



# **SPECIFICATION**

**LEMIEUX ISLAND  
WATER PURIFICATION PLANT  
1 ONIGAM STREET, OTTAWA, ONTARIO**

**ASPHALT REPLACEMENT**

**FOR:**

**DRINKING WATER SERVICES  
PUBLIC WORKS AND ENVIRONMENTAL SERVICES DEPARTMENT**

**CONSULTANT:**



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**CONTRACT NO.: LEMIEUX-2021  
FACILITY NO: LEMIEUX**

**APRIL 2022**

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**END OF SECTION**

**Part 1 General**

**1.1 GENERAL DESCRIPTION OF THE WORKDOCUMENTS**

- .1 The Contractor shall complete the works in accordance with the following documents:
  - .1 The attached City's request for tender document.
  - .2 Specifications labeled:  
**Asphalt Replacement  
Lemieux Island WPP  
1 Onigam Street, Ottawa**
  - .3 Drawings:
    - 00 Notes**
    - 01 Site Plan**
    - 02 Partial Site Plan – Area 1**
    - 03 Partial Site Plan – Area 2**
    - 04 Partial Site Plan – Area 3**
    - 05 Details**
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  - .4 The specifications are not intended as a detailed description of all activities to perform the individual tasks but serve to indicate particular requirements of the required work and remove all hazards to make site safe.
  - .5 It is the intention of the specifications to provide finished work. Any items omitted there which are clearly necessary for the completion of the work or its appurtenances shall be considered as portion of the work.

**1.2 GENERAL DESCRIPTION OF THE WORK**

- .2 Work under this contract includes:
  - .1 Removal of existing materials, including pavement, curbs, stairs, coping stones, guardrails, pavers, fencing, landscaping, and other obstacle to the extent as indicated on the drawings.
  - .2 Installation the new assemblies, including pavement, concrete sidewalks, concrete stairs, coping stones, guardrails, retaining walls, landscaping, curbs, etc, in accordance with the attached drawings and specifications.
  - .3 All associated repair work, sealants, etc. to complete the project as per the design intent.
- .3 Overtime costs shall be included in the Unit and Stipulated Prices provided in the form of Tender. No extra costs will be paid by Owner for work which must be performed outside normal working hours.
- .4 Ensure that any defects discovered are corrected before continuing work.

- .5 Ensure site conditions are satisfactory for execution of work.
- .6 Address to Consultant all questions on work. Consultant will transmit written instructions.
- .7 Coordinate all trades to provide a smooth, conflict free, flow of work.
- .8 The Contractor shall have a competent person for emergency calls after construction hours and during weekends. It shall be the Contractor's responsibility to supply the Owner's representative with the name and telephone number of the person to be contacted during these periods.

### **1.3 DEFINITIONS**

- .1 "CONSULTANT" and "Fishburn Sheridan & Associates Ltd.", and "FSA" are synonymous.
- .2 "OWNER" and "City of Ottawa" are synonymous.
- .3 "CONSTRUCTOR" and "CONTRACTOR" are synonymous.

### **1.4 OTHER CONTRACTORS**

- .1 Other Contractors, Sub-Contractors and the Owner's own forces, may be performing work on the site at the same time as the Work is being done under this Contract. The successful bidder shall provide all reasonable co-operation and collaboration with these other forces to ensure a timely completion of the work, taking into consideration and without undermining its own role as the "Constructor".

### **1.5 USE OF THE SITE**

- .1 Carry out the Work so as to have the least possible interference and disturbance to the normal use of the premises. The successful bidder is expected to include in the bid an allowance for the performance of off-hours work should it be required to conform with the above.
- .2 Maintain services to existing building and provide for personnel and vehicle access.
- .3 Restrict construction access to and from site to approved location. Do not allow construction traffic to block entrances or exits for any reason.
- .4 Co-ordinate any interference with Owner's operation in this area and abide by Owner's direction in this regard. In cases of conflicting requirements, Owner's operation takes precedence but all reasonable effort to accommodate Contractor's needs will be made.
- .5 The Contractor shall provide access to and about the site to ensure continuous an efficient delivery and movement of materials and equipment. Arrange routes so that they do not conflict with Owner's operations.
- .6 Design, construct and maintain temporary access to and egress from work areas, including stairs, runways, ramps or ladders and exterior doors, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

- .7 Contractor to maintain access and egress for occupants, public and normal use of site.

## **1.6 EXISTING SERVICES**

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings.
- .2 Services are to be left operational unless otherwise authorized by Owner.
- .3 Unless otherwise specified, the Contractor will be responsible for disconnection, relocation, re-installation and extending all services required to facilitate work under this Contract. Co-ordinate work with the Owner and provide minimum 48 hours notification if services are to be interrupted.

## **1.7 CUTTING AND PATCHING**

- .1 Generally patch and "make good" any and all surfaces cut, damaged, exposed, or disturbed to comply with any appropriate statutory requirements and to the Owner's acceptance.

## **1.8 PROTECTION OF PROPERTY**

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

## **1.9 PRECONSTRUCTION CONDITIONS**

- .1 Prior to commencing mobilization, the Contractor shall record preconstruction conditions by photographing all items that could potentially be claimed by the Owner or Consultant as damaged during the course of the work.
- .2 These items should include adjacent wall areas, landscaping, pavement, windows, paint finishes and any roof top equipment on or adjacent to the subject roof.
- .3 In the event that the Contractor is permitted to store materials or equipment on adjacent roofs or use adjacent roofs to access the subject roofs, these areas shall also be reviewed for preconstruction damage and photographed.
- .4 Provide Consultant and Owner with photographic record of preconstruction photographs a minimum of 24 hours prior to commencing mobilization.
- .5 All such damages observed during final or post construction review that cannot be verified as pre-existing, are potentially considered the Contractor's responsibility to rectify.

## **1.10 OCCUPATIONAL HEALTH AND SAFETY**

- .1 Follow the Ontario Provincial Occupational Health and Safety Act and Regulations for Construction Projects. For the purposes of the act, the person or company contracted to carry out the work shall be deemed the "**Constructor**".
- .2 Hazardous materials, not identified by the Owner, may be encountered at the worksite. Use all necessary precautions when handling such material. It is possible that asbestos may exist in some form and if encountered the Contractor

is responsible to notify the Owner and to follow Ontario Ministry of Labour regulations governing the handling of asbestos in the workplace.

- .3 The Owner may cause those who do not comply with the O.H.S.A. and Regulations to be escorted from the site.

#### **1.11 PROTECTION OF BUILDING FINISHES AND EQUIPMENT**

- .1 Prevent movement, settlement, or other damage to other adjacent structures, utilities, and parts of building to remain in place. Provide bracing and shoring if required.
- .2 Keep noise, dust, and inconvenience to occupants to a minimum.
- .3 Protect building systems, services and equipment. Protect all furnishings within work area with (6 mil) polyethylene film during construction. Remove film during non-construction hours and leave premises in clean, unencumbered and safe manner for normal daytime function.
- .4 Provide temporary dust tight screens, partitions, covers, railings, barricades, supports and/or other protection as required. Protect workers, finished areas of work and public.

#### **1.12 PARKING**

- .1 Parking is available on site.
- .2 All vehicles must be parked in designated parking areas (except for reasonable loading and unloading of equipment and/or materials to a local entrance).

#### **1.13 SIGNS AND ADVERTISEMENTS**

- .1 No signs or advertisements of any description other than notices regarding safety shall be displayed at the Work Site without permission of the Owner.
- .2 Upon completion of the Work, all signs shall be removed except those specifically directed by the Owner to remain.

#### **1.14 CLEAN-UP**

- .1 Maintain the work area in tidy condition, free from the accumulation of waste products and debris.
- .2 Remove waste and materials regularly so as to maintain a tidy work site. Do not dispose of any waste in the Owner's facilities unless specifically directed to do so by authorised personnel.
- .3 Store materials in areas specially designated by the Owner. Dispose of this debris in a legal manner so as to avoid causing a hazard to occupants and visitors on site.

#### **1.15 MATCHING**

- .1 Where new work occurs in or adjacent to existing work, it is the intent that colours and textures of visible finishes within these areas shall be matched to the satisfaction of the Owner.

**1.16 DISRUPTION OF SERVICES**

- .1 The Contractor is responsible to provide adequate written notice to the Owner of any interruption of services (i.e., mechanical, electrical etc.) for the connection of new services or the alteration of existing.
- .2 The Contractor is expected to co-operate reasonably with the Owner in the scheduling of service interruptions.

**1.17 SANITARY FACILITIES**

- .1 Temporary sanitary facilities will be provided by the Constructor in compliance with the Occupational Health and Safety Act and Regulations for Construction Projects.

**1.18 POWER**

- .1 Maximum power of 110V will be available at no cost. Any connection to this power source will be done at the Contractor's expense and liability, and in accordance with the Canadian Electrical Code.

**1.19 WATER SUPPLY**

- .1 Water supply is available at no cost. Connection and disconnection will be at Contractor's expense and liability.

**1.20 TEMPORARY FACILITIES**

- .1 Any temporary facilities provided at the site by the Contractor must be removed upon completion of the work and the area used must be returned to the original condition.

**1.21 DOCUMENTS REQUIRED**

- .1 Maintain at the job site, one copy each of the following:
  - .1 Original Plans and Specifications and completed Form of Tender.
  - .2 Building Department stamped drawings if required.
  - .3 Any changes to Drawings or Details.
  - .4 Shop Drawings and any changes.
  - .5 Addenda.
  - .6 Change Orders.
  - .7 Site Instructions.
  - .8 Contractor's Safety Policy.
  - .9 Safety Data Sheets.

**1.22 WORK SCHEDULE**

- .1 The Contractor is to schedule work to begin immediately to order long-term delivery items.
- .2 Upon award of contract, a pre-construction meeting shall be held to review work schedule, payment procedure, etc.

- .3 Within 5 days of on-site meeting, submit for Consultant's approval a work schedule, indicating the timing of the work including the sequence of all operations involved therein in order to meet the completion date. Cooperate with the City of Ottawa in scheduling and phasing the work.
- .4 Hour of work to be Monday to Friday 7:00 am to 4:00 pm. Alternative hours are subject to approval in advance by the City of Ottawa.

### **1.23 OPERATION AND MAINTENANCE DATA**

- .1 Provide Consultant with 2 printed sets of operating and maintenance instructions and data books and 3 electronic sets (PDF format recorded on electronic disk or flash drive), 10 days prior to advising Consultant that the Work is substantially performed, including:
  - .1 Complete listing of materials, products and equipment including serial numbers, manufacturer's names and sources of supply;
  - .2 Complete cleaning and maintenance instructions for each finish, assembly, component and system;
  - .3 Final reviewed Shop Drawings;
  - .4 Copies of all warranties, properly executed;
  - .5 List contact address and phone numbers of trades, sub-trades, and suppliers;
  - .6 All permits and certificates of acceptance (test results, etc.);
  - .7 Technical data sheets and MSDS for all materials used;
  - .8 As-Built drawings;
  - .9 Operation and maintenance instructions for all equipment and systems sufficiently detailed with respect to design elements, operational procedures, technical data, construction features, component functions, and maintenance requirements to permit effective start-up, operation, maintenance, repair, modification, extension, and expansion of any portion of the system.
  - .10 Format: Hard covered, vinyl, 3 'D' ring binder with loose leaf 8.5x11" with spine and face pockets, project name and number must appear on binder face and spine. Organize contents into applicable sections of work to parallel project specifications breakdown. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.
- .2 Submit maintenance and operation data which are manufacturer's latest published editions at date of submission. Include the following:
  - .1 Data books and literature;
  - .2 Submit instructions in plain English to guide Owner in proper operation and maintenance of building components;
  - .3 Maintenance instructions, specifying warnings of any maintenance practice that may damage or disfigure specified Products

- .4 Recommended maintenance materials.
- .5 Organize contents into applicable categories of the Work, numbered to match the Specification Section numbering system. Insert tabs between each Specification Section.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

**Part 1 General**

**1.1 ADMINISTRATIVE**

- .1 Submit to Consultant submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
- .10 Keep one reviewed copy of each submission on site.

**1.2 SHOP DRAWINGS AND PRODUCT DATA**

- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario.
- .2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .3 Allow 2 days for Consultant's review of each submission.

- .4 Adjustments made on shop drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .5 Make changes in shop drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant in writing of revisions other than those requested.
- .6 Accompany submissions with transmittal letter, in duplicate, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .7 Submissions include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication.
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.
    - .7 Operating weight.
    - .8 Wiring diagrams.
    - .9 Single line and schematic diagrams.
    - .10 Relationship to adjacent work.
- .8 After Consultant's review, distribute copies.
- .9 Submit an electronic copy of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.

- .10 Submit an electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.
- .11 Submit an electronic copy of test reports for requirements requested in specification Sections and as requested by Consultant.
  - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
  - .2 Testing must have been within 3 years of date of contract award for project.
- .12 Submit an electronic copy of certificates for requirements requested in specification Sections and as requested by Consultant.
  - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
  - .2 Certificates must be dated after award of project contract complete with project name.
- .13 Submit an electronic copy of manufacturer's instructions for requirements requested in specification Sections and as requested by Consultant.
  - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .14 Submit an electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Consultant.
- .15 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .16 Submit an electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Consultant.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.
- .19 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .20 The review of shop drawings by the City of Ottawa is for sole purpose of ascertaining conformance with general concept.

- .1 This review shall not mean that the City of Ottawa approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
- .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

### **1.3 SAMPLES**

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

### **1.4 PHOTOGRAPHIC DOCUMENTATION**

- .1 Submit electronic copy of colour digital photography, standard resolution monthly with progress statement and as directed by Consultant.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: 2 locations.
  - .1 Viewpoints and their location as determined by Consultant.
- .4 Frequency of photographic documentation: as directed by Consultant.
  - .1 Upon completion of: excavation, foundation, framing and services before concealment of Work, and as directed by Consultant.

**1.5 CERTIFICATES AND TRANSCRIPTS**

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

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCES**

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Province of Ontario
  - .1 Occupational Health and Safety Act Projects, R.S.O. 1990, c.0.1, as amended and Regulations for Construction O. Reg. 213/91 as amended - Updated 2014.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .1 Results of site specific safety hazard assessment.
  - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .4 Submit copies of incident and accident reports.
- .5 Submit WHMIS 2015 SDS - Safety Data Sheets.
- .6 Consultant will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 2 days after receipt of plan. Revise plan as appropriate and resubmit plan to Consultant within 2 days after receipt of comments from Consultant.
- .7 Consultant's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

**1.3 SAFETY ASSESSMENT**

- .1 Perform site specific safety hazard assessment related to project as required.

**1.4 MEETINGS**

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

**1.5 GENERAL REQUIREMENTS**

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain,

and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

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

## **1.6 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Contractor will be responsible and assume the role Constructor as described in the Ontario Occupational Health and Safety Act and Regulations for Construction Projects.
- .3 Contractor shall be the Principal Contractor as described in the Ontario Health and Safety Act for the Construction for only their scope and areas of work as defined and described in this project specification.
- .4 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

## **1.7 COMPLIANCE REQUIREMENTS**

- .1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990, c. 0.1 and Ontario Regulations for Construction Projects, O. Reg. 213/91.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

## **1.8 UNFORSEEN HAZARDS**

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

## **1.9 HEALTH AND SAFETY CO-ORDINATOR**

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
  - .1 Have working knowledge of occupational safety and health regulations.

- .2 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
- .3 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

#### **1.10 POSTING OF DOCUMENTS**

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

#### **1.11 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Consultant.
- .2 Provide Consultant with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Consultant may stop Work if non-compliance of health and safety regulations is not corrected.

#### **1.12 BLASTING**

- .1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by Consultant.

#### **1.13 POWDER ACTUATED DEVICES**

- .1 Use powder actuated devices only after receipt of written permission from Consultant.

#### **1.14 WORK STOPPAGE**

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

### **Part 2 Products**

#### **2.1 NOT USED**

- .1 Not used.

### **Part 3 Execution**

#### **3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

**Part 1 General**

**1.1 INSPECTION**

- .1 Allow Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Consultant will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.

**1.2 INDEPENDENT INSPECTION AGENCIES**

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

**1.3 PROCEDURES**

- .1 Notify appropriate agency and Consultant in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

**1.4 REJECTED WORK**

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

- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Consultant.

## **1.5 REPORTS**

- .1 Submit one copy of inspection and test reports to Consultant.
- .2 Provide copies to subcontractor of work being inspected or tested.

## **1.6 TESTS AND MIX DESIGNS**

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Consultant and may be authorized as recoverable.

## **1.7 MOCK-UPS**

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations acceptable to Consultant.
- .3 Prepare mock-ups for Consultant's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Mock-ups may remain as part of Work.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

## **Part 3 Execution**

### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1 General**

**1.1 PROJECT CLEANLINESS**

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Dispose of waste materials and debris off site.
- .5 Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .6 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

**1.2 FINAL CLEANING**

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site, unless approved by Consultant.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .8 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .9 Remove dirt and other disfiguration from exterior surfaces.
- .10 Sweep and wash clean paved areas.

**END OF SECTION**

**Part 1 General**

**1.1 SUMMARY**

- .1 Section includes descriptions for demolishing, salvaging, recycling and removing site work items identified for removal in whole or in part, and for backfilling trenches and excavations resulting from site demolition activities.

**1.2 MEASUREMENT AND PAYMENT**

- .1 Removal of existing asphalt pavement and concrete slab will be measured in square metres of surface actually removed regardless of depth removed or number of operations required.
- .2 Payment under this item will include operations involved in removing, hauling and stockpiling designated pavement and cleaning of remaining adjacent surface.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Shop Drawings: Submit drawings stamped and signed by professional engineer registered or licensed in Ontario, Canada as follows:
    - .1 Submit for review and approval, temporary shoring drawings for podium slab.

**1.4 QUALITY ASSURANCE**

- .1 Comply with hauling and disposal regulations of Authority Having Jurisdiction.

**Part 2 Products**

**2.1 EQUIPMENT**

- .1 Use excavating equipment capable of operating and removing part of pavement surface to depths or grades indicated, without damaging adjacent areas and structures.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of selective site demolition required.
- .2 Consultant does not guaranty that existing conditions are the same as those indicated in Project Record Documents.

- .3 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to Consultant.

### **3.2 PREPARATION**

- .1 Temporary Erosion and Sedimentation Control:
  - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction, sediment and erosion control drawings, sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
  - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
  - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- .2 Prior to beginning removal operation, inspect and verify with Consultant areas, depths and lines of asphalt pavement to be removed.
- .3 Protection: protect existing areas not designated for removal, light units, fencing and structures from damage. In event of damage, immediately replace or make repairs to approval of Consultant at no additional cost.

### **3.3 REMOVAL**

- .1 Remove existing asphalt pavement, structures and curbs to the extent as indicated on the drawings.
  - .1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Consultant.
- .2 Use equipment and methods of removal and hauling which do not damage or disturb concrete podium, foundations, curbs and building façade.
- .3 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
- .4 Suppress dust generated by removal process.

### **3.4 STOCKPILING**

- .1 Label stockpiles, indicating material type and quantity.
- .2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.
- .3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.

- .4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and, and which does not impede demolition or hauling procedures.

### **3.5 CLEANING**

- .1 Progress Cleaning:
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

**END OF SECTION**

**Part 1 General**

**1.1 MEASUREMENT AND PAYMENT**

- .1 Removal of existing asphalt pavement will be measured in square metres of surface actually removed regardless of depth removed or number of operations required.
- .2 Payment for asphalt pavement removal shall be included in the lump sum cost for the scope of paving work indicated on the drawings.
- .3 Payment under this item will include operations involved in removing, hauling and stockpiling designated pavement and cleaning of remaining pavement surface.

**Part 2 Products**

**2.1 EQUIPMENT**

- .1 Use excavating equipment capable of operating and removing part of pavement surface to depths or grades indicated, without damaging adjacent areas and structures.

**Part 3 Execution**

**3.1 PREPARATION**

- .1 Temporary Erosion and Sedimentation Control:
  - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction, sediment and erosion control drawings, sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
  - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
  - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- .2 Prior to beginning removal operation, inspect and verify with Consultant areas, depths and lines of asphalt pavement to be removed.
- .3 Protection: protect existing areas not designated for removal, light units, fencing and structures from damage. In event of damage, immediately replace or make repairs to approval of Consultant at no additional cost.

### **3.2 REMOVAL**

- .1 Remove existing asphalt pavement. Mark existing grades as required to ensure new assemblies match existing.
- .2 Use equipment and methods of removal and hauling which do not damage or disturb concrete pads, curbs and building façade.
- .3 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
- .4 Suppress dust generated by removal process.

### **3.3 FINISH TOLERANCES**

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

### **3.4 CLEANING**

- .1 Progress Cleaning:
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

**END OF SECTION**

**Part 1 General**

**1.1 SECTION INCLUDES**

- .1 Repair of shallow deteriorated concrete areas when cast-in-place concrete cannot be used.

**1.2 MEASUREMENT AND PAYMENT**

- .1 Measurement Procedures:
  - .1 Measure removal of concrete in square metres.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Product Data:
  - .1 Submit product descriptions, application procedures, and precautions in use or application of products.
  - .2 Qualification Statement: Installer qualifications, including previous projects.

**1.4 QUALITY REQUIREMENTS**

- .1 Applicator qualifications:
  - .1 Minimum 3 years experience in work of this Section.
  - .2 Successful completion of at least 3 projects of similar scope and complexity within the past 5 years.
- .2 Mockups:
  - .1 Provide one mock-up of:
    - .1 Concrete repair: 0.5 square metres.
  - .2 Locate where directed by the Consultant.

**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Protect materials from moisture absorption and damage; reject damaged containers.
- .2 Store sand to prevent inclusion of foreign matter.
- .3 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Consultant and at no cost to Consultant.

**1.6 PROJECT CONDITIONS**

- .1 Do not apply repair materials during inclement or freezing weather, or if such conditions are anticipated within material curing period.

## **Part 2 Products**

### **2.1 MANUFACTURERS**

.1 Acceptable manufacturers:

- .1 King Concrete
- .2 Sika
- .3 Or equivalent.

### **2.2 MATERIALS**

.1 Concrete topside repair products:

.1 One-component, high performance, cementitious concrete, containing Portland Cement, an acrylic-based re-dispersible polymer binder, 10 mm stone. To be used for repair thicknesses of 38 mm and more.

.1 Standard of acceptance:

- .1 LM-S10 concrete by King Concrete.
- .2 Or equivalent.

.2 Concrete patching and thin surface repair products:

.1 High performance, rapid setting, cementitious repair mortar containing hydraulic cements, well graded, natural fine aggregate. To be used for repair thicknesses of 6 mm to 38 mm.

.1 Standard of acceptance:

- .1 DURO-CRETE by King Concrete.
- .2 Or equivalent.

.3 Bonding agent: polyvinyl acetate emulsion.

.4 Cleaning agent: commercial muriatic acid.

.5 Polymer modified repair mortar: Polymer modified cementitious multi-component, fast setting, trowel grade patching mortar, made for use on horizontal and vertical surfaces. Bond strength greater than concrete, 28-day compressive strength greater than 30 MPa, vapour permeable, non-corrosive to steel.

## **Part 3 Execution**

### **3.1 PREPARATION**

.1 Clean surfaces to be repaired; remove loose and foreign matter which could interfere with application of concrete repair product(s), using wire brush.

.2 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Consultant.

- .3 Do not disturb items designated to remain in place.
- .4 Notify Consultant when removal work is complete so that exact locations of repairs can be marked. Following concrete repair work in accordance with Section 03 03 30 - Concrete Restoration, prepare concrete surface to level of cleanliness as specified by the waterproofing manufacturer.
- .5 Restore areas and existing works outside areas of demolition to conditions that existed prior to beginning of Work.

### **3.2 REPAIR OF DAMAGED CONCRETE**

- .1 Remove loose and deteriorated concrete back to a point at which sound material is reached. Undercut surfaces to form key with new material.
- .2 Remove concrete around and below exposed portions of wire mesh or reinforcing steel.
- .3 Sandblast or wire brush rusted or corroded wire mesh or reinforcing steel to expose sound, clean metal, in accordance with manufacturer's instructions.
- .4 Bend reinforcing bars projecting above level of adjacent surfaces down to at least 50 mm below adjacent surface.
- .5 Coat exposed reinforcing bars and concrete surface with bonding agent.
- .6 Fill voids with patching mix; finish flush with adjacent surfaces.

### **3.3 CLEANING**

- .1 Progress Cleaning:
  - .1 Leave Work area clean at end of each day.
  - .2 Remove debris, trim surfaces and leave work site clean, upon completion of Work
  - .3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

### **3.4 PROTECTION**

- .1 Repair damage to adjacent materials or property caused by demolition.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCES**

- .1 ASTM International
  - .1 ASTM A641 / A641M-09a(2014), Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.
- .3 CSA International
  - .1 CSA-A23.1/A23.2-2004, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
  - .3 CAN/CSA-G30.18-M92(R2002), Billet-Steel Bars for Concrete Reinforcement.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-installation Meetings: convene pre-installation meeting one week prior to beginning concrete works.
  - .1 Ensure key personnel, site supervisor, Consultant speciality contractor - finishing, forming concrete producer, testing laboratories attend.
  - .2 Verify project requirements.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 At least 4 weeks prior to beginning Work, submit to Consultant datasheets of the materials proposed for use.
- .2 Provide and pay for all testing / inspection results and reports required for review by Consultant and do not proceed without written approval when deviations from mix design or parameters are found.
- .3 Concrete hauling time: provide for review by Consultant deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.

**1.4 QUALITY ASSURANCE**

- .1 Provide to Consultant, 2 weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
  - .1 Quality Control Plan: provide written report to Consultant verifying compliance that concrete in place meets performance requirements.

**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Delivery and Acceptance Requirements:

- .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
  - .1 Do not modify maximum time limit without receipt of prior written agreement from Consultant and concrete producer as described in CSA A23.1/A23.2.
  - .2 Deviations to be submitted for review by the Consultant.
- .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

## **1.6 AMBIENT CONDITIONS**

- .1 Placing concrete during rain or weather events damaging to concrete is prohibited.
- .2 Protect newly placed concrete from rain or weather events in accordance with CSA A23.1/A23.2.
- .3 Cold weather protection:
  - .1 Maintain protection equipment, in readiness on Site.
  - .2 Use such equipment when ambient temperature below 5°C, or when temperature may fall below 5°C before concrete cured.
  - .3 Placing concrete upon or against surface at temperature below 5°C is prohibited.
- .4 Hot weather protection:
  - .1 Protect concrete from direct sunlight when ambient temperature above 27°C.
  - .2 Prevent forms of getting too hot before concrete placed. Apply accepted methods of cooling not to affect concrete adversely.
- .5 Protect from drying.

## **Part 2 Products**

### **2.1 DESIGN CRITERIA**

- .1 Alternative 1 - Performance: to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

### **2.2 PERFORMANCE CRITERIA**

- .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Consultant and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

### **2.3 MATERIALS**

- .1 Cement: to CSA A3001, Type GU.
- .2 Water: to CSA A23.1/A23.2.

- .3 Welded steel wire fabric:
  - .1 Plain, in accordance ASTM A 1064/A 1064M, fabricated from as drawn steel wire into flat sheets; sizes as indicated on Drawings.
  - .2 Finish:
    - .1 Galvanized: Fabricated from galvanized wire having Class A coating in accordance with ASTM A641.
- .4 Premoulded joint filler:
  - .1 Bituminous impregnated fibreboard: to ASTM D1751.
- .5 Joint sealer/filler: grey to CAN/CGSB-19.24, Type 1, Class B.
- .6 Other concrete materials: to CSA A23.1/A23.2.

## **2.4 MIXES**

- .1 Alternative 1 - Performance Method for specifying concrete: to meet Consultant performance criteria to CSA A23.1/A23.2.
  - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in PART 3 - VERIFICATION.
  - .2 Provide concrete mix to meet following hard state requirements:
    - .1 Durability and class of exposure: C-1.
    - .2 Compressive strength at 28 days: 35 MPa minimum.
    - .3 Intended application: foundation wall.
    - .4 Aggregate size 20 mm maximum.
    - .5 Air entrainment: 5-8%.
  - .3 Concrete supplier's certification.
  - .4 Provide quality management plan to ensure verification of concrete quality to specified performance.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Provide Consultant 5 day notice before each concrete pour.
- .2 Place concrete reinforcing as indicated on Drawings.
- .3 During concreting operations:
  - .1 Ensure concrete delivery and handling facilitates placing with minimum of rehandling, and without damage to existing structure or Work.
- .4 Protect previous Work from staining.
- .5 Clean and remove stains prior to application of concrete finishes.

### **3.2 INSTALLATION/APPLICATION**

- .1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.

### **3.3 FINISHES**

- .1 Formed surfaces exposed to view: sack rubbed finish in accordance with CSA A23.1/A23.2.
- .2 Equipment pads: provide smooth trowelled surface.
- .3 Pavements, walks, curbs and exposed site concrete:
  - .1 Screed to plane surfaces and use aluminum magnesium wood floats.
  - .2 Provide round edges and joint spacings using standard tools.
  - .3 Trowel smooth to provide lightly brushed non-slip finish.

### **3.4 CONTROL JOINTS**

- .1 Cut and Form control joints in slabs on grade at locations indicated, to CSA A23.1/A23.2 and install specified joint sealer/filler.

### **3.5 EXPANSION AND ISOLATION JOINTS**

- .1 Install premoulded joint filler in expansion and isolation joints full depth of slab flush with finished surface to CSA A23.1/A23.2.

### **3.6 CURING**

- .1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and to CSA A23.1/A23.2.

### **3.7 SITE TOLERANCES**

- .1 Concrete floor slab finishing tolerance to CSA A23.1/A23.2.

### **3.8 FIELD QUALITY CONTROL**

- .1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory designated and paid for by the Contractor. Material testing to be completed for the truck that delivers concrete to the site. Testing to include casting of concrete cylinders for compressive strength testing and on site review of air entrainment and slump.

### **3.9 CLEANING**

- .1 Use trigger operated spray nozzles for water hoses.
- .2 Designate cleaning area for tools to limit water use and runoff.
- .3 Waste Management:
  - .1 Use excess concrete for additional paving, post footing anchorage, swale rip-rap reinforcing, mud slab, flowable fill, footing bottom, retaining wall footing ballast, storm structure covers, underground utility pipe kickers, storm pipe flared end section, toe wash protection, shoulder and toe outfall restraints for temporary erosion pipes.
  - .2 Divert unused concrete materials from landfill to local quarry facility after receipt of written approval from Consultant.
  - .3 Provide appropriate area on job site where concrete trucks can be safely washed.

- .4 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCES**

- .1 ASTM International
  - .1 ASTM D4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for aggregate materials and include product characteristics, performance criteria, physical size, finish and limitations.

**1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Transportation and Handling: handle and transport aggregates to avoid segregation, contamination and degradation.
- .3 Storage: store washed materials or materials excavated from underwater 24 hours minimum to allow free water to drain and for materials to attain uniform water content.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
  - .1 Greatest dimension to exceed 5 times least dimension.
- .3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
  - .1 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
  - .2 Reclaimed asphalt pavement.
  - .3 Reclaimed concrete material.
- .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
  - .1 Crushed rock.

- .2 Gravel and crushed gravel composed of naturally formed particles of stone.
- .3 Light weight aggregate, including slag and expanded shale.
- .4 Reclaimed asphalt pavement.
- .5 Reclaimed concrete material.

## **2.2 SOURCE QUALITY CONTROL**

- .1 Inform Consultant of proposed source of aggregates and provide access for sampling 4 weeks minimum before starting production.
- .2 If materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate alternative source.
- .3 Advise Consultant 4 weeks minimum in advance of proposed change of material source.
- .4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions are acceptable for topsoil stripping.
  - .1 Visually inspect substrate in presence of Consultant.
  - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
  - .3 Proceed with topsoil stripping. only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

### **3.2 PREPARATION**

- .1 Processing:
  - .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
  - .2 Blend aggregates, as required, including reclaimed materials that meet physical requirements of specification is permitted in order to satisfy gradation requirements for material and, percentage of crushed particles, or particle shapes specified.
    - .1 Use methods and equipment approved in writing by Consultant.
- .2 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate gradation.
- .3 Where necessary, screen, crush, wash, classify and process aggregates with suitable equipment to meet requirements.

- .1 Use only equipment approved in writing by Consultant.
- .4 Stockpiling:
  - .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Consultant. Do not stockpile on completed pavement surfaces.
  - .2 Stockpile aggregates in sufficient quantities to meet project schedules.
  - .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
  - .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.
  - .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
  - .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Consultant within 48 hours of rejection.
  - .7 Stockpile materials in uniform layers of thickness as follows:
    - .1 Maximum 1.5 m for coarse aggregate and base course materials.
    - .2 Maximum 1.5 m for fine aggregate and sub-base materials.
    - .3 Maximum 1.5 m for other materials.
  - .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
  - .9 Do not cone piles or spill material over edges of piles.
  - .10 Do not use conveying stackers.
  - .11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

### **3.3 CLEANING**

- .1 Progress Cleaning:
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .4 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.
- .5 Restrict public access to temporary or permanently abandoned stockpiles by means acceptable to Consultant.

**END OF SECTION**

**Part 1 General**

**1.1 MEASUREMENT PROCEDURES**

- .1 Excavated materials will be measured in cubic metres in their original location.
  - .1 Common excavation quantities measured will be actual volume removed within following limits:
    - .1 Width for trench excavation as indicated.
    - .2 Width for excavation for structures as indicated.
    - .3 Depth from ground elevation and surface of pavement immediately prior to excavation, to elevation as indicated by Consultant.
  - .2 Sheet piling and bracing left in place on direction of Consultant will be measured in square metres of surface area of plane surface of sheet piling.
  - .3 Shoring, bracing, cofferdams, underpinning and de-watering of excavation will not be measured separately for payment.
  - .4 Backfilling to authorized excavation limits will be measured in cubic metres compacted in place for each type of material specified.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 ASTM D422-63-2002, Standard Test Method for Particle-Size Analysis of Soils.
  - .4 ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>2</sup>) (600 kN-m/m<sup>2</sup>).
  - .5 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
    - .1 CSA-A3001-03, Cementitious Materials for Use in Concrete.
  - .2 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

### **1.3 SUBMITTALS**

- .1 Quality Control:
  - .1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.
  - .2 Submit for review by Consultant proposed dewatering methods as described in PART 3 of this Section.
  - .3 Submit to Consultant written notice at least 7 days prior to excavation work, to ensure cross sections are taken.
  - .4 Submit to Consultant written notice when bottom of excavation is reached.
  - .5 Submit to Consultant inspection results and report as described in PART 3 of this Section.
- .2 Preconstruction Submittals:
  - .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
  - .2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field.

### **1.4 QUALITY ASSURANCE**

- .1 Qualification Statement: submit proof of insurance coverage for professional liability.
- .2 Keep design and supporting data on site.
- .3 Engage services of qualified professional Engineer who is registered or licensed in Province of Ontario, Canada in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work.

### **1.5 EXISTING CONDITIONS**

- .1 Buried services:
  - .1 Before commencing work verify and establish location of buried services on and adjacent to site.
  - .2 Prior to beginning excavation Work, establish location and state of use of buried utilities and structures, with authorities having jurisdiction, to clearly mark such locations to prevent disturbance during Work.
  - .3 Confirm locations of buried utilities by careful test excavations or soil hydrovac methods.
  - .4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
  - .5 Where utility lines or structures exist in area of excavation, obtain direction of Consultant before removing or re-routing.
  - .6 Record location of maintained, re-routed and abandoned underground lines.
  - .7 Confirm locations of recent excavations adjacent to area of excavation.

- .2 Existing buildings and surface features:
  - .1 Conduct, with Consultant, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.
  - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Consultant.

## Part 2 Products

### 2.1 MATERIALS

- .1 Type 1 and Type 2 fill: properties to Section 31 05 16 – Aggregates for Earthwork and the following requirements:
  - .1 Crushed, pit run or screened stone, gravel or sand.
  - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.
  - .3 Table:

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

## Part 3 Execution

### 3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.

- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### **3.2 SITE PREPARATION**

- .1 Remove obstructions from surfaces to be excavated within limits indicated.
- .2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

### **3.3 PREPARATION/PROTECTION**

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

### **3.4 STOCKPILING**

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

### **3.5 COFFERDAMS, SHORING, BRACING**

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with the Health and Safety Act for the Province of Ontario.
  - .1 Where conditions are unstable, Consultant to verify and advise methods.
- .2 Construct temporary Works to depths, heights and locations as indicated.
- .3 During backfill operation:
  - .1 Unless otherwise indicated or directed by Consultant, remove sheeting and shoring from excavations.
  - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.

- .3 Pull sheeting in increments.
- .4 When sheeting is required to remain in place, cut off tops at elevations as indicated.
- .5 Upon completion of substructure construction:
  - .1 Remove cofferdams, shoring and bracing.
  - .2 Remove excess materials from site and restore watercourses as directed by Consultant.

### **3.6 DEWATERING AND HEAVE PREVENTION**

- .1 Keep excavations free of water while Work is in progress.
- .2 Provide for Consultant's review details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.
- .3 Protect open excavations against flooding and damage due to surface run-off.
- .4 Dispose of water to approved runoff areas and in a manner not detrimental to public and private property, or portion of work completed or under construction.
  - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.
- .5 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

### **3.7 EXCAVATION**

- .1 Advise Consultant at least 7 days in advance of excavation operations for initial cross sections to be taken.
- .2 Excavate to lines, grades, elevations and dimensions as indicated.
- .3 Remove paving, concrete slab, granular and other obstructions encountered during excavation as required to expose the podium slab below.
- .4 Excavation must not interfere with bearing capacity of adjacent foundations.
- .5 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Consultant.
- .6 Restrict vehicle operations directly adjacent to open trenches.
- .7 Dispose of surplus and unsuitable excavated material off site.
- .8 Do not obstruct flow of surface drainage or natural watercourses.
- .9 Earth bottoms of excavations adjacent to the podium to be undisturbed soil, level, free from loose, soft or organic matter.

- .10 Notify Consultant when bottom of excavation is reached.
- .11 Obtain Consultant approval of completed excavation.
- .12 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Consultant.
- .13 Hand trim, make firm and remove loose material and debris from excavations.
  - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
  - .2 Clean out rock seams and fill with concrete mortar or grout to approval of Consultant.
- .14 Install geotextiles to separate aggregate.

### **3.8 FILL TYPES AND COMPACTION**

- .1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698 and ASTM D1557.
  - .1 Exterior side of perimeter walls: use Type 1 fill to subgrade level. Compact to 98 % of corrected maximum dry density.
  - .2 Within building area: use Type 1 to underside of base course for floor slabs. Compact to 98 % of corrected maximum dry density.
  - .3 Under concrete slabs: provide 300 mm compacted thickness base course of Type 1 fill to underside of slab. Compact base course to 98 %.

### **3.9 BACKFILLING**

- .1 Vibratory compaction equipment: hand-held pneumatic tamper
- .2 Do not proceed with backfilling operations until completion of following:
  - .1 Consultant has inspected and approved installations.
  - .2 Consultant has inspected and approved of construction below finish grade.
  - .3 Inspection, testing, approval, and recording location of underground utilities.
  - .4 Removal of concrete formwork.
  - .5 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.
- .3 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .4 Do not use backfill material which is frozen or contains ice, snow or debris.
- .5 Place backfill material in uniform layers not exceeding 300 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

- .6 Compaction testing to be completed on the backfill placed around the perimeter of the building, as well as the building parking lot. Testing frequency to be completed every 300 mm (12") lift and compared to the specified compaction percentage specified in the Specifications.
- .7 Backfilling around installations:
  - .1 Place bedding and surround material as specified elsewhere.
  - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
  - .3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 0.5 m.
  - .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
    - .1 Permit concrete to cure for minimum 7 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Consultant, or:
    - .2 If approved by Consultant, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Consultant.
- .8 Consolidate and level unshrinkable fill with internal vibrators.
- .9 Install drainage and filter system in backfill as indicated.

### **3.10 RESTORATION**

- .1 Reinstall pavements disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .2 Clean and reinstall areas affected by Work as directed by Consultant.
- .3 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.
- .4 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 31 05 16 – Aggregates for Earthwork.

**1.2 REFERENCES**

- .1 ASTM International
  - .1 ASTM C117-04, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - .3 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .4 ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft ; ) (600kN-m/m ; ).
  - .5 ASTM D1557-09, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft ; ) (2,700kN-m/m ; ).
  - .6 ASTM D1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
  - .7 ASTM D4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
  - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

**1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
  - .1 Stockpile minimum 50 % of total aggregate required prior to beginning operation.
  - .2 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .3 Replace defective or damaged materials with new.
  - .4 Store cement in weathertight bins or silos that provide protection from dampness and easy access for inspection and identification of each shipment.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Granular base: material in accordance with Section 31 05 16 - Aggregates for Earthwork and following requirements:
  - .1 Granular materials to be as follows:

Fill Type	Gradation	Material
Sub-base	Granular 'B', Type II	Quarried Bedrock; or
		50 mm Crushed Limestone
Base Course	Granular 'A'	Quarried Bedrock; or
		20 mm Crushed Limestone; or
		Reclaimed Concrete Material; or Reclaimed Asphalt Pavement, up to 30% by mass

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Temporary Erosion and Sedimentation Control:
  - .1 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
  - .2 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### **3.2 PLACEMENT AND INSTALLATION**

- .1 Place granular base after sub-base, subgrade surface is inspected and approved in writing by Consultant.
- .2 Placing:
  - .1 Construct granular base to depth and grade in areas indicated.
  - .2 Ensure no frozen material is placed.
  - .3 Place material only on clean unfrozen surface, free from snow and ice.
  - .4 Begin spreading base material on crown line or on high side of one-way slope.
  - .5 Place material using methods which do not lead to segregation or degradation of aggregate.
  - .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
  - .7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
    - .1 Consultant may authorize thicker lifts (layers) if specified compaction can be achieved.

- .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .9 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 **Compaction Equipment:**
  - .1 Ensure compaction equipment is capable of obtaining required material densities.
  - .2 Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from Consultant before use.
  - .3 Equipped with device that records hours of actual work, not motor running hours.
- .4 **Compacting:**
  - .1 Compact to density not less than 100 % corrected maximum dry density, maximum dry density to ASTM D698 and ASTM D1557.
  - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
  - .3 Apply water as necessary during compacting to obtain specified density.
  - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved in writing by Consultant.
  - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- .5 **Proof rolling:**
  - .1 For proof rolling use standard roller of 45400 kg gross mass with four pneumatic tires each carrying 11350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm.
  - .2 Obtain written approval from Consultant to use non-standard proof rolling equipment.
  - .3 Proof roll at level in granular base as indicated.
    - .1 If use of non standard proof rolling equipment is approved, Consultant to determine level of proof rolling.
  - .4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
  - .5 Where proof rolling reveals defective base or sub-base, remove defective materials to depth and extent as directed by Consultant and replace with new materials.

### **3.3 SITE TOLERANCES**

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

### **3.4 CLEANING**

- .1 **Progress Cleaning:**

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning:
  - .1 Upon completion remove surplus materials, rubbish, tools and equipment.

### **3.5 PROTECTION**

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

**END OF SECTION**

**Part 1 General**

**1.1 MEASUREMENT AND PAYMENT**

- .1 Asphalt concrete pavement including granular base and sub-base will be measured in square metres of asphalt surface in place.

**1.2 REFERENCES**

- .1 ASTM International
  - .1 ASTM D698-07e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>2</sup>) (600 kN-m/m<sup>2</sup>).
  - .2 ASTM D995-95b(2002), Standard Specification for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
  - .3 ASTM D1557-09, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>2</sup>) (2,700 kN-m/m<sup>2</sup>).
  - .4 ASTM D1559-89, Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.
- .2 Asphalt Institute (AI)
  - .1 AI MS-2, Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-8.2-M88, Sieves Testing, Woven Wire, Metric.
- .4 Ontario Provincial Standard Specification (OPSS)
  - .1 OPSS 1150, Material Specification for Hot Mix Asphalt.
  - .2 OPSS 1001, Aggregates – General.
  - .3 OPSS 1003, Aggregates – Hot Mix Asphalt.
  - .4 OPSS 1101, Performance Graded Asphalt Cement.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for asphalt paving mix, aggregate, and coatings and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Samples:
  - .1 Submit asphalt concrete mix design for review.
- .3 Test and Evaluation Reports:

- .1 Materials to be tested by accredited testing laboratory and paid for by the Contractor. Material testing to be completed once for the base layer and once for the top layer. Tests to evaluate for gradation of the aggregates.
- .2 Submit test certificates showing suitability of materials at least 4 weeks prior to commencing work.

#### 1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations.
  - .2 Store and protect aggregate from damage.
  - .3 Replace defective or damaged materials with new.

### Part 2 Products

#### 2.1 MATERIALS

- .1 Granular base and sub-base material: to Section 31 05 16 - Aggregates for Earthwork and Section 32 11 23 - Aggregate Base Courses.
- .2 Asphalt materials shall conform to the requirements of OPSS 1101 and OPSS 1150.
- .3 Asphalt materials to be as follows:

Hot Mix Type	Abbr.	Thickness	Summary of Hot Mix Use and Properties
Hot Laid 3	HL 3	40 mm	A dense-graded surface course mix for intermediate volume roads with a maximum aggregate size of 16 mm.
Hot Laid 8	HL 8	50 mm	A coarse-graded binder course mix. The maximum aggregate size is 26.5 mm.

- .4 Aggregate Gradation Requirements - Mix Design Criteria

Mix Types	Percentage Passing by Dry Mass of Aggregates											
	Sieves											
	mm								µm			
	26.5	19.0	16.0	13.2	9.5	4.75	2.36	1.18	600	300	150	75
HL 3			100	98-100	75-90	50-60	36-60	25-58	16-45	7-26	3-10	0-5
HL 8	100	94-100	77-95	65-90	48-78	30-50	21-50	12-49	6-38	3-22	1-9	0-6

#### 2.2 EQUIPMENT

- .1 Pavers: mechanical grade, controlled self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.

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

## 2.3 MIX DESIGN

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

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

- .3 Measure physical requirements as follows:
  - .1 Marshall load and flow value: to ASTM D1559.
  - .2 Compute void properties on basis of bulk specific gravity of aggregate to ASTM C127 and ASTM C128. Make allowance for volume of asphalt absorbed into pores of aggregate.
  - .3 Air voids: to ASTM D3203.
  - .4 Voids in mineral aggregate: to AI MS-2, chapter 4.
- .4 Do not change job-mix without prior approval Consultant. When change in material source proposed, new job-mix formula will be provided by Consultant.
- .5 Return plant dust collected during processing to mix in quantities acceptable to Consultant.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Asphalt work including removal of existing asphalt, placement of asphalt and, set up of the required temporary travel paths to be completed during weekends only.
- .2 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt paving installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Consultant.
  - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

**3.2 SUBGRADE PREPARATION AND INSPECTION**

- .1 Temporary Erosion and Sedimentation Control:
  - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
  - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
  - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- .2 Verify grades of subgrade drains and other items set in paving area for conformity with elevations and sections before placing granular base and sub-base material.
- .3 Obtain written approval of subgrade by Consultant before placing granular sub-base and base.

**3.3 GRANULAR SUB-BASE AND GRANULAR BASE**

- .1 Place granular base and sub-base material on clean unfrozen surface, free from snow and ice.
- .2 Place granular base and sub-base to compacted thicknesses as indicated. Do not place frozen material.
- .3 Place in layers not exceeding 150 mm compacted thickness. Compact to density not less than 98 % maximum dry density in accordance with ASTM D698.
- .4 Finished base surface to be within 10 mm of specified grade, but not uniformly high or low.

### **3.4 ASPHALT PRIME**

- .1 Cutback asphalt:
  - .1 Heat asphalt prime for pumping and spraying.
  - .2 Apply cutback asphalt prime to granular base, at rate directed by Consultant, but do not exceed 2.2 L/m<sup>2</sup>.
  - .3 Apply on dry surface, unless otherwise directed by Consultant.
- .2 Emulsified asphalt:
  - .1 Dilute asphalt emulsion with clean water at 1:1 ratio for application. Mix thoroughly by pumping or other method approved in writing by Consultant.
  - .2 Apply diluted asphalt emulsion at rate directed by Consultant but do not exceed 5 L/m<sup>2</sup>.
  - .3 Apply on damp surface unless directed by Consultant.
- .3 Do not apply primer when air temperature is below 5°C or when rain is forecast within 2 hours.
- .4 If asphalt prime fails to set within 24 hours, spread sand blotter material in amounts required to absorb excess material. Sweep and remove excess blotter material.

### **3.5 PLANT AND MIXING REQUIREMENTS**

- .1 In accordance with ASTM D995.

### **3.6 ASPHALT CONCRETE PAVING**

- .1 Obtain written approval of tack coat, base and primer from Consultant before placing asphalt mix.
- .2 Place asphalt mix only when base or previous course is dry and air temperature is above 5°C.
- .3 Place asphalt concrete in compacted layers not exceeding 50 mm.
- .4 Minimum 135°C mix temperature required when spreading.
- .5 Maximum 160°C mix temperature permitted at any time.
- .6 Compact each course with roller as soon as it can support roller weight without undue cracking or displacement.
- .7 Compact parking lot asphalt concrete to density not less than 95 % of density obtained with Marshall specimens prepared in accordance with ASTM D1559 from samples of mix being used. Roll until roller marks are eliminated.
- .8 Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.

- .9 Moisten roller wheels with water to prevent pick up of material.
- .10 Compact mix with hot tampers or other equipment approved by Consultant, in areas inaccessible to roller.
- .11 Finish surface to be within 10 mm of design elevation and with no irregularities greater than 10 mm in 4.5 m.
- .12 Repair areas showing checking, rippling or segregation as directed by Consultant.

### **3.7 JOINTS**

- .1 Remove surplus material from surface of previously laid strip. Do not deposit on surface of freshly laid strip.
- .2 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.
- .3 For cold joints, cut back to full depth vertical face and tack face with hot asphalt.
- .4 For longitudinal joints, overlap previously laid strip with spreader by 25 to 50 mm.

### **3.8 TESTING**

- .1 Inspection and testing of asphalt pavement will be carried out by designated testing laboratory.
- .2 Costs of tests will be paid by Contractor.

### **3.9 CLEANING**

- .1 Progress Cleaning:
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning:
  - .1 Upon completion remove surplus materials, rubbish, tools and equipment.

### **3.10 PROTECTION**

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

**END OF SECTION**

**Part 1 General**

**1.1 MEASUREMENT FOR PAYMENT**

- .1 Pavement marking: measured by lump sum.
- .2 Pavement marking including reflective glass beads: measured by lump sum.
- .3 Supply of paint: measured in litres.
- .4 Supply of reflective glass beads: measured in kilograms.
- .5 Symbols and letters: measured in units.

**1.2 REFERENCES**

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.5-99, Low Flash Petroleum Spirits Thinner.
  - .2 CAN/CGSB 1.74-01, Alkyde Traffic Paint.
- .2 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1 Safety Data Sheets (SDS).
- .3 The Master Painters Institute (MPI)
  - .1 Architectural Painting Specification Manual - current edition.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature and data sheets for pavement markings and include product characteristics, performance criteria, physical size, finish and limitations.

**1.4 DELIVERY, STORAGE AND HANDLING**

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

**1.5 QUALITY ASSURANCE**

- .1 Installer qualifications: company or person in application of pavement markings with at least 5 years of experience.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Paint:
  - .1 To MPI -EXT 2.1B, Alkyd zone/traffic marking.
  - .2 Paints: in accordance with MPI recommendation for surface conditions.
  - .3 Colour: to MPI listed, yellow.
- .2 Thinner: to MPI listed manufacturer.
- .3 Glass reflective beads: type suitable for application to wet paint surface for light reflectance.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive pavement markings previously installed under other Sections or Contracts are acceptable for product installation in accordance with MPI instructions prior to pavement markings installation.
  - .1 Visually inspect substrate in presence of Consultant.
- .2 Pavement surface: dry, free from water, frost, ice, dust, oil, grease and other deleterious materials.
- .3 Proceed with Work only after unacceptable conditions have been rectified.

### **3.2 EQUIPMENT REQUIREMENTS**

- .1 Paint applicator: approved pressure type mobile with positive shut-off distributor capable of applying paint in single, double and dashed lines and capable of applying marking components uniformly, at rates specified, and to dimensions as indicated.
- .2 Distributor: capable of applying reflective glass beads as overlay on freshly applied paint.

### **3.3 APPLICATION**

- .1 Pavement markings: Lay out pavement markings as indicated in drawings. Width of line markings to be 100 mm.
- .2 Unless otherwise approved by Consultant, apply paint only when air temperature is above 10°C, wind speed is less than 60 km/h and no rain is forecast within next 4 hours.
- .3 Apply traffic paint evenly at rate of 3 m<sup>2</sup>/L.

- .4 Do not thin paint unless approved by Consultant.
- .5 Symbols and letters to match existing dimensions.
- .6 Paint lines: of uniform colour and density with sharp edges.
- .7 Thoroughly clean distributor tank before refilling with paint of different colour.
- .8 Apply glass beads at rate of 0.5 kg/l of painted area immediately after application of paint.

### **3.4 TOLERANCE**

- .1 Paint markings: within plus or minus 12 mm of dimensions indicated.

### **3.5 CLEANING**

- .1 Progress Cleaning:
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

### **3.6 PROTECTION OF COMPLETED WORK**

- .1 Protect pavement markings until dry.
- .2 Repair damage to adjacent materials caused by pavement marking application.

**END OF SECTION**

**Part 1 General**

**1.1 MEASUREMENT PROCEDURES**

- .1 Preparation of sub-grade for placing of topsoil will not be measured for payment.
- .2 Measure supplying, placing and spreading topsoil in cubic metres determined by truck box measurement as loaded.
  - .1 Truck box capacity determined by Consultant.

**1.2 REFERENCES**

- .1 Agriculture and Agri-Food Canada
  - .1 The Canadian System of Soil Classification, Third Edition, 1998.
- .2 Canadian Council of Ministers of the Environment
  - .1 PN1340-2005, Guidelines for Compost Quality.

**1.3 DEFINITIONS**

- .1 Compost:
  - .1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.
  - .2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.
  - .3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below (25) (50)), and contain no toxic or growth inhibiting contaminates.
  - .4 Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A) (B).

**1.4 QUALITY ASSURANCE**

- .1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

**Part 2 Products**

**2.1 TOPSOIL**

- .1 Topsoil for seeded areas: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
  - .1 Soil texture based on The Canadian System of Soil Classification, to be imported, manufactured or site spread. Friable loam either heavy clay or very light sand nature, containing minimum 4% organic material for clay loams and, and 2% for sandy loams, to a maximum of 20% by volume.
  - .2 Contain no toxic elements or growth inhibiting materials.
  - .3 Finished surface free from:

- .1 Debris and stones over 50 mm diameter.
- .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
- .4 Consistence: friable when moist.

## **2.2 SOIL AMENDMENTS**

- .1 Fertilizer:
  - .1 Fertility: major soil nutrients present in following amounts:
  - .2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
  - .3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
  - .4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
  - .5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
  - .6 Ph value: 6.5 to 8.0.
- .2 Peatmoss:
  - .1 Derived from partially decomposed species of Sphagnum Mosses.
  - .2 Elastic and homogeneous, brown in colour.
  - .3 Free of wood and deleterious material which could prohibit growth.
  - .4 Shredded particle minimum size: 5 mm.
- .3 Sand: washed coarse silica sand, medium to course textured.
- .4 Organic matter: compost Category A, in accordance with CCME PN1340, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.
- .5 Limestone:
  - .1 Ground agricultural limestone.
  - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
- .6 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

## **2.3 SOURCE QUALITY CONTROL**

- .1 Advise Consultant of sources of topsoil to be utilized with sufficient lead time for testing.
- .2 Contractor is responsible for amendments to supply topsoil as specified.
- .3 Soil testing by recognized testing facility for PH, P and K, and organic matter.
- .4 Testing of topsoil will be carried out by testing laboratory designated by the Province of Ontario.

- .1 Soil sampling, testing and analysis to be in accordance with Provincial standards.

### **Part 3 Execution**

#### **3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

#### **3.2 BACKFILLING**

- .1 Backfill as per section 31 23 33.01 and:
  - .1 Compact backfill at moisture content not exceeding optimum value in accordance with ASTM D698.

#### **3.3 FINISH TOLERANCES**

- .1 Levelling pad: top surface within plus or minus 3 mm of indicated elevations.

#### **3.4 PREPARATION OF EXISTING GRADE**

- .1 Verify that grades are correct.
  - .1 If discrepancies occur, notify Consultant and do not commence work until instructed by Consultant.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
  - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
  - .2 Remove debris which protrudes more than 75 mm above surface.
  - .3 Dispose of removed material off site.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.
  - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

#### **3.5 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL**

- .1 Place topsoil after Consultant has accepted subgrade.

- .2 Spread topsoil in uniform layers not exceeding 150 mm.
- .3 Spread topsoil as indicated to following minimum depths after settlement.
  - .1 150 mm for seeded areas.
- .4 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

### **3.6 FINISH GRADING**

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage.
- .2 Fine grade entire topsoil area to contours and elevations shown on drawings.
- .3 Achieve a positive slope of 2% away from the building over a 3.6m distance.
- .4 Prepare loose friable bed by leaving surfaces smooth, uniform and firm against deep footprinting.

### **3.7 ACCEPTANCE**

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

### **3.8 SURPLUS MATERIAL**

- .1 Dispose of materials except topsoil not required off site.

### **3.9 CLEANING**

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

**END OF SECTION**

**Part 1 General**

**1.1 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Landscape Contractor: to be a Member in Good Standing of Horticultural Trades Association.
  - .2 Landscape Planting Supervisor: Landscape Industry Certified Technician with Softscape Installation designation.
  - .3 Landscape Maintenance Supervisor: Landscape Industry Certified Technician with Turf Maintenance designation.

**1.2 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
  - .1 Labelled bags of fertilizer identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number.
  - .2 Inoculant containers to be tagged with expiry date.
- .3 Storage and Handling Requirements:
  - .1 Store fertilizer off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.
  - .1 Grass mixture: "Certified", "Canada No. 1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
- .2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:
  - .1 Type I mulch:
    - .1 Made from wood cellulose fibre.
    - .2 Organic matter content: 95% plus or minus 0.5%.
    - .3 Value of pH: 6.0.
    - .4 Potential water absorption: 900%.
  - .2 Type II mulch:

- .1 Made from newsprint processed to produce fibre lengths of 15 mm minimum and 25 mm maximum. Greater proportions of ingredients to be straw.
- .3 Tackifier: water dilutable, liquid dispersion.
- .4 Water: free of impurities that would inhibit germination and growth.
- .5 Fertilizer:
  - .1 To Canada "Fertilizers Act" and Regulations.
  - .2 Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.
- .6 Inoculants: inoculant containers to be tagged with expiry date.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

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

#### **3.2 INSTALLERS**

- .1 Use installers members in Good Standing of Horticultural Trades Association.

#### **3.3 PROTECTION OF EXISTING CONDITIONS**

- .1 Protect structures, signs, guide rails, fences, plant material, utilities and other surfaces not intended for spray.
- .2 Immediately remove any material sprayed where not intended as directed by Consultant.

#### **3.4 PREPARATION OF SURFACES**

- .1 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water.
- .2 Fine grade areas to be seeded free of humps and hollows.
  - .1 Ensure areas are free of deleterious and refuse materials.
- .3 Cultivated areas identified as requiring cultivation to depth of 25 mm.

- .4 Ensure areas to be seeded are moist to depth of 150 mm before seeding.
- .5 Obtain Consultant's approval of grade and topsoil depth before starting to seed.

### **3.5 FERTILIZING PROGRAM**

- .1 Fertilize prior to fine grading applying fertilizer equally distributed in accordance with the manufacturer's instructions.
- .2 Fertilize during establishment and warranty periods applying fertilizer equally distributed in accordance with the manufacturer's instructions.

### **3.6 PREPARATION OF SLURRY**

- .1 Measure quantities of materials by weight or weight-calibrated volume measurement satisfactory to Consultant. Supply equipment required for this work.
- .2 Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.
- .3 After materials are in seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.

### **3.7 SLURRY APPLICATION**

- .1 Ensure seed is placed under supervision of certified Landscape Planting Supervisor.
- .2 Hydraulic seeding equipment:
  - .1 Slurry tank.
  - .2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.
  - .3 Capable of seeding by 50 m hand operated hoses and appropriate nozzles.
  - .4 Tank volume to be certified by certifying authority and identified by authorities "Volume Certification Plate".
- .3 Slurry mixture applied per square metre.
  - .1 Seed: grass mixture.
  - .2 Mulch: Type II kg.
  - .3 Water: Minimum 30,000 L.
- .4 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
  - .1 Using correct nozzle for application.
  - .2 Using hoses for surfaces difficult to reach and to control application.

- .5 Blend application 300 mm into adjacent grass areas or sodded areas and previous applications to form uniform surfaces.
- .6 Re-apply where application is not uniform.
- .7 Remove slurry from items and areas not designated to be sprayed.

### **3.8 CLEANING**

- .1 Progress Cleaning:
  - .1 Leave Work area clean at end of each day.
  - .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
  - .1 Clean and reinstate areas affected by Work.

### **3.9 PROTECTION**

- .1 Protect seeded areas from trespass until plants are established.
- .2 Remove protection devices as directed by Consultant and/or Owner.

### **3.10 MAINTENANCE DURING ESTABLISHMENT PERIOD**

- .1 Ensure maintenance is carried out under supervision of certified Landscape Maintenance Supervisor.
- .2 Perform following operations from time of seed application until acceptance by Owner.
- .3 Grass Mixture:
  - .1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
  - .2 Mow grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass.
  - .3 Fertilize seeded areas after first cutting in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles.
  - .4 Control weeds by mechanical or chemical means utilizing acceptable integrated pest management practices.
  - .5 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.

**END OF SECTION**