.

.2 If requested, flood test drainage system to confirm water-tightness and that system is free draining. Consultant shall be present.

.3 If water is unavailable, System XFR 15-50 installations may be air tested at a pressure no greater than 5 psi. Proper pressure regulation, relief devices, and procedures must be used to ensure test pressures do not exceed 5 psi.

3.5 Cleaning of Drainage System

.1 Power flush (high-pressure jetting or approved equivalent) all drainage systems within Work areas to verify that all new and existing drains, drain lines, and related piping are totally cleaned, operational, and free running.

.2 Sumps shall be vacuumed clean of all silt and debris upon completion of the drainage system cleaning.

.3 Clean all sediment buckets of all debris.

.4 Test drainage system to confirm unobstructed operation.

3.6 Painting

.1 Do not paint System XFR 15-50 pipe and fittings.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 This Section outlines repair and inspection procedures to be undertaken when existing electrical conduits, fixtures, etc. are damaged due to the construction activity.

.2 Damaged electrical conduits, fixtures, etc. must be repaired in a timely fashion. If repair cannot be made in a timely fashion, a temporary system must be installed.

.3 Visit site to ascertain and note existing conditions that will affect the Work.

1.2 Regulatory Requirements

.1 Comply with Safety Codes Act and rules and regulations made pursuant thereto, including Canadian Electrical Code.

.2 Unless otherwise indicated, all references in the Contract Documents to "Canadian Electrical Code" or "CEC" shall mean the edition of the Canadian Electrical Code, Part I, CSA C22.1 and the variations made thereto by Ontario regulation, which are in force on the date of bid closing for the Contract.

.3 All electrical products shall be tested, certified, and labelled in accordance with a certification program accredited by the Standards Council of Canada.

.4 Submit drawings and specifications to authority having jurisdiction and local utility company for examination and approval before commencement of electrical work. Pay any associated fees required to obtain a permit for the Work.

.5 Submit a copy of electrical permit obtained from the Authority Having Jurisdiction to the Consultant.

1.3 Examination of Site

.1 Visit and examine the site and all applicable Drawings before Bid. The Bid shall include all costs for required electrical work necessary for performance of the Work. No extras will be paid due to failure to visit the site or adequately review all required interfacing details.

1.4 Delivery, Storage, and Handling

.1 Submit copies of Safety Data Sheets (SDS) for all products prior to arrival on site.

.2 Deliver, store, and maintain packaged material with manufacturer's seals and labels intact.

.3 Store material in regulation containers in accordance with the Occupational Health and Safety Act and manufacturer instructions.

.4 Toxic or hazardous chemicals shall be secured in a locked storage area with appropriate protection measures in accordance with the Occupational Health and Safety Act.

.5 All containers to be labelled with material expiration dates. Material that is older than the expiry date shall be rejected. Shelf life shall be strictly adhered to and material shipped without dates will be rejected. Immediately remove rejected materials from site.

2.0 PRODUCTS

2.1 Materials

.1 Use new products unless otherwise specified.

.2 Provide electronic copies of maintenance instructions for finished surfaces and maintenance material before Substantial Performance of the Work.

3.0 EXECUTION

3.1 Exposed Conduits, Fixtures, Etc.

.1 All exposed conduits and fixtures are to be properly protected and operational at all times during the Work. Refer to Section 01 56 00.

.2 Repair or replacement of damaged exposed conduits, cables, and fixtures is Contractor's responsibility when damage was caused by Contractor's operations. Required repair or replacement work to exposed conduits, fixtures, etc. may be performed by Contractor's own electrician.

3.2 Existing Embedded Electrical Services

.1 Identify potential areas of buried or hidden conduit, and locate or switch off high voltage systems in the area of Work to prevent possible damage and injury. Coordinate requirements with Owner.

.2 Take utmost precaution during demolition operations to prevent damage to buried or hidden conduit and cables. Immediately report damage to hidden conduits, cables, and systems to Owner and Consultant.

.3 Damaged or deteriorated conduits are not to be covered up without specific approval from Owner.

.4 Allow reasonable time in scheduling of the Work for implementation of any required repairs to buried or hidden conduit, cables, and systems.

.5 Take all precautions to ensure embedded conduits uncovered by the work are not live before performing demolition work around them.

.6 Repair or abandon damaged conduit, cabling, and systems uncovered by the Work at discretion of Owner. Owner will pay for repairs to damaged hidden conduit, cabling, and systems, provided damage did not result from a lack of Contractor care or negligence. Negligence shall be determined at discretion of Consultant.

.7 All repairs to embedded electrical conduit, cabling, and services will be performed by an electrician that is agreeable to Owner and paid via Change Order through contingency allowance.

3.3 Temporary Systems

.1 If damage to surface-mounted or hidden conduit, cabling, and systems cannot be repaired in a timely fashion, Owner may, at their discretion, request that Contractor provide a temporary system or connection to maintain operation.

.2 Costs for requested temporary systems will be allocated to Owner for damage to hidden conduit, cabling, and systems and to Contractor for damage to surface mounted conduit, cabling, and systems.

3.4 Inspection of Work

.1 All electrical system repair work is to be inspected as required by the authority having jurisdiction.

.2 Arrange for required inspections of repairs within 48 hours of repairing damage. Schedule all required inspections, regardless of whether Owner's or Contractor's electrician performed the repair.

.3 Cost of inspections shall be responsibility of Contractor.

.4 Copies of inspection certificates for required inspections shall be distributed to Owner and Consultant upon completing the Project.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Preparation of existing subgrade material and installation of new granular backfill material.

1.2 References

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 Ontario Building Code

.3	ASTM C117	Standard Test Method for Materials Finer than 75-μm (No. 200) Sieve in Mineral Aggregates by Washing
.4	ASTM C136/136M	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
.5	CAN/CGSB-8.1-88	Sieves, Testing, Woven Wire, Inch Series (Withdrawn)
.6	CAN/CGSB-8.2-M88	Sieves, Testing, Woven Wire, Metric Series (Withdrawn)
.7	OPSS 501	Compacting
.8	OPSS 1010	Aggregates - Base, Subbase, Select Subgrade, and Backfill Material

1.3 Submittals

.1 Obtain certificates from suppliers that attest that supplied materials comply with Specifications and submit to Consultant.

.2 Obtain copies of waybills for supplied granular backfill material and submit to Consultant at end of each workday.

.3 Unit weight of supplied materials will be determined by average of three compaction tests conducted in the field or by using minimum specified weights and volume based on measured areas.

2.0 PRODUCTS

2.1 Materials

.1 Gradations to be within specified limits when tested to ASTM C117 and ASTM C136/136M. Sieve sizes to CAN/CGSB-8.1 and/or CAN/CGSB-8.2.

.2 Granular base to be Granular “A” to OPSS 1010. Inclusion of reclaimed asphalt pavement (RAP) and/or reclaimed concrete materials (RCM) will be at Consultant’s discretion.

.3 Crushed stone or gravel shall consist of hard, durable, angular particles that are free from clay lumps, cementation, organic material, frozen material, and other deleterious materials.

.4 Filter fabric to be suitable for intended use, as confirmed by Consultant.

3.0 EXECUTION

3.1 Surface Preparation Prior to Installation of New Material

.1 Verify grade of items set in work area for conformance with required elevations before placing granular material. Prepare and compact subgrade prior to placing granular backfill material.

.2 Allow for Consultant review of subgrade before placing granular backfill material.

.3 Place granular backfill material only on clean unfrozen subgrade and backfill material that is free from snow and ice.

.4 Place granular backfill material to compacted thicknesses indicated in Contract Documents. Do not place frozen material.

.5 Place granular backfill in layers not exceeding 150 mm compacted thickness. Compact to density not less than 98% of maximum dry density (MDD) determined using standard proctor test.

.6 Finished base surface to be within 10 mm of specified grade but not uniformly high or low. Where grades are not specified on Drawings, confirm requirements with Consultant and ensure slopes to drain.

.7 Replace all damaged, deteriorated, and unsuitable sections of existing subgrade prior to placement of granular backfill material.

3.2 Compacting

.1 Compact subgrade and granular backfill in accordance with the Ontario Provincial Standard Specifications, using proper equipment to achieve specified density, and complying with OPSS 501.

.2 Compact subgrade and backfill material to a minimum of 98% of MDD as determined by the standard proctor test method.

.3 Density is to be measured using a nuclear density gauge.

.4 Finished surfaces to be to finished grades where indicated, or as directed by the Consultant, with slope to drains and catch basins.

.5 Finished surfaces to be uniform, smooth, even, dense, and free from shallow areas, protrusions, and surplus backfill. Correct any irregularities that vary more than 6 mm in 3,050 mm (1/4” in 10’-0”).

3.3 Inspection and Testing

.1 Testing to be conducted by a testing agency designated by Owner. Unless otherwise noted, the Owner will pay costs of inspection and testing described in this Section.

.2 Inform Consultant and testing agency 24 hours in advance of work to be performed under this Section.

.3 Testing may include site sampling and laboratory testing and/or in-situ compaction testing.

END OF SECTION