

**APRON IV JOINT SEALING REPLACEMENT - 2024**  
**VICTORIA AIRPORT AUTHORITY**  
**ISSUED FOR TENDER**  
**SPECIFICATIONS**



**VAA Project Number 6784**



creating & delivering | **BETTER SOLUTIONS**

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## **PART 1 - GENERAL**

### **1. RELATED SECTIONS**

- .1 Section 01 56 00 – Temporary Barriers and Enclosures.
- .2 Section 01 35 13.13 – Special Project Procedures for Airport Facilities.

### **2. WORK COVERED BY CONTRACT DOCUMENTS**

Construction Work of this Contract comprises of

General Work to be undertaken includes but is not limited to the following:

- .1 Apply for permits; site preparation; install, maintain and remove low-profile barricades; quality control; survey; etc.
- .2 Prepare and submit project schedule, shop drawings, submittals, etc.
- .3 Maintain a clean work area, free of Foreign Object Debris (FOD)
- .4 Operate and complete the work in accordance with the Plan of Construction Operations (PCO).

Work for Work Area A includes but is not limited to the following:

- .1 Sawcut Stand 6 perimeter HMAC (full depth) and relief cut as shown on the drawings.
- .2 100mm depth (minimum) removal of asphalt and concrete overtop of existing overlaid Stand 6 concrete panels.
- .3 Supply and install concrete overlay.
- .4 Sawcut and supply and install joint sealant for new concrete overlay.
- .5 Repaint the existing Stand 6 paint markings.
- .6 Maintain a clear pedestrian walkway from Stand 7 to the Lower Hold Room West Walkway.

Work for Work Area B includes but is not limited to the following:

- .1 Selective spall repairs along existing concrete panel edges. (PROVISIONAL)
- .2 Selective concrete panel crack repairs. (PROVISIONAL)
- .3 Selective concrete panel crack rout and seal with hot pour joint sealant. (PROVISIONAL)

- .4 Removal of existing joint sealant between the concrete/concrete and concrete/asphalt joints. Joints should be cleaned so there is no debris or remnants of the old joint sealant.
- .5 Widening of existing joints measuring 17-21mm up to a consistent 21mm width. Existing joints wider than 21mm should remain the same existing width.
- .6 Install of backer rod and joint sealant as shown on the drawings.
- .7 Provide, install and maintain traffic cones or other effective means to delineate a temporary access corridor for baggage carts during the work shift. Temporary access corridor delineators are to be removed at the end of each shift.
- .8 Work to be coordinated to ensure Work Area C is available to aircraft during regular scheduled times.

Work for Work Area C includes but is not limited to the following:

- .1 Removal of existing joint sealant between the concrete/concrete joints. Joints should be cleaned so there is no debris or remnants of the old joint sealant.
- .2 Widening of existing joints measuring 17-21mm up to a consistent 21mm width. Existing joints wider than 21mm should remain the same existing width.
- .3 Install of backer rod and joint sealant as shown on the drawings.
- .4 Repaint the existing paint markings removed or damaged by joint sealant replacement.
- .5 Provide, install and maintain traffic cones or other effective means to delineate a temporary access corridor for baggage carts during the work shift. Temporary access corridor delineators are to be removed at the end of each shift.
- .6 Work to be coordinated to ensure Work Area B is available to aircraft during regular scheduled times.

Work for Work Area D includes but is not limited to the following:

- .7 Removal of existing joint sealant between the concrete/concrete joints. Joints should be cleaned so there is no debris or remnants of the old joint sealant.
- .8 Widening of existing joints measuring 17-21mm up to a consistent 21mm width. Existing joints wider than 21mm should remain the same existing width.

- .9 Install of backer rod and joint sealant as shown on the drawings.

Work for Work Area E is provisional and includes but is not limited to the following:

- .1 Removal of existing joint sealant between the asphalt/asphalt joints. Joints should be cleaned so there is no debris or remnants of the old joint sealant.
- .2 Widening of existing joints measuring less than 15mm up to a consistent 15mm width. Existing joints wider than 15mm should remain the same existing width.
- .3 Install of joint sealant as shown on the drawings.

### **3. CONTRACT METHOD**

- .1 Construct Work under a unit price contract.

### **4. WORK BY OTHERS**

- .1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from the Consultant.
- .2 Co-ordinate work with that of other Contractors as applicable. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor or Contract, report promptly to the Consultant, in writing, any defects which may interfere with proper execution of Work.

### **5. WORK SEQUENCE**

- .1 Maintain fire access/control.
- .2 Construct Work in stages as detailed in the PCO document and on the PCO drawings to provide for continuous airport usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.

### **6. CONTRACTOR USE OF PREMISES**

- .1 Co-ordinate use of premises as outlined in the Plan of Construction Operation.
- .2 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .3 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

- .4 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Consultant.
- .5 At completion of operations the condition of the existing facilities are to be restored to a condition equal to or better than that which existed before new work started.

## **7. OWNER OCCUPANCY**

- .1 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

## **8. OWNER FURNISHED ITEMS**

- .1 Owner Responsibilities:
  - .1 Arrange for delivery of shop drawings, product data, samples, manufacturer's instructions, and certificates to Contractor.
  - .2 Arrange and pay for delivery to site (Airport property) in accordance with Progress Schedule.
  - .3 Inspect deliveries jointly with Contractor.
  - .4 Arrange for replacement of damaged, defective or missing items.
  - .5 Arrange for manufacturer's field services; arrange for and deliver manufacturer's warranties and bonds to Contractor.
- .2 Contractor Responsibilities:
  - .1 Designate submittals and delivery date for each product in progress schedule.
  - .2 Review shop drawings, product data, samples, and other submittals. Submit to Consultant notification of observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
  - .3 Receive and unload products at site.
  - .4 Inspect deliveries jointly with Owner; record shortages, and damaged or defective items.
  - .5 Handle products at site, including uncrating and storage.
  - .6 Protect products from damage, and from exposure to elements.
  - .7 Assemble, install, connect, adjust, and finish products.

- .8 Provide installation inspections required by public authorities.
  - .9 Repair or replace items damaged by Contractor or subcontractor on site.
  - .10 Install, maintain, and remove low-profile barricades as detailed in the PCO. Barricades are to be secured with sandbags; sandbags are to be provided by the Contractor. Barricades are to be removed at the end of the construction shift.
  - .11 Install, maintain, and remove traffic cones (or other effective means) to delineate a temporary access corridor for baggage carts as detailed in the PCO.
- .3 Schedule of Owner furnished items
- .1 Low-profile barricades with steady burning red lights.

## **9. EXISTING SERVICES**

- .1 Notify Consultant and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give the Owner 48 hours' notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by Owner with minimum disturbance to operations.
- .3 Establish location and extent of service lines in area of work before starting Work. Notify Consultant of findings.
- .4 Submit schedule to and obtain approval from the Owner for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties. Requests for power shutdowns and locates shall be submitted, in writing, a minimum of seventy-two (72) hours prior to scheduled work. Requests shall indicate scope of work, area, circuits affected, as well as the date and time of requested shut down.
- .5 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
- .6 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .7 Record locations of maintained, re-routed and abandoned service lines.
- .8 Construct barriers to be in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

**10. DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy each document as follows:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Reviewed Shop Drawings.
  - .5 List of Outstanding Shop Drawings.
  - .6 Change Orders.
  - .7 Other Modifications to Contract.
  - .8 Field Test Reports.
  - .9 Copy of Approved Work Schedule.
  - .10 Health and Safety Plan and Other Safety Related Documents.
  - .11 Other documents as specified.

**PART 2 - PRODUCTS**

- 1. NOT USED

**PART 3 - EXECUTION**

- 1. NOT USED

**END OF SECTION**



**NOT USED**

## **PART 1 - GENERAL**

### **1. GENERAL**

- .1 This section of the specifications forms part of the Contract Documents and shall be read in conjunction with them.
- .2 This section specifies the requirements for measurement and payment of the Work to be performed under the various specifications and as outlined on the Unit Price List for each scope of work.
- .3 In case of conflict between various sections of the specifications this section takes precedence over the specifications.
- .4 Unless otherwise specified, unit rates and lump sum price bid shall include for all labour, materials, tools, equipment, operating and maintenance costs, temporary works, and for supervision, overhead and profit required to complete the work as described in the Contract Documents. It is further understood and agreed that the cost for each item includes all permits and fees, and any or all municipal, provincial or federal charges in connection with the work and that costs of a general nature that do not pertain to any one item or for which no particular reference is made in the descriptions are distributed among all items that are bid.
- .5 Quantities for payment to be accepted by the Consultant.

## **PART 2 - DESCRIPTION OF ITEMS**

### **1. GENERAL CIVIL CONSTRUCTION ITEMS**

- .1 Payment of lump sum price bid for Mob / Demob / Temporary Facilities / Barricades / Survey / Quality control and shall include:
  - .1 Low-Profile Barricades complete with steady burning red lights provided by the VAA and indicated in the Plan of Construction Operations shall be included in the lump sum price bid under Mob / Demob. Price shall include the installation, maintenance, and removal of barricades and lights during construction. Barricades are to be held down using sand bags provided by the Contractor. Barricades and red lights are to be handed back to the airport in good operating condition upon completion of the work.
  - .2 Traffic cones for delineation of the temporary access corridor for baggage carts as indicated on the Plan of Construction Operations shall be included in the lump sum price under Mob / Demob. Traffic cones are to be provided by the Contractor.
  - .3 Keeping the pedestrian walkway clear from Stand 7 to the Lower Hold Room West Walkway as indicated on the Plan of Construction Operations shall be included in the lump sum price under Mob / Demob.

- .4 Closeout Submittals and As-built Survey Data
  - .1 Construction, quantity, and as-built record surveys.
  - .2 Topographic survey of all constructed/finished surfaces and other appurtenances related to the project, upon completion.
  - .3 All survey as listed in individual specification sections. No separate payment for survey will be provided.
- .2 Partial payment for this item will be made once per month as work progresses. The partial payments will be made as follows:
  - .1 When 5% of the original contract amount is earned, 25% of the amount bid for this item will be paid.
  - .2 When 50% of the original contract amount is earned, 50% of the amount bid for this item will be paid.
  - .3 When 75% of the original contract amount is earned, 75% of the amount bid for this item will be paid.
  - .4 When 100% of the original contract amount is earned, 100% of the amount bid for this item will be paid.

## **2. JOINT SEALANT**

- .1 Payment for the concrete/concrete joint sealant works shall include the removal of existing joint sealant, cleaning the existing joints, widening joints less than 21mm wide to 21mm wide, install of properly sized backer rod and sealing of concrete/concrete joints with specified joint sealant shall be at the unit price bid per lineal metre. Measurement for payment shall be based on actual lineal metres of joint sealing constructed and accepted by the Consultant. No separate payment shall be made for extra sawcutting or joint sealing necessary to repair edges damaged by the Contractor. Payment at the tendered unit price shall be full compensation for existing sealant removal, joint widening as required, removal of concrete laitance, cleaning of joints, supply and installation of foam backer rod and joint sealant, cleanup, and other work incidental to this section.
- .2 Payment for the concrete/HMAC joint sealant works is to include the removal of existing joint sealant, cleaning of the existing joints, sealing of concrete/HMAC joints with hot pour sealant shall be at the unit price bid per lineal metre. Measurement for payment shall be based on actual lineal metres of joint sealing constructed and accepted by the Consultant. No separate payment shall be made for extra sawcutting or joint sealing necessary to repair edges damaged by the Contractor. Payment at the tendered unit price shall be full compensation for existing sealant removal, joint widening as required, removal of concrete laitance, cleaning of joints, supply and installation of joint sealant, cleanup, and other work incidental to this section.

- .3 Payment for the PROVISIONAL HMAC/HMAC joint sealant works is to include the removal of existing joint sealant, cleaning of the existing joints, widening joints less than 15mm wide to 15mm wide, sealing of HMAC/HMAC joints with hot pour sealant shall be at the unit price bid per lineal metre. Measurement for payment shall be based on actual lineal metres of joint sealing constructed and accepted by the Consultant. No separate payment shall be made for extra sawcutting or joint sealing necessary to repair edges damaged by the Contractor. Payment at the tendered unit price shall be full compensation for existing sealant removal, joint widening as required, removal of concrete laitance, cleaning of joints, supply and installation of joint sealant, cleanup, and other work incidental to this section.
- .4 Payment for sawcutting and sealing of joints for the concrete panel overlay shall be at the unit price bid per lineal metre. Measurement for payment shall be based on actual lineal metres of joint sealing constructed and accepted by the Consultant. No separate payment shall be made for extra sawcutting or joint sealing necessary to repair edges damaged by the Contractor. Payment at the tendered unit price shall be full compensation for sawcutting, widening of joint; removal of concrete laitance; cleaning of joints; supply and installation of foam backer rod and joint sealant; cleanup and other work incidental to this section.

### **3. CONCRETE PANEL REPAIRS**

- .1 Apron concrete spall repairs shall be measured by surveyed square metre of repaired PCC. Repair methodology to be completed as described on the drawings and in the project specifications. Payment under this item will include all equipment and operations involved in sawcutting, protection of adjacent concrete and/or asphalt pavement structures, cleaning and disposal of laitance and disposal off-site, breaking if required and removing concrete, removing steel reinforcement if required, sweeping, dust control, loading, hauling, stockpiling if required, cleaning and disposal off-site, supply and install of Delpatch™ Elastomeric Concrete as per manufacturer's specifications, supply and install of bond breaking medium (as required), cleanup, and all other work, equipment and materials incidental to complete the work as specified.
- .2 Apron concrete crack repairs shall be measured by lineal metre and be the actual length of repaired crack measured in the field. Repair methodology to be completed as described on the drawings and in the project specifications. Payment under this item will include all equipment and operations involved in sawcutting, protection of adjacent concrete and/or asphalt pavement structures, cleaning and disposal of laitance and disposal off-site, breaking if required and removing concrete, removing steel reinforcement if required, sweeping, dust control, loading, hauling, stockpiling if required, cleaning and disposal off-site, supply and install of Delpatch™ Elastomeric Concrete as per manufacturer's specifications, supply and install of bond breaking medium (as required), cleanup, and all other work, equipment and materials incidental to complete the work as specified.

- .3 Rout and sealing of cracks on the existing concrete panels shall be measured per lineal metre and be the actual length of repaired crack measured in the field. Repair methodology to be completed as described on the drawings and in the project specifications. Payment under this item will include full compensation for layout, sawcutting, routing, cleaning (as required with water and compressed air), supply and installation of joint sealant, protection during curing and all other incidentals necessary to complete the work.

#### **4. ASPHALT AND CONCRETE REMOVAL**

- .1 Sawcutting asphalt full depth shall be measured in lineal metre to depths specified. Payment includes sawcutting, protection of adjacent and underlying concrete and/or asphalt pavement structures, cleaning and disposal of laitance and disposal off-site, cleaning of remaining pavement edges and surfaces.
- .2 Payment for removal of existing asphalt and concrete pavements includes removal and off-site disposal of asphalt and concrete material to depths specified on the drawings. Payment will be made on a square metre basis as specified in the Schedule of Quantities and Prices including milling, dust control, loading, hauling, disposal, drainage and dewatering during construction and maintenance of the work area. Payment for excavation shall be full compensation for furnishing all labour, materials, tools, equipment, transportation, cleaning, and incidentals necessary to complete this item. Existing underlying concrete panels and surrounding asphalt are to be protected in place by the Contractor. Measurements for payment shall not include the quantity of materials excavated/removed without authorization beyond the neat lines determined in the field.

#### **5. CONCRETE OVERLAY**

- .1 Portland Cement Concrete Paving shall be measured in square metres of actual surface area completed to the design thickness and accepted by the Consultant.
- .1 Payment at the tendered unit price shall be full compensation for milling/roughening of underlying concrete panel surface; supply and installation of formwork; supply and application of bonding agent, supply and placement of wire mesh reinforcement and support chairs; concrete mix design; supply, placing, finishing, and curing of concrete; installation of thickened edges; QC testing; initial sawcutting; and all other work incidental to this section.
- .1 No payment shall be made until all the 28 day compressive and flexural strength test results are available and are acceptable to the Consultant.

#### **6. PAINTED LINES AND MARKINGS**

- .1 No separate payment will be provided for painted lines and markings.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1. RELATED SECTIONS**

- .1 Section 01 32 16.07 – Construction Progress Schedules - Bar (GANTT) Chart.
- .2 Section 01 35 13.13 – Special Procedure for Airport Facilities.
- .3 Section 01 56 00 – Temporary Barriers and Enclosures.

### **2. ACCESS AND EGRESS**

- .1 Maintain the gate and temporary "access to" and "egress from" work areas, including roads and ramps, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.
- .2 Maintain the GSE Corridor as access to the VAA as shown on the Plan of Construction Operations.
- .3 Maintain a clear pedestrian walkway from Stand 7 to the Lower Hold Room West Walkway as shown on the Plan of Construction Operations.

### **3. USE OF SITE AND FACILITIES**

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with the Owner's Representative and Consultant to facilitate work as stated.
- .2 Where security is reduced by work provide temporary means to maintain security.
- .3 Use of site shall be limited to the designated areas by work and storage.
- .4 Parking of private vehicles shall be limited to areas designated by the Airport Authority. Private vehicles will not be allowed on airside property unless in areas designated by the Airport Authority.
- .5 Closures: protect work temporarily until permanent enclosures are completed.

### **4. EXISTING SERVICES**

- .1 Notify the Owner's Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give the Owner's Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum. Carry out interruptions after normal working hours of occupants, preferably at night.

- .3 Construct barriers to be in accordance with the drawings and Section 01 56 00 – Temporary Barriers and Enclosures.

**5. SPECIAL REQUIREMENTS**

- .1 Submit a schedule in accordance with Section 01 32 16.07 – Construction Progress Schedules - Bar (GANTT) Chart.
- .2 Contractor shall follow the Plan of Construction Operations as specified in the Contract Documents.
- .3 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .4 Keep within limits of work and avenues of ingress and egress.
- .5 Ingress and egress of Contractor vehicles at site is limited and only allowed under escort.

**6. SECURITY CLEARANCES**

- .1 Personnel must provide photo ID daily to obtain daily airside security pass. Obtain clearance, as instructed, for each individual who will require to enter premises.
- .2 Personnel will be checked daily at start of work shift and provided with a pass which must be worn at all times. The pass must be returned at end of work shift and personnel checked out.

**7. SECURITY ESCORT**

- .1 Personnel employed on this project must be escorted at all times when executing airside work.
- .2 Submit an escort request to the Consultant at least 4 days before service is needed.

**8. BUILDING SMOKING ENVIRONMENT**

- .1 Comply with smoking restrictions. Smoking is not allowed.



**PART 2 - PRODUCTS**

1. NOT USED

**PART 3 - EXECUTION**

1. NOT USED

**END OF SECTION**

## **PART 1 - GENERAL**

### **1. DESCRIPTION**

- .1 This section specified requirements for project meetings including the pre-construction, progress, and safety meetings as required by the Contract Documents or as required by the Engineer or Airport Authority.

### **2. ADMINISTRATIVE**

- .1 The Engineer and/or the Owner's Representative shall schedule and administer project and safety meetings throughout the progress of the work.
- .2 Provide physical space and make arrangements for meetings.
- .3 The Engineer will record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .4 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants and affected parties not in attendance.
- .5 Representative of the Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

### **3. PRECONSTRUCTION MEETING**

- .1 Immediately upon issuance of "Issued for Construction" drawings, the Engineer will schedule a meeting of parties in the contract to discuss and resolve administrative procedures, safety and responsibilities.
- .2 Senior representatives of the Owner, the Engineer, the Contractor, major Subcontractors, field inspectors, supervisors, the Airport Security Supervisor and the Airport Safety Officer will be in attendance.
- .3 Meeting will be held within three (3) days of issuance of "IFC" drawings.
- .4 Establish time and location of meeting and notify parties concerned minimum five (5) days before meeting.
- .5 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .6 Agenda to include:
  - .1 Appointment of official representative of participants in the Work.
  - .2 Impact of the Aeronautics Act on the project and its participants.

- .3 Schedule of Work: in accordance with Section 01 32 16.07 – Construction Progress Schedules - Bar (GANTT) Chart and progress scheduling.
- .4 Discussion of safety.
- .5 Discussion of Plan of Construction Operation and work restrictions.
- .6 Schedule of submission of shop drawings, samples. Submit submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .7 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 – Construction Facilities.
- .8 Delivery schedule of specified equipment.
- .9 Site security in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.
- .10 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .11 Owner provided products.
- .12 Record drawings in accordance with Section 01 33 00 – Submittal Procedures.
- .13 Maintenance manuals in accordance with Section 01 78 00 – Closeout Submittals.
- .14 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 – Closeout Submittals.
- .15 Monthly progress claims, administrative procedures, photographs, hold backs.
- .16 Appointment of inspection and testing agencies or firms.
- .17 Insurances, transcript of policies.

#### **4. PROGRESS MEETINGS**

- .1 During course of the Work, the Engineer and/or the Owner's Representative will schedule progress/safety meetings weekly.
- .2 The Contractor, major Subcontractors involved in the Work, the Engineer and/or representative(s), the Airport Safety Officer and the Airport Security Supervisor and affected airport users are to be in attendance.

- .3 The Engineer will record minutes of meetings and circulate to attending parties and affected parties not in attendance within three (3) days after meeting.
  
- .4 Agenda to include the following:
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review of Work progress since previous meeting.
  - .3 Field observations, problems, conflicts.
  - .4 Problems which impede construction schedule.
  - .5 Review of off-site fabrication delivery schedules.
  - .6 Corrective measures and procedures to regain projected schedule.
  - .7 Revision to construction schedule.
  - .8 Progress schedule, during succeeding work period.
  - .9 Review submittal schedules: expedite as required.
  - .10 Maintenance of quality standards.
  - .11 Review proposed changes for effect on the construction schedule and on the completion date.
  - .12 Other business.

**PART 2 - PRODUCTS**

- 1. NOT USED

**PART 3 - EXECUTION**

- 1. NOT USED

**END OF SECTION**

**NOT USED**

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## **PART 1 - GENERAL**

### **1. RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures

### **2. DEFINITIONS**

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (Gantt chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Duration: number of work periods (not including holidays or other non-working periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .5 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .6 Milestone: significant event in project, usually completion of major deliverable.
- .7 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .8 Project Planning, Monitoring and Control System: overall system operated by Consultant to enable monitoring of project work in relation to established milestones.

### **3. REQUIREMENTS**

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.

- .3 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

#### **4. SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit to Consultant within ten working days of Contract Award a Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

#### **5. PROJECT MILESTONES**

- .1 Project milestones form interim targets for Project Schedule.
- .2 Earliest Start date for 2024 construction is May 27, 2024.
- .3 Latest end date for 2024 construction is August 31, 2024.

#### **6. MASTER PLAN (NOT USED)**

#### **7. PROJECT SCHEDULE**

- .1 Develop detailed Project Schedule. Work should be scheduled to occur within a continuous window within the Project Milestone dates noted in Part 1, Section 5 – Project Milestones.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
  - .1 Award.
  - .2 Shop Drawings, Samples.
  - .3 Permits.
  - .4 Mobilization.
  - .5 Joint Sealing.
  - .6 Spall Repairs.
  - .7 Crack Repairs.
  - .8 Asphalt Removal and Concrete Overlay.
  - .9 Paint Markings.
  - .10 Supplied item required dates.

## **8. PROJECT SCHEDULE REPORTING**

- .1 Update Project schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of the Project Schedule, a narrative report identifying the Work status to date, comparing current progress to the baseline, presenting current forecasts, defining problem areas, anticipated delays and their impact with possible mitigation.

## **9. PROJECT MEETINGS**

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

## **PART 2 - PRODUCTS**

1. NOT USED

## **PART 3 - EXECUTION**

1. NOT USED

**END OF SECTION**



**NOT USED**

**PART 1 - GENERAL****1. DESCRIPTION**

- .1 This section specifies general requirements and procedures for the Contractor's submissions of shop drawings, product data, samples and mock-ups to the Consultant for review.

**2. ADMINISTRATIVE**

- .1 Submit to the Consultant submittals listed for review. Submit promptly and in orderly sequence to not cause delay in the Work. Failure to submit in ample time is not considered sufficient reason for extension of the 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 the 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 the 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 the Work and Contract Documents. Submittals not stamped, signed, dated and identified as to the specific project will be returned without being examined and considered rejected.
- .6 Notify the Consultant, in writing at the time of submission, identifying any deviations from the requirements of the Contract Documents, stating reasons for such deviations.
- .7 Verify that field measurements and affected adjacent Work are co-ordinated.
- .8 The Contractor's responsibility for errors and omissions in submission is not relieved by the Consultant's review of submittals.
- .9 The Contractor's responsibility for deviations in submission from the requirements of Contract Documents is not relieved by the Consultant review.
- .10 Keep one reviewed copy of each submission on site.
- .11 Submittals shall be in a reproducible or electronic form acceptable to the Consultant. Facsimile versions of submittals are not acceptable.

### **3. SHOP DRAWINGS AND PRODUCT DATA**

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of the Work.
- .2 Submit shop drawings bearing stamp and signature of a qualified professional engineer registered or licensed in the Province of British Columbia, Canada.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of the Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of the Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow five (5) days for the Consultant's review of each submission.
- .5 Adjustments made on shop drawings by the Consultant are not intended to change the Contract Price. If adjustments affect the value of the Work, state such in writing to the Consultant prior to proceeding with the Work.
- .6 Make changes in shop drawings as the Consultant may require, consistent with the Contract Documents. When resubmitting, notify the Consultant in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .8 Submissions include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.

- .2 Supplier.
- .3 Manufacturer.
- .4 The Contractor's stamp, signed by the Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with the Contract Documents.
- .5 Details of appropriate portions of the 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.
- .9 After the Consultant's review, distribute copies.
- .10 Submit electronic copy of shop drawings for each requirement requested in the specification Sections and as the Consultant may reasonably request.
- .11 Submit electronic copies of product data sheets or brochures for requirements requested in the Specification Sections and as requested by the Consultant where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit electronic copies of test reports for requirements requested in the Specification Sections and as requested by the Consultant.
  - .1 Report signed by the authorized official of a testing laboratory that the 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 three (3) years of the date of the contract award for the project.

- .13 Submit electronic copies of certificates for requirements requested in the Specification Sections and as requested by the Consultant.
  - .1 Statements printed on the manufacturer's letterhead and signed by the responsible officials of the manufacturer of the product, system or material attesting that the product, system or material meets the specification requirements.
  - .2 Certificates must be dated after the award of the project contract complete with the project name.
- .14 Submit electronic copies of the manufacturer's instructions for requirements requested in the Specification Sections and as requested by the 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.
- .15 Submit electronic copies of the Manufacturer's Field Reports for requirements requested in Specification Sections and as requested by the Consultant.
  - .1 Documentation of testing and verification actions taken by the manufacturer's representative to confirm compliance with the manufacturer's standards or instructions.
- .16 Submit electronic copies of Operation and Maintenance Data for requirements requested in Specification Sections and as requested by the Consultant.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to the project.
- .19 If upon review by the Consultant, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of the Work may proceed. If shop drawings are rejected, a noted copy will be returned and resubmission of the corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of the Work may proceed.

#### **4. SAMPLES**

- .1 Submit for review samples in duplicate as requested in respective Specification Sections. Label samples with their origin and intended use.
- .2 Deliver samples are to be prepaid to the Consultant's site office.
- .3 Notify the Consultant in writing, at the time of submission of deviations in samples from requirements of the Contract Documents.
- .4 Where colour, pattern or texture is a criterion, submit a full range of samples.

- .5 Adjustments made on samples by the Consultant are not intended to change the Contract Price. If adjustments affect the value of the Work, state such in writing to the Consultant prior to proceeding with the Work.
- .6 Make changes in samples which the Consultant may require, consistent with the Contract Documents.
- .7 Reviewed and accepted samples will become the standard of workmanship and material against which the installed Work will be verified.

**5. MOCK-UPS (NOT USED)**

**6. CERTIFICATES AND TRANSCRIPTS**

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

**7. PROJECT SUBMITTALS LIST**

- .1 Please Refer to each Specification Section in the Contract to identify complete List of Submittals.

**PART 2 - PRODUCTS**

- 1. NOT USED**

**PART 3 - EXECUTION**

- 1. NOT USED**

**END OF SECTION**

**NOT USED**

**PART 1 - GENERAL****1. SUMMARY**

.1 Section Includes:

- .1 Movement of equipment and other special procedures that must be considered when construction is being carried out while the airport facility is in use.

**2. RELATED SECTIONS**

- .1 TP 312E, 5<sup>th</sup> Edition.
- .2 Approved Plan of Construction Operations (PCO). See Appendix A.

**3. GENERAL PROTECTION**

- .1 Do not disrupt airport business except as permitted by the Consultant.
- .2 Provide barricades and lights where directed.

**4. MOVEMENT OF EQUIPMENT AND PERSONNEL**

- .1 In areas of airport not closed to aircraft traffic:
  - .1 Obtain the Consultant's approval on scheduling of the Work.
  - .2 Control movements of equipment and personnel as directed by the Consultant.
  - .3 Obey signals from the airport traffic control tower instantly.
  - .4 All movement to and from construction sites is to be under the control of a security escort.
  - .5 All construction activity is to be monitored by a security escort.
  - .6 All instructions from the security escort regarding airport rules, safety and conduct while on airside are to be obeyed immediately.
  - .7 All work must be planned and executed in conformance with the approved Plan of Construction Operations (PCO).
- .2 Provide, install and maintain traffic cones or other effective means to delineate a temporary access corridor for baggage carts while in Work Areas B and C. Temporary access corridor delineators are to be removed at the end of each work shift.



- .3 While working in Work Area A, maintain a clear pedestrian walkway from Stand 7 to the Lower Hold Room West Walkway.

## **5. UNSERVICEABLE AREAS**

- .1 The Owner will provide, and the Contractor will install, maintain and remove low-profile barricades with steady burning red lights, as noted in the Plan of Construction Operations. The low-profile barricades are to be secured with sandbags provided by the contractor. To prevent FOD on the apron, the Contractor is to ensure the sandbags are not damaged at any point during the project.
- .2 All low-profile barricades with red lights will be returned to the owner in good condition at the end of the project.
- .3 Open flames and inflammable fuels without a hot work permit, are not allowed.
- .4 Park equipment not in use and stockpile materials as indicated in the Plan of Construction Operations.

## **6. MEASUREMENT FOR PAYMENT**

- .1 Refer to Section 01 13 00 – Measurement for Payment

## **7. TRENCHING**

- .1 Obtain the Consultant's written permission to undertake trenching on pavements open to aircraft traffic which cannot be completed, backfilled and sealed within one working day.

## **8. AIRPORT FACILITIES**

- .1 Coordinate with the Authority for permits and procedures to locate and/or disclose the underground facilities such as cables, pipes and ducts.
- .2 The Contractor shall be responsible for locating and confirming existing surface and underground structures and utility installations that may be damaged during construction.
- .3 All surfaces around the Work Area are to be cleaned and restored for aircraft use by the end of each work shift.

## **PART 2 - PRODUCTS**

### **1. CLOSURE MARKINGS**

- .1 The Contractor will be required to maintain low-profile barricades with steady burning red lights, as detailed in the PCO, to delineate the edge of the construction areas.

- .2 The Contractor will be required to remove the low-profile barricades for Work Areas D and E so they can be reopened to aircraft operations at the end of each construction shift.

## **PART 3 - EXECUTION**

### **1. APPLICATION**

- .1 Low-profile barricades with steady burning red lights must be displayed for the entire time work is completed in Work Areas A, B and C.
- .2 Barricades must be of standard dimensions and placed in accordance with the Plan of Construction Operations and TP 312E, 5<sup>th</sup> Edition.
- .3 Fix low profile barriers to the pavement to prevent movement by wind or jet blast using sandbags. Place enough weight to prevent barriers from being displaced.

**END OF SECTION**



**Apron IV Joint Sealing Replacement - 2024**  
**SPECIAL PROJECT PROCEDURES**  
**FOR AIRPORT FACILITIES**  
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**NOT USED**

## **PART 1 - GENERAL**

### **1. DESCRIPTION**

- .1 This section specifies the requirements for protection of the environment during the execution of the Work.

### **2. REFERENCES**

#### .1 Definitions:

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

#### .2 Reference Standards:

- .1 All references to this Specifications, Standards, or Methods shall be understood to refer to the latest adopted revision, including all amendments.
- .2 The Victoria Airport Authority
  - .1 Articles of Agreement and General Conditions for Construction Contracts.

### **3. SUBMITTALS**

- .1 Prior to commencing construction activities or delivery of materials to the site, submit within ten (10) working days of Contract award an Environmental Protection Plan for review and acceptance by the VAA. The Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which must be addressed during Work.
- .2 Address topics at level of detail commensurate with environmental issue and required work tasks.
- .3 Environmental Protection Plan should include:

- .1 Names of person or persons responsible for ensuring adherence to Environmental Protection Plan.
- .2 Names and qualifications of persons responsible for training site personnel.
- .3 Descriptions of environmental protection personnel training program.
- .4 Erosion and Sediment Control Plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .5 Drawings showing locations of proposed haul roads, stream crossings, and material storage areas, including methods to control runoff and to contain materials on-site.
- .6 Mitigation plans to address adverse weather conditions such as wet weather.
- .7 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.
- .8 Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .9 Non-Hazardous Solid Waste Disposal Plan identifying methods and locations for solid waste disposal including clearing debris.
- .10 Air Pollution Control Plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off the project site.
- .11 Contaminant Prevention Plan that:
  - .1 Identifies potentially hazardous substances to be used on job site;
  - .2 Identifies intended actions to prevent introduction of such materials into air, water, or ground; and
  - .3 Details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .12 Wastewater Management Plan that identifies methods and procedures for management and/or discharge of wastewaters which are directly derived from construction activities.

- .13 Biological Resources Plan that defines procedures for identifying and protecting biological components at or adjacent to the site.

#### **4. FIRES**

- .1 Fires and burning of rubbish on site not permitted.

#### **5. DISPOSAL OF WASTES**

- .1 Do not bury rubbish and waste materials on-site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways.

#### **6. DRAINAGE**

- .1 Provide an Erosion and Sediment Control Plan identifying the type and location of erosion and sediment controls provided. Ensure the plan includes monitoring and reporting requirements to assure that the control measures are in compliance with the Erosion and Sediment Control Plan, Federal, Provincial, and Municipal laws and regulations.
- .2 Provide temporary drainage and pumping as necessary to keep site free from water as required.
- .3 The Contractor shall ensure that water does not collect in excavations from rainfalls during working hours or after hours when the Contractor is not onsite.
- .4 Do not pump water containing suspended materials into waterways, sewers, or drainage systems. Ensure pumped water into waterways, sewers, or drainage systems is free of suspended materials.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

#### **7. WORK ADJACENT TO WATERWAYS**

- .1 Do not dump excavated fill, waste material or debris in waterways.

#### **8. POLLUTION CONTROL**

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant to local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.

- .1 Provide temporary enclosures where indicated by the Engineer.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .5 All spills of any nature must be reported to the Director of Airside Operations and Environment and cleaned up immediately to the satisfaction of Victoria Airports Environmental Department.
- .6 No dust or debris is permitted on the apron at any time during the joint sealant removal, joint widening and joint sealant install processes.

## 9. NOTIFICATION

- .1 The VAA will notify the Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 The Contractor, after receipt of such notice, shall inform the VAA of proposed corrective action and take such action accepted by Departmental Representative.
- .3 The Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions will be granted or equitable adjustments allowed to the Contractor for such suspensions.

## 10. SPILLS OR RELEASE OF DELETERIOUS SUBSTANCES

- .1 Measures to be implemented to prevent, control or mitigate spills or release of deleterious substances:
  - .1 Contractor shall take due care to ensure no deleterious materials enter any surface drainage pathways located in the project area. The recommendations in the Land Development Guidelines for the Protection of Aquatic Habitat (Chillibeck et al. 1993) regarding erosion and sediment control shall be implemented. Silt-laden runoff water from the site shall not be allowed to enter nearby surface water. Engineering controls, such as silt fences and/or absorbent materials shall be implemented, as required, to ensure proper isolation of soil and contaminants from groundwater and surface water.
  - .2 Emergency response procedure for spills of deleterious substances must be in place. In the event of a spill, the Contractor will immediately implement their Spill Response Protocol and will contact the **Airport Fire Service at 250-953-7566 or Airport Security at 250-953-7511.**

- .3 Response equipment to be on site at all times (i.e. spill kits) and workers trained in their location and use. The resources on hand must be sufficient to respond effectively and expediently to any spill that could occur on site.
- .4 All equipment brought onto the site will be clean and properly maintained.
- .5 Any equipment maintenance must occur in a designated area and must be conducted away from any surface water drains or collection points.
- .6 Any equipment remaining on site overnight shall have appropriately placed drip pans.
- .7 Waste generated will be prevented from entering the environment.
- .8 Prevent discharges containing asphalt, grout, concrete or other waste materials from reaching storm drains or the aquatic environment. This includes, but is not limited to:
  - .1 Cleaning equipment off-site; and
  - .2 Protection of any other drainage structures not identified here with filter fences and/or silt socks, if required.
- .9 Protection of the roadways from tracking of mud, soil and debris needs to be maintained throughout the work.
- .10 Ensure that equipment and machinery is properly maintained to minimize unnecessary noise pollution. Consider local municipal noise bylaws when mobilizing equipment.

## **PART 2 - PRODUCTS**

### **1. NOT USED**

## **PART 3 - EXECUTION**

### **1. CLEANING**

- .1 Clean in accordance with Section 01 74 11 – Cleaning.
- .2 Waste management: separate waste materials for reuse and recycling.
- .3 Do not dispose of waste or volatile materials, such as mineral spirits, oil, or paint thinner into waterways, storm, or sanitary sewers.
- .4 Do not bury rubbish and waste materials on site. Dispose of off-site in accordance with applicable laws and regulations.



**END OF SECTION**

## **PART 1 - GENERAL**

### **1. DESCRIPTION**

- .1 This section specifies the requirements for testing laboratory services to be provided by the Contractor during the execution of the work.

### **2. RELATED REQUIREMENTS SPECIFIED ELSEWHERE**

- .1 Particular requirements for inspection and testing designated by the Consultant to be carried out by testing laboratory are specified under various sections of the specifications.

### **3. REFERENCES**

- .1 All references to these Specifications, Standards, or Methods shall be understood to refer to the latest adopted revision, including all amendments.
- .2 The Victoria Airport Authority
  - .1 Articles of Agreement and General Conditions for Construction Contracts.

### **4. MEASUREMENT AND PAYMENT**

- .1 No separate payment will be made for testing laboratory services. The Unit rates and lump sum price bid shall include all labour, materials, tools, equipment, etc. as required by the Contractor to complete the quality control testing as specified under the various sections.
- .2 Where tests or inspections by designated testing laboratory reveal work not in accordance with contract requirements, the Contractor shall pay the costs for additional tests or inspections as the Consultant may require, to verify the acceptability of the corrected work.

### **5. CONTRACTOR'S RESPONSIBILITIES**

- .1 Quality control testing and testing laboratory services shall consist of but not limited to all testing as specified under the various sections of the specifications.
- .2 Furnish labour and facilities to:
  - .1 Provide access to work to be inspected and tested.
  - .2 Facilitate inspections and tests.
  - .3 Make good work disturbed by inspection and test.
  - .4 Provide storage on site for the laboratory's exclusive use to store equipment and cure test samples.

- .3 Where materials are specified to be tested, deliver representative samples in required quantity to the testing laboratory.
- .4 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by the Consultant.

## **6. INSPECTION**

- .1 Allow the Consultant access to the Work. If part of the Work is in preparation at locations other than the Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if the Work is designated for special tests, inspections or approvals by the Consultant's instructions, or the law of the Place of Work.
- .3 If the 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 The Consultant will order part of the Work to be examined if the Work is suspected to be not in accordance with the Contract Documents. If, upon examination such work is found not in accordance with the Contract Documents, correct such Work and pay cost of examination and correction.

## **7. INDEPENDENT INSPECTION AGENCIES**

- .1 Independent Inspection/Testing Agencies may be engaged by the Consultant for purpose of inspecting and/ or testing portions of Work, at the discretion of the Consultant.
- .2 If requested, provide equipment required for executing inspection and testing by appointed agencies.
- .3 The employment of Inspection/Testing Agencies does not relax responsibility to perform the Work in accordance with the 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 defects and irregularities as advised by the Consultant at no cost to the Consultant. Pay the costs for retesting and re-inspection.

## **8. ACCESS TO WORK**

- .1 Allow inspection/testing agencies access to the Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

## **9. PROCEDURES**

- .1 Notify appropriate agency and the 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 the specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in the Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

## **10. REJECTED WORK**

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

## **11. REPORTS**

- .1 Submit four (4) copies of inspection and test reports to the Consultant.
- .2 Provide copies to any subcontractor of work being inspected or tested.

## **12. TESTS AND MIX DESIGNS**

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

## **13. MILL TESTS**

- .1 Submit mill test certificates as requested or as required of the Specification Sections.

**PART 2 - PRODUCTS**

1. NOT USED

**PART 3 - EXECUTION**

1. NOT USED

**END OF SECTION**

## **PART 1 - GENERAL**

### **1. DESCRIPTION**

- .1 This section specifies the requirements for temporary facilities during the execution of the Work.

### **2. REFERENCES**

- .1 All references to this Specifications, Standards, or Methods shall be understood to refer to the latest adopted revision, including all amendments.
- .2 The Victoria Airport Authority
  - .1 Articles of Agreement and General Conditions for Construction Contracts.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/ CGSB 1.189-00, Exterior Alkyd Primer for Wood.
  - .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .4 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1/A23.2-19, Concrete Materials and Methods of Concrete Construction/ Methods of Test and Standard Practices for Concrete.
  - .2 CSA-0121:17(R2022), Douglas Fir Plywood.
  - .3 CAN/ CSA-S269.2-16(R2021), Access Scaffolding for Construction Purposes.
- .5 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: May 14, 2004.

### **3. MEASUREMENT PROCEDURES**

- .1 See Section 01 13 00 Measurement for Payment.

### **4. SUBMITTALS**

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

### **5. INSTALLATION AND REMOVAL**

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced (if applicable) and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area (if applicable) and details of fence installation.

- .2 Identify areas which have to be graveled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Provide a site trailer during construction of adequate size to hold weekly construction meetings.
- .6 Remove from site all such work after use.
- .7 In the event of snowfall, the Contractor shall provide snow removal as required during the period of work.
- .8 Clean roads, runways, taxiways and apron areas where used by the Contractor's equipment and as directed by the Consultant.
- .9 Provide and maintain adequate access to project sites.

## **6. SITE STORAGE/LOADING**

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

## **7. CONSTRUCTION PARKING**

- .1 Designated parking space will be made available on site. Maintain and administer these spaces as directed.
- .2 Provide and maintain adequate access to project site.
- .3 Clean access routes and apron, runway and taxiway areas where used by the Contractor's equipment.

## **8. SECURITY**

- .1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

## **9. EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

- .3 Provide adequate weather tight sheds with raised floors, for storage of materials, tools, and equipment which are subject to damage by weather.

## **10. SANITARY FACILITIES**

- .1 Provide sanitary facilities for the work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in a sanitary condition.

## **11. PROTECTION AND MAINTENANCE OF TRAFFIC**

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during the construction period except as otherwise specifically directed by the Consultant.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect the travelling public from damage to person and property.
- .5 The Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. The Contractor is responsible for repair of damage to roads caused by construction operations.
- .7 Construct access and haul roads as necessary.
- .8 Haul roads to be constructed with suitable grades and widths; sharp curves, blind corners and dangerous cross traffic shall be avoided.
- .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .10 Dust control: adequate to ensure safe operation at all times.
- .11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by the Consultant.
- .12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .13 Provide snow removal during the period of the Work.



- .14 Remove, upon completion of work, haul roads designated by the Consultant.

## **12. CLEAN-UP**

- .1 Remove construction debris, waste materials, packaging material from the work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Do not stack stored new or salvaged material in construction facilities.

## **13. WATER SUPPLY**

- .1 Arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances.

## **14. POWER**

- .1 Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances.
- .2 Install temporary facilities for power such as pole lines and underground cables to approval of the local power supply authority.

## **PART 2 - PRODUCTS**

### **1. NOT USED**

## **PART 3 - EXECUTION**

### **1. TEMPORARY EROSION AND SEDIMENTATION CONTROL – NOT APPLICABLE**

- .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 the 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.

**END OF SECTION**

**NOT USED**

**PART 1 - GENERAL****1. REFERENCES**

- .1 All references to this Specifications, Standards, or Methods shall be understood to refer to the latest adopted revision, including all amendments.
- .2 Canadian General Standards Board (CGSB)
  - .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
  - .2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA-O121:17, Douglas Fir Plywood.
- .4 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as Of: May 14, 2004.

**2. INSTALLATION AND REMOVAL**

- .1 Provide temporary controls in order to execute the Work expeditiously.
- .2 Remove from site all such work after use.
- .3 Provide as required by the Plan of Construction Operation and the Owner.

**3. ACCESS TO SITE**

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

**4. PUBLIC TRAFFIC FLOW**

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

**5. FIRE ROUTES**

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

**6. PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**

- .1 Protect surrounding private and public property from damage during performance of the Work.

- .2 Be responsible for damage incurred.

**PART 2 - PRODUCTS**

1. NOT USED

**PART 3 - EXECUTION**

1. NOT USED

**END OF SECTION**

## **PART 1 - GENERAL**

### **1. DESCRIPTION**

- .1 This section specifies the general requirements for Material and Equipment that are to be installed as part of the Work by the Contractor.

### **2. REFERENCES**

- .1 The Victoria Airport Authority
  - .1 Articles of Agreement and General Conditions of Construction Contracts.
- .2 Within text of each specifications section, reference may be made to reference standards.
- .3 Conform to these reference standards, in whole or in part as specifically requested in the specifications.
- .4 If there is question as to whether products or systems are in conformance with applicable standards, the Engineer reserves right to have such products or systems tested to prove or disprove conformance.
- .5 The cost for such testing will be borne by the Contractor in event of non-conformance.

### **3. QUALITY**

- .1 Products, materials, equipment and articles incorporated in the Work shall be new, not damaged or defective, and of the best quality for the purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials in otherwise utilizing recycled and recovered materials in execution of work.
- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with the Engineer based upon requirements of the Contract Documents.
- .5 Unless otherwise indicated in the specifications, maintain uniformity of manufacture for any particular or like item throughout construction.

- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

#### **4. AVAILABILITY**

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

#### **5. STORAGE, HANDLING AND PROTECTION**

- .1 Deliver, handle, and store products in a manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable. Immediately remove rejected material and equipment from site.
- .2 Store packaged or bundled products in their original and undamaged condition with the manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in the Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store Cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber on flat, solid supports and keep clear of the ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of the Engineer.
- .9 Touch-up damaged factory finished surfaces to the Engineer's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

- .10 Deliver, store, and maintain packaged materials and equipment with manufacturer's seals and labels intact.
- .11 Prevent damage, adulteration, and soiling of material and equipment during deliver, handling, and storage. Immediately remove rejected material and equipment from site.
- .12 Store material and equipment in accordance with the supplier's instructions.

## **6. TRANSPORTATION**

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

## **7. MANUFACTURER'S INSTRUCTIONS**

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

## **8. QUALITY OF WORK**

- .1 Ensure the Quality of Work is of the highest standard, executed by workers experienced and skilled in the respective duties for which they are employed. Immediately notify the Engineer if required the Work is such as to make it impractical to produce the required results.
- .2 Do not employ anyone unskilled in their required duties. The Engineer reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to the standard or fitness of the Quality of Work in cases of dispute rest solely with the Engineer whose decision is final.
- .4 Provide a demonstrated track record for airfield joint sealing projects at airports within the last five (5) years.

## **9. SUBSTITUTION**

- .1 No substitutions will be permitted without prior written approval of the Engineer.
- .2 Proposals for substitution may only be submitted after award of the contract. Such request must include statements of the respective costs of items originally specified and the proposed substitution.

- .3 Proposals will be considered by the Engineer if:
  - .1 Materials selected by tenderer from those specified, are not available.
  - .2 Delivery date of materials selected from those materials specified would unduly delay completion of the contract; or
  - .3 Alternative material to those specified which are brought to the attention of and considered by the Engineer as equivalent to the material specified and will result in a credit to the Contract amount.
- .4 Should a proposed substitution be accepted either in part or in whole, the contractor shall assume full responsibility and costs when the substitution affects other work on the project. The Contractor shall pay for design or drawing changes required as result of the substitution.
- .5 Amounts of all credits arising from the approval of a substitutions will be determined by the Engineer and the Contract Price will be reduced accordingly.

## **10. CO-ORDINATION**

- .1 Ensure co-operation of workers in laying out the Work. Maintain efficient and continuous supervision.
- .2 Be responsible for the coordination and placement of openings, sleeves and accessories.

## **11. REMEDIAL WORK**

- .1 Perform remedial work required to repair or replace parts or portions of the Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of the Work.

## **12. FASTENINGS – NOT APPLICABLE**

- .1 Provide metal fastenings and accessories of the same texture, colour and finish as adjacent materials, unless otherwise indicated.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected Specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.



- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of the material to which the anchorage is made are not acceptable.
- .7 Obtain the Engineer's approval before using explosive actuated fastening devices. If approval is obtained comply with CSA Z166-1975.

### **13. FASTENINGS - EQUIPMENT**

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

### **14. CONSTRUCTION EQUIPMENT AND PLANT**

- .1 On request, prove to the satisfaction of the Engineer that the construction equipment and plant are adequate to manufacture, transport, place and finish work to the quality and at the production rates specified. If inadequate, replace or provide additional equipment or plant as directed.
- .2 Maintain construction equipment and plant in good operating order.
- .3 Plant must meet emissions standards of the authority having jurisdiction.

### **15. PROTECTION OF WORK IN PROGRESS**

- .1 Prevent overloading of parts of the Work. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written acceptance of the Engineer.

### **16. EXISTING UTILITIES**

- .1 When breaking into or connecting to existing services or utilities, execute the Work at times directed by the local governing authorities, with minimum of disturbance to the Work.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by the authority having jurisdiction. Stake and record location of capped service.

**PART 2 - PRODUCTS**

1. NOT USED

**PART 3 - EXECUTION**

1. NOT USED

**END OF SECTION**

## **PART 1 - GENERAL**

### **1. REFERENCES**

- .1 The Victoria Airport Authority
- .1 Articles of Agreement and General Conditions for Construction Contracts.
- .2 The Owner's identification of existing survey control points and property limits.

### **2. QUALIFICATIONS OF SURVEYOR**

- .1 Qualified registered land surveyor, licensed to practice in the Place of Work, acceptable to the Consultant
- .2 The Contractor shall supply a competent fully equipped survey crew to carry out work as listed below. Unsuitable or unqualified personnel shall be removed from the project and replaced immediately with qualified personnel.

### **3. SURVEY REFERENCE POINTS**

- .1 Existing base horizontal and vertical control points are designated on drawings.
- .2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice to the Consultant.
- .4 Report to the Consultant when reference a point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5 Require the surveyor to replace control points in accordance with the original survey control. Costs to replace geodetic bench marks or legal survey pins as a result of the Contractor negligence will be deducted from the Contractor's payment. In particular, legal pins shall be laid out by a competent registered Canada Land Surveyor.

### **4. GENERAL REQUIREMENTS**

- .1 All layout of the Work shall be the responsibility of the Contractor.
- .2 The Contractor shall set all Work stakes and /or marks necessary to complete the work and be responsible for the preservation of all stakes and marks. The layout of the Work shall be as required to ensure that tolerances are achieved.
- .3 The Consultant will furnish the Contractor with a complete set of construction drawings. The Contractor shall provide the Consultant with a copy of all vertical control grades as established from the information provided. Should the Contractor's survey utilize a control points network, the Contractor shall provide to the Consultant a copy of the coordinates and elevations of the control points.

- .4 If at any time during the progress of the Work any error shall appear or arise in the position, levels, dimensions or alignment of any part of the Work, the Contractor shall stop working on that portion of the Work and notify the Consultant. If the Contractor proceeds with the Work after a discrepancy is discovered, he does so at his own risk. The Contractor shall make allowances in his work schedule for delays of this nature and shall not claim or be paid for standby or shut down.

**5. CONSTRUCTION SURVEY LAYOUT**

- .1 The Contractor shall provide stakes and/or marks required to properly identify critical changes in transverse/longitudinal slopes or grade breaks in addition to the intervals specified below for each material layer. The grade stakes must be placed as directed below and available to the Consultant for grade checking prior to the installation of the next layer or surfaces. The Contractor must provide 3 boning rods for the Consultant to use for grade checking. The intervals for grade stakes or hubs shall be as follows:
  - .1 The interval for setting grades for subgrade, granular course, and topsoil construction shall be 12.0 metres in the longitudinal direction and 6 metres in the transverse direction and at each change in transverse slope and provide a finished grade as built for each layer.
  - .2 The Contractor shall provide asphalt grades referenced to finished pavement elevations. The Contractor shall be responsible for establishing grades for base and intermediate asphalt lifts as required. The interval for setting asphalt grades shall be 10.0 metres in the longitudinal direction of paving and 5.0 metres in the transverse direction and at each change in transverse slope and/or the width of the paving mat as agreed to by the Contractor and the Consultant.
  - .3 The interval for setting grades for Portland Cement Concrete (PCC) construction shall be dimensions for each individual PCC panel, or in general a 6 metre grid.
  - .4 Table 1 consists of survey layout for electrical, underground pipes / culverts and miscellaneous items to be provided by the Contractor. Layout requirements may be changed as mutually agreed upon with the Contractor and the Consultant.

**TABLE 1 – SURVEY LAYOUT PROVISIONS (NOT ALL ARE APPLICABLE)**

ITEM	LOCATION LAYOUT	OFFSET LAYOUT	ELEVATION	COMMENTS
Paint Markings	√			Marks at 10.0 m intervals on tangent lines. Marks at 5.0 m intervals on curves. Marks to center or edge of numbers and letters
Concrete Panels	√	√	√	Location and offset survey at corners. Elevation to top of concrete.

## **6. CONTRACTOR'S RESPONSIBILITIES**

- .1 The Contractor must satisfy themselves before commencing any work as to the meaning and intent of all marks and stakes. Should the Contractor discover or suspect any apparent error or omission in the Drawings, Specifications, stakes, marks, engineering tests, or other measurements done or provided by the Consultant, the Contractor shall immediately bring such apparent error or omission to the attention of the Consultant. The Consultant will make corrections and interpretations as may be necessary for the fulfilment of the intent of the Drawings and Specifications.
- .2 The Contractor shall be responsible for transferring the information from the Drawings, Specifications, or other measurements provided by the Consultant for performance of the Work in accordance with the Contract Documents.

## **7. EXISTING SERVICES**

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

## **8. RECORDS**

- .1 Maintain a complete, accurate log of control and survey work as it progresses, and as required in Section 01 13 00 for construction, quantity, and as-built record survey.
- .2 Record the locations of maintained, re-routed and abandoned service lines.

## **9. SUBMITTALS**

- .1 Submit the name and address of the Surveyor to the Consultant.
- .2 Throughout the duration of the project, the Contractor shall submit as-built survey information to the Consultant for review. In addition, upon completion of the project, the Contractor shall submit a complete set of mark-up drawings to the Consultant.
- .3 On request of the Consultant, submit documentation to verify the accuracy of field engineering work.
- .4 Submit a certificate signed by the surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with the Contract Documents.

**10. SUBSURFACE CONDITIONS**

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

**11. MEASUREMENT FOR PAYMENT**

- .1 See Section 01 13 00 – Measurement for Payment.

**PART 2 - PRODUCTS**

1. NOT USED

**PART 3 - EXECUTION**

1. NOT USED

**END OF SECTION**

## **PART 1 - GENERAL**

### **1. DESCRIPTION**

- .1 This Section specifies the requirements for the cleaning of the project site and the completed work during the time of Work and at the completion of the work.

### **2. REFERENCES**

- .1 All references to this Specifications, Standards, or Methods shall be understood to refer to the latest adopted revision, including all amendments.
- .2 The Victoria Airport Authority
  - .1 Articles of Agreement and General Conditions for Construction Contracts.

### **3. MEASUREMENT PROCEDURES**

- .1 No separate payment will be made under this Section. Include costs in the appropriate tender items.

### **4. GENERAL**

- .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
- .2 Store volatile waste in covered metal containers, and remove from the premises at end of each working day.
- .3 Dust control shall be exercised as required and as directed by the Engineer. Contractors shall supply the necessary water truck(s) as required for dust control purposes.

### **5. PROJECT CLEANLINESS**

- .1 Maintain the Work in tidy condition, free from accumulation of waste products and debris, including other than that caused by the Owner or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Engineer. Do not burn waste materials on site.
- .3 Clear snow and ice and remove from site.
- .4 Make arrangements with and obtain permits from the authorities having jurisdiction for the disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling.

- .7 Dispose of waste materials and debris off site at an approved facility except as directed by the Engineer.
- .8 For work on or around airside pavements, provide continuous cleaning of dust and debris as necessary to prevent damage to aircraft.
- .9 Prevent materials and rubbish from blowing onto aircraft maneuvering areas and becoming a hazard to aircraft operations.
- .10 The Contractor must demonstrate that he has sufficient equipment (pressure sprayers, vacuums, brushes, sweepers, trucks) and manpower to clean the asphalt and concrete from debris and slurry during saw cutting operations. The Contractor must also prevent the slurry from flowing out of the specific site area during work operations.
- .11 Use only cleaning materials recommended by the manufacturer of surfaces to be cleaned, and use as recommended by the cleaning material manufacturer.
- .12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

## **6. DAILY / FINAL CLEANING**

- .1 At the end of each shift in Work Area D and E, remove surplus products, tools, construction machinery and equipment not required for performance of the remaining Work.
- .2 When work is completed in Work Area B, ensure that Work Area C is adequately clean for aircraft usage as outlined in the PCO.
- .3 When work is completed in Work Area C, ensure that Work Area B is adequately clean for aircraft usage as outlined in the PCO.
- .4 Remove waste products and debris, and leave the Work area clean.
- .5 Remove waste materials from site on a daily basis at the end of each shift and dispose as directed by the Engineer. Do not burn any waste materials.
- .6 Make arrangements with and obtain permits from the authorities having jurisdiction for disposal of waste and debris.
- .7 Clean lighting reflectors, lenses, and other lighting surfaces.
- .8 Remove dirt and other disfiguration from exterior surfaces.
- .9 Sweep and wash clean paved areas.
- .10 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.



- .11 Manholes, catch basins, and electrical vaults.
  - .1 Protect existing facilities from joint sealant removal, cement slurry, and cleaning debris.
  - .2 If contaminated due to construction activities, all debris and water shall be removed from the underground structure with a hydrovac unit at the completion of the project.
- .12 Pavement surfaces
  - .1 All pavements shall be cleaned of mud, cement slurry or other deleterious materials at the end of each shift prior to inspection.
- .13 Landscaped Surfaces
  - .1 Rake surface to remove debris except in newly planted areas where debris shall be handpicked.
- .14 Electrical Equipment
  - .1 Protect existing facilities from joint sealant removal, cement slurry, and cleaning debris .
  - .2 If contaminated due to construction activities, clean lighting reflectors, lenses, and other lighting surfaces.

## **7. MEASUREMENT FOR PAYMENT**

- .1 No separate payment will be made for cleaning of the project site and the completed work during the time of Work and at the completion of the work.

**END OF SECTION**

**NOT USED**

## **PART 1 - GENERAL**

### **1. DESCRIPTION**

- .1 This Section specifies the requirements for the preparation of Project Record Documents by the Contractor for submission to the Consultant at the completion of the Work.

### **2. ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-warranty Meeting:
  - .1 Convene meeting one week prior to contract completion with contractor's representative and Consultant to:
    - .1 Verify Project requirements.
    - .2 Review manufacturer's installation instructions and warranty requirements.
  - .2 Consultant to establish communication procedures for:
    - .1 Notifying construction warranty defects.
    - .2 Determine priorities for type of defects.
    - .3 Determine reasonable response time.
  - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
  - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

### **3. ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Two (2) weeks prior to Substantial Performance of the Work, submit to the Consultant, four final copies of operating and maintenance manuals in English.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in the Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.

**4. FORMAT**

- .1 Organize data as instructional manual.
- .2 All submittals and final documents to be provided digitally. Delivered on two thumb drives.
- .3 Cover: identify each digital manual with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .4 Arrange content by systems, under Section numbers / folders and sequence of Table of Contents.
- .5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .6 Text: manufacturer's printed data, or typewritten data.
- .7 Drawings: Provide digital PDFs as well as CAD files (dwg format) on thumb drives.

**5. CONTENTS - PROJECT RECORD DOCUMENTS**

- .1 Table of Contents for Each Volume: provide title of project;
  - .1 Date of submission; names.
  - .2 Addresses, and telephone numbers of the Contractor with name of responsible parties.
  - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
  - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
  - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

## **6. AS-BUILT DOCUMENTS AND SAMPLES**

- .1 Consultant will provide one set of white prints for record drawing purposes.
- .2 Maintain, in addition to requirements in General Conditions, at site for Consultant one record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to Contract.
  - .5 Reviewed shop drawings, product data, and samples.
  - .6 Field test records.
  - .7 Inspection certificates.
  - .8 Manufacturer's certificates.
  - .9 Daily Manpower Summary and construction activity report.
  - .10 Weekly safety meeting and toolbox meetings
- .3 Store record documents and samples in field office apart from documents used for construction.
  - .1 Provide files, racks, and secure storage.
- .4 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
  - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .5 Maintain record documents in clean, dry and legible condition.
  - .1 Do not use record documents for construction purposes.
- .6 Keep record documents and samples available for inspection by Consultant.

## **7. RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS**

- .1 Record information on set of blue line opaque drawings. Wherever possible record as-built information digitally by survey to be incorporated into CAD file at end of project.

- .2 Maintain project record drawings and record accurately deviations from the Contract documents.
- .3 Record changes in red and submit set of prints to the Consultant at completion of project. Wherever possible record as-built information digitally to be incorporated into CAD file at end of project.
- .4 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .5 Record information concurrently with construction progress.
  - .1 Do not conceal the Work until required information is recorded.
- .6 Contract Drawings and shop drawings: mark each item to record actual construction, including:
  - .1 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .2 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
  - .3 Field changes of dimension and detail.
  - .4 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .5 Field changes of dimension and detail.
  - .6 Changes made by change orders or field order.
  - .7 Details not on the original Contract Drawings.
  - .8 References to related shop drawings and modifications.
- .7 Specifications: mark each item to record actual construction, including:
  - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
  - .2 Changes made by Addenda and Change Orders.
- .8 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records required by individual specifications sections.
- .9 Provide digital photos and daily construction summary report for site records.

**8. FINAL SURVEY**

- .1 Submit final site survey drawings and survey certificate, certifying that elevations and locations of completed Work are in conformance, or non-conformance with the Contract Documents. This includes all panel corner elevations and topographic survey. Survey data to be in ACAD Civil 3D with break lines completed and/or other format acceptable to the Consultant. CSV file and feature code file showing descriptions of points to accompany data.

**9. EQUIPMENT AND SYSTEMS – NOT USED**

- .1 For each item of equipment and each system include description of unit or system, and component parts.
  - .1 Give function, normal operation characteristics and limiting conditions.
  - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
  - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
  - .2 Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.

- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Section 01 45 00 – Quality Control.

## 10. MAINTENANCE MATERIALS – NOT USED

- .1 Spare Parts:
  - .1 Provide spare parts, in quantities specified in individual specification sections.
  - .2 Provide items of same manufacture and quality as items in Work.
  - .3 Deliver to site; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to the Consultant.
    - .2 Include approved listings in the Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit prior to final payment.
- .2 Extra Stock Materials:
  - .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
  - .2 Provide items of same manufacture and quality as items in the Work.
  - .3 Deliver to site; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to the Consultant.
    - .2 Include approved listings in the Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit prior to final payment.
- .3 Special Tools:
  - .1 Provide special tools, in quantities specified in individual specification section.



- .2 Provide items with tags identifying their associated function and equipment.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue items.
  - .1 Submit inventory listing to the Consultant.
  - .2 Include approved listings in the Maintenance Manual.

#### **11. DELIVERY, STORAGE AND HANDLING**

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

**END OF SECTION**

**NOT USED**

## **PART 1 - GENERAL**

### **1. DESCRIPTION**

- .1 This section specifies requirements for sawcutting, removal, disposal, and salvage of site work indicated by the Contract Documents or as directed by the Consultant.

### **2. SUMMARY**

- .1 Section Includes.
  - .1 Methods and procedures for demolishing, salvaging, recycling, and removing site work items designated to be removed in whole or in part, and for backfilling resulting trenches and excavations.
- .2 Related Sections.
  - .1 Section 01 33 00 - Submittal Procedures.
  - .2 Section 01 45 00 - Quality Control.
  - .3 Section 01 35 43 - Environmental Procedures.

### **3. MEASUREMENT PROCEDURES.**

- .1 Refer to Section 01 13 00 – Measurement for Payment.

### **4. REFERENCES**

- .1 All references to this Specifications, Standards, or Methods shall be understood to refer to the latest adopted revision, including all amendments.
- .2 Department of Justice Canada (Jus).
  - .1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
  - .2 Canadian Environmental Protection Act, 1999 (CEPA), c. 33.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .4 Transport Canada (TC).
  - .1 Transportation of Dangerous Goods Act, 2019 (TDGA).

## **5. DEFINITIONS**

- .1 Demolition: rapid destruction of pavements following removal of hazardous materials.
- .2 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities, and hazardous products, may include but not limited to: asbestos, PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well-being or environment if handled improperly.

## **6. SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets.
- .3 Shop drawings.
  - .1 Submit for acceptance drawings, diagrams or details showing sequence of demolition work, and supporting structures and underpinning where required by authorities having jurisdiction.
  - .2 Submit drawings stamped and signed by qualified professional engineer registered or licensed in Province of British Columbia, Canada.
- .4 Hazardous Materials: provide description of Hazardous Materials and Notification of Filing with proper authorities prior to beginning of the Work, as required.

## **7. QUALITY ASSURANCE**

- .1 Regulatory Requirements: ensure Work is performed in compliance with applicable Provincial/Territorial regulations.
- .2 Site Meetings.
  - .1 Convene pre-installation meeting one week prior to beginning work of this Section.
    - .1 Verify project requirements.
    - .2 Review installation and substrate conditions.
    - .3 Co-ordination with other construction sub trades.
  - .2 Arrange for site visit with the Consultant to examine existing site conditions adjacent to demolition work, prior to start of the Work.
  - .3 Hold project meetings every week.

- .4 Ensure key personnel, site supervisor, project manager, and subcontractor representatives attend.

## **8. DELIVERY, STORAGE AND HANDLING**

- .1 Perform Work in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Storage and Protection.
  - .1 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to acceptance of the Consultant and at no cost to the Owner.
  - .2 Remove and store materials to be salvaged, in manner to prevent damage.
  - .3 Store and protect in accordance with requirements for maximum preservation of material.
  - .4 Handle salvaged materials as new materials.
  - .5 Existing buried utilities and structures:
    - .1 Size, depth, and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
    - .2 Prior to commencing any excavation work, notify the applicable owner or authorities, confirm location and state of use of buried utilities and structures. Clearly mark such locations to prevent disturbance during work.
    - .3 Confirm locations of buried utilities by careful test excavations.
    - .4 Maintain and protect from damage, water, sewer, gas, fuel, electric, telephone, and other utilities and structures encountered. Obtain direction from the Consultant before moving or otherwise disturbing utilities or structures.
    - .5 Record as-built locations of maintained, re-routed and abandoned underground lines on Drawings.
- .3 Waste Management and Disposal.
  - .1 Divert excess materials from landfill to site accepted by the Consultant.
  - .2 Separate for reuse and recycling and place in designated containers for Steel, Metal, and Plastic waste.
  - .3 Place materials defined as hazardous or toxic in designated containers.

- .4 Handle and dispose of hazardous materials in accordance with Regional and Municipal regulations.
- .5 Label location of salvaged material's storage areas and provide barriers and security devices.
- .6 Ensure emptied containers are sealed and stored safely.
- .7 Source separate for recycling materials that cannot be salvaged for reuse including wood, metal, concrete and asphalt, and gypsum.
- .8 Remove materials that cannot be salvaged for reuse or recycling and dispose of in accordance with applicable codes at licensed facilities.
- .9 All materials suitable for re-use, other than that which is designated for re-use in work shall be transported and stockpiled at locations indicated or as directed by the Consultant.
- .10 The Contractor shall be responsible for obtaining all necessary permits.

## **9. SITE CONDITIONS**

- .1 Site Environmental Requirements.
  - .1 Perform work in accordance with Section 01 35 43 - Environmental Procedures.
  - .2 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
  - .3 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
    - .1 Ensure proper disposal procedures are maintained throughout the project.
  - .4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.
  - .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities or as directed by the Consultant.
  - .6 Protect trees, plants, and foliage on site and adjacent properties where indicated.

## **PART 2 - PRODUCTS**

### **1. EQUIPMENT**

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

## **PART 3 - EXECUTION**

### **1. PREPARATION**

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

### **2. REMOVAL OF HAZARDOUS WASTES**

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

### **3. REMOVAL OPERATIONS**

- .1 Remove items as indicated on the drawings and as noted elsewhere in the specifications.
- .2 Do not disturb items designated to remain in place.
- .3 Removal of items shall be staged in accordance with the operations plan to ensure the continued operation of the airport.
- .4 Removal of Pavements, Curbs, and Gutters:
  - .1 Perform sawcuts to lines indicated on drawings or as directed by the Consultant.
  - .2 Square up adjacent surfaces to remain in place by saw cutting or other method accepted by the Consultant.
  - .3 Protect adjacent joints and load transfer devices.
  - .4 Protect underlying and adjacent granular materials and concrete panels.
- .5 Prevent contamination of removed asphalt and concrete pavement by topsoil, underlying gravel or other materials.

- .6 Excavate at least 300 mm below pipe invert, when removing pipes under existing or future pavement area.
- .7 Use equipment and methods of removal and hauling which do not tear, gouge, break or otherwise damage or disturb adjacent pavement or underlying granular material and concrete panels.
- .8 Provide for suppression of dust generated by removal process.
- .9 Salvage.
  - .1 Carefully dismantle items containing materials for salvage. Reuse items as indicated on drawings. Stockpile salvaged materials not designated for re-use in work at locations indicated or as directed by the Consultant.
- .10 Disposal of Material.
  - .1 Dispose of materials not designated for salvage or reuse.
  - .2 All materials suitable for re-use, other than that which is designated for re-use in work shall be transported and stockpiled at locations indicated or as directed by the Consultant.
  - .3 Contractor shall be responsible for obtaining all necessary permits.
  - .4 Trim disposal areas to acceptance of the Consultant.

#### **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 examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

#### **5. REMOVAL FROM SITE**

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



- .3 Transport material designated for alternate disposal using accepted facilities in accordance with the applicable regulations.
- .4 Dispose of materials not designated for alternate disposal in accordance with the applicable regulations.

## **6. RESTORATION**

- .1 Restore areas and existing works outside areas of demolition to conditions that existed prior to beginning of the Work.
- .2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

## **7. CLEANING**

- .1 Remove debris, trim surfaces and leave work site clean, upon completion of the Work.
- .2 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
- .3 Ensure all haul routes are free from debris and dirt during and after construction activities, to the satisfaction of the Consultant.

**END OF SECTION**

**NOT USED**

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**PART 1 - GENERAL****1. SECTION INCLUDES**

- .1 Methods for removal of existing asphalt pavement.

**2. RELATED SECTIONS**

- .1 Section 01 74 11 - Cleaning.

**3. MEASUREMENT PROCEDURES**

- .1 Refer to Section 01 13 00 – Measurement for Payment.

**4. WASTE MANAGEMENT AND DISPOSAL**

- .1 Divert unused asphalt materials from landfill to local facility as accepted by local jurisdictions.
- .2 Separate waste materials for reuse and recycling in accordance with governing agencies.

**PART 2 - PRODUCTS****1. EQUIPMENT**

- .1 Use cold milling, planning, or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing pavement to depths or grades indicated.
- .2 Use mechanical saw cutting machine capable of following a straight line to provide a straight, clean vertical surface.

**PART 3 - EXECUTION****1. PREPARATION**

- .1 Prior to beginning removal, saw cutting, and milling operation, inspect, and verify with Consultant areas, depths, and lines of asphalt pavement to be milled or removed.

**2. PROTECTION**

- .1 Protect existing pavement not designated for removal or milling, light units, and structures from damage. In event of damage, immediately replace or make repairs to acceptance of Consultant at no additional cost.

- .2 Protect existing storm catch basins and inlets from slurry/debris entering the systems. In event of damage, immediately replace or make repair to acceptance of Consultant at no additional cost.
- .3 Protect existing aircraft tie down anchors which are to remain from disturbance during cold milling. In event of damage, immediately replace or make repair to acceptance of Consultant at no additional cost.

### **3. REMOVAL**

- .1 Remove existing asphalt pavement to lines and grades as indicated or established by Consultant.
- .2 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.
- .3 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel, or other materials.
- .4 Provide for suppression of dust generated by removal process.

### **4. 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.

### **5. SWEEPING**

- .1 Sweep remaining asphalt pavement and milled surfaces clean of debris and loose asphalt material resulting from removal operations using mechanical rotary power brooms and hand brooming as required.

**END OF SECTION**

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**PART 1 - GENERAL**

**1. DESCRIPTION**

- .1 This section specifies the requirements for the supply and construction of formwork for Cast-In-Place concrete items as indicated by the Contract Documents or as directed by the Consultant.

**2. RELATED SECTIONS**

- .1 Section 03 20 01 - Concrete Reinforcing.
- .2 Section 03 30 53 - Cast-in-place Concrete.
- .3 Section 32 13 13 – Concrete Paving.

**3. REFERENCES**

- .1 All references to this Specifications, Standards, or Methods shall be understood to refer to the latest adopted revision, including all amendments.
- .2 Canadian Standards Association (CSA International)
- .3 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .4 CSA O86S1, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
- .5 CSA-O121, Douglas Fir Plywood.
- .6 CSA-O151, Canadian Softwood Plywood.
- .7 CSA-O153, Poplar Plywood.
- .8 CAN/CSA-O325.0, Construction Sheathing.
- .9 CSA-O437 Series, Standards for OSB and Waferboard.
- .10 CAN/CSA S269.3, Concrete Formwork, National Standard of Canada
- .11 Underwriters' Laboratories of Canada (ULC)
- .12 CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards, and Pipe Covering.

**4. MEASUREMENT FOR PAYMENT**

- .1 No measurement shall be made under this section. Include costs in items of work for which concrete formwork is required.

**5. SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings for formwork.
- .3 Submit drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada.
- .4 Indicate method and schedule of construction, shoring, stripping, and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CAN/CSA-S269.3 for formwork drawings.
- .5 Indicate formwork design data: permissible rate of concrete placement and temperature of concrete, in forms.
- .6 Indicate sequence of erection and removal of formwork for review by the Consultant.
- .7 When slip forming and flying forms are used, submit details of equipment and procedures for review by the Consultant.

**6. DELIVERY, STORAGE AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 Place materials defined as hazardous or toxic in designated containers.
  - .2 Divert wood materials from landfill to a recycling facility as accepted by the Consultant.
  - .3 Divert plastic materials from landfill to a recycling facility as accepted by the Consultant.
  - .4 Divert unused form release material from landfill to an official hazardous material collections site as accepted by the Consultant.

**PART 2 - PRODUCTS**

**1. GENERAL**

- .1 Products shall meet the standards set out in the referenced standards and requirements of this section.

## **2. MATERIALS**

- .1 Formwork materials:
  - .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121 CAN/CSA-O86 CSA O437 Series CSA-O153.
  - .2 For concrete with special architectural features, use formwork materials to CSA-A23.1/A23.2.
  - .3 Rigid insulation board: to CAN/ULC-S701.
  - .4 Formwork shall be G1S exterior grade Douglas Fir Plywood, steel or other suitable form grade material. Forms shall not have patches, broken edges, or joint widths greater than 1.5 mm.
  - .5 Pan forms: permanent as indicated.
- .2 Form ties:
  - .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
  - .2 For architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.
- .3 Form liner:
  - .1 Plywood: Douglas Fir to CSA-O121, grade.
  - .2 Waferboard: to CAN/CSA-O325.0.
- .4 Form release agent
  - .1 Non-staining chemical type form release agent.
  - .2 Form stripping agent: colourless mineral oil, biodegradable, free of kerosene, with viscosity between 70 and 110 seconds Saybolt Universal, 15 to 24 mm<sup>2</sup>/s at 40 °C, flashpoint minimum 150 °C, open cup.

## **PART 3 - EXECUTION**

### **1. FABRICATION AND ERECTION**

- .1 The Contractor shall assume full responsibility for the structural adequacy of the forms to withstand all concrete and construction loads.

- .2 Verify lines, levels, and centres before proceeding with formwork and ensure dimensions agree with drawings.
- .3 Obtain the Consultant's acceptance for use of earth forms framing openings not indicated on drawings.
- .4 Hand trim sides and bottoms, and remove loose earth from earth forms before placing concrete.
- .5 Forms shall be constructed that the finished concrete will conform to the shape, dimensions and tolerances as specified.
- .6 Refer to architectural drawings for concrete members requiring architectural exposed finishes.
- .7 Do not place shores and mud sills on frozen ground.
- .8 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .9 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations, and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .10 Align form joints and make watertight.
- .11 Keep form joints to minimum.
- .12 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
- .13 Form chases, slots, openings, drips, recesses, expansion, and control joints as indicated.
- .14 Construct forms for architectural concrete, and place ties as indicated.
- .15 Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.
- .16 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.
- .17 When slip forming is used, submit details as indicated in Part 1, Section 5 – Submittals.

## **2. REMOVAL AND RESHORING**

- .1 Forms shall not be removed until concrete has attained sufficient strength that no damage to strength or continuity of concrete will occur when forms are removed. Obtain acceptance from the Consultant prior to removing formwork.



- .2 Remove forms in a manner to prevent damage to concrete. Use only wooden edges to wedge between the form and the concrete.
- .3 Re-use formwork subject to requirements of CSA-A23.1/A23.2.

**END OF SECTION**

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## **PART 1 - GENERAL**

### **1. DESCRIPTION**

- .1 This section specifies the requirements for the supply and installation of reinforcing steel for the partial depth concrete top repair of a manhole as indicated by the Contract Documents or as directed by the Consultant.

### **2. RELATED SECTIONS**

- .1 Section 03 10 00 - Concrete Forming and Accessories.
- .2 Section 03 30 00 - Cast-in-place Concrete.
- .3 Section 32 13 13 – Concrete Paving

### **3. MEASUREMENT PROCEDURES**

- .1 No measurement will be made under this Section.
  - .1 Include costs in items of work for which reinforcing steel is required.

### **4. REFERENCES**

- .1 All references to this Specifications, Standards, or Methods shall be understood to refer to the latest adopted revision, including all amendments.
- .2 American Concrete Institute (ACI)
  - .1 MNL-66(20), ACI Detailing Manual
    - .1 ACI 315, Standard on Detailing of Concrete Reinforcement.
    - .2 ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.
- .3 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A143/A143M, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
  - .2 ASTM A185/A185M, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
  - .3 ASTM A497/A497M, Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.

- .4 ASTM A775/A775M, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
- .4 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1/A23.2:19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2 CSA-A23.3:19, Design of Concrete Structures.
  - .3 CSA-G30.18:21, Carbon steel bars for concrete reinforcement.
  - .4 CSA-G40.20-13/G40.21-13 (R2023), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .5 CAN/CSA-G164-18 (R2023), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .6 CSA-W186-M1990 (R2016), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .5 Reinforcing Steel Institute of Canada (RSIC)
  - .1 RSIC, Reinforcing Steel Manual of Standard Practice 2020.

## 5. SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice and ACI 315.
- .3 At least four weeks prior to commencing work provide to the Consultant.
  - .1 A certified copy of mill test report of reinforcing steel, showing physical and chemical analysis.
  - .2 Proposed source of material to be supplied.
- .4 Submit shop drawings including placing of reinforcement and indicate:
  - .1 Bar bending details.
  - .2 Lists.
  - .3 Quantities of reinforcement.
  - .4 Indicate sizes, spacings, locations of chairs, spacers, and hangers.

- .5 Detail lap lengths and bar development lengths to CSA-A23.3:19, unless otherwise indicated.
  - .1 Provide type A, B, C tension lap splices where indicated.
- .6 When Chromate solution is used as replacement for galvanizing non-prestressed reinforcement, provide product description for review and acceptance by the Consultant prior to its use.
- .7 Quality Assurance: in accordance with Section 01 45 00 – Quality Control and as described in Part 2, Section 3 – Source Quality Control.
  - .1 Mill Test Report: provide the Consultant with certified copy of mill test report of reinforcing steel, minimum four weeks prior to beginning reinforcing work.
  - .2 Submit in writing to the Consultant proposed source of reinforcement material to be supplied.

## **6. DELIVERY, STORAGE AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with governing agencies.
  - .2 Place materials defined as hazardous or toxic in designated containers.

## **PART 2 - PRODUCTS**

### **1. MATERIALS**

- .1 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18:21, unless indicated otherwise.
- .2 Reinforcing steel: weldable low alloy steel deformed bars to CAN/CSA-G30.18:21.
- .3 Deformed steel wire for concrete reinforcement: to ASTM A1064/A1064M
- .4 Welded steel wire fabric: to ASTM A1064/A1064M
  - .1 Provide in flat sheets only.
- .5 Welded deformed steel wire fabric: to ASTM A1064/A1064M.
  - .1 Provide in flat sheets only.
- .6 Epoxy Coating of non-prestressed reinforcement: to ASTM A775/A775M.

- .7 Galvanizing of non-prestressed reinforcement: to included in A23.3:19, minimum zinc coating 610 g/m<sup>2</sup>.
- .8 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2:19.
- .9 Mechanical splices: subject to acceptance by the Consultant.
- .10 Plain round bars: to CSA-G40.20-13/G40.21-13 (R2023).

## **2. FABRICATION**

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2:19, ACI 315 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
  - .1 ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures unless indicated otherwise.
- .2 Obtain Consultant's acceptance for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon acceptance by the Consultant, weld reinforcement in accordance with CSA-W186:21.
- .4 Welding shall be performed by a company certified by the Canadian Welding Bureau in accordance with CSA-W47.1-09 (R2014).
- .5 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.
  - .1 Ship epoxy coated bars in accordance with ASTM A775A/A775M.

## **3. SOURCE QUALITY CONTROL**

- .1 Provide the Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum four weeks prior to beginning reinforcing work.
- .2 Inform the Consultant of proposed source of material to be supplied.

## **PART 3 - EXECUTION**

### **1. PREPARATION**

- .1 Galvanizing to include chromate treatment.
- .2 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.

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## **2. PLACING REINFORCEMENT**

- .1 Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2:19.
- .2 Reinforcing steel shall not be spliced unless indicated by the Contract documents or accepted by the Consultant.
- .3 Reinforcement of size and layout indicated by the Contract documents shall be accurately placed and aligned. Place all dowels accurately.
- .4 Reinforcing steel shall be adequately supported by proper chairs, spacers, hangers, and ties to prevent movement during placement of concrete.
- .5 Reinforcing steel shall be placed to meet standard tolerances.
- .6 Use plain round bars as slip dowels in concrete.
  - .1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.
  - .2 When paint is dry, apply thick even film of mineral lubricating grease.
- .7 Prior to placing concrete, obtain the Consultant's acceptance of reinforcing material and placement.
- .8 Ensure cover to reinforcement is maintained during concrete pour.
- .9 Protect epoxy coated portions of bars with covering during transportation and handling.

## **3. FIELD TOUCH-UP**

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

**END OF SECTION**

## **PART 1 - GENERAL**

### **1. DESCRIPTION**

- .1 This section specifies the requirements for supply and application of joint sealants as indicated by the Contract Documents or as directed by the Consultant.

### **2. SUBMITTALS**

- .1 At least two weeks prior to commencing work submit the following to the Consultant.
  - .1 Manufacturer's test data and certification that the products supplied meet the requirements of this section.
  - .2 Submit samples of joint sealant and foam backer rod if requested by the Engineer.

### **3. MEASUREMENT PROCEDURES**

- .1 Refer to Section 01 13 00 – Measurement for Payment.

## **PART 2 - PRODUCTS**

### **1. MATERIALS**

- .1 Backer rod: to ASTM D5249 Type 1, non-gassing, heat-resistant, round foam rod. Diameter of rod is dependent on the width of joint, but should be 25% larger than the joint width.
- .2 Joint sealant product for PCC/PCC joints are to be Sikasil®-728 SL silicone sealant or Crafcro Roadsaver SL 34903, or accepted equivalent.
- .3 Joint sealant product for HMAC/PCC and HMAC/HMAC joints is to be Crafcro Roadsaver 522 or accepted equivalent.

## **PART 3 - EXECUTION**

### **1. GENERAL NOTE**

- .1 No dust debris is permitted on the apron at any point of the removals, joint widening or sealing processes.

### **2. PREPARATION**

- .1 Remove existing joint sealant from all joints as outlined on the drawings. There should be no remnants of the existing sealant or backer rod in the joints.
- .2 Saw cut joints to dimensions as shown on the drawings or specified by the Consultant.

- .1 For PCC/PCC Joints: Joints that are currently less than 21mm wide should be widened to a consistent 21mm width. Joints greater than 21mm should remain their existing width.
- .2 For HMAC/HMAC Joints: Joints that are currently less than 15mm wide should be widened to a consistent 15mm width. Joints greater than 15mm should remain their existing width.
- .3 Flush joints with water to remove saw slurry immediately after sawing.
- .4 Sandblast joint to remove remaining residue.
- .5 After sandblasting, clean, and dry saw cut joints using lance with oil-free hot compressed air, applied at minimum pressure of 600 kPa.
- .6 Follow manufacturer's specifications for any additional joint preparation requirements.
- .7 Dispose of material removed from joints off site to appropriate disposal facility.

### **3. APPLICATION OF SEALANT**

- .1 Obtain Consultant's review for preparation of joints before application of sealant.
- .2 Do not use sealant material that has been frozen.
- .3 Install backer rod and apply sealant for PCC/PCC joints as per manufacturers' recommendations. Ensure joints are clean and dry immediately before installing backer rod and applying sealant.
- .4 Fill joints with sealant immediately after cleaning. Maintain tip of cone or wand close to bottom of routed groove during filling.
- .5 Fill joints only when air temperature is above 10°C, daily low temperature does not fall below 5°C, and no rain is forecast. Obtain acceptance from Consultant to apply joint sealant if temperature is below 10°C and expected to fall below 5°C.
- .6 Pour sealant in joint so that cooled cured sealant fills crack from the bottom up to a level 6 mm below the pavement surface.
- .7 Where the sealant is deficient in any of the following ways, it shall be removed and resealed as directed by the Consultant.
  - .1 The sealant contains imbedded foreign material or other dusting material.
  - .2 The sealant contains trapped air bubbles.
  - .3 The sealant has debonded or pulled away from the pavement surfaces of the sealant reservoir.
  - .4 The backer rod has 'floated' in the joint and the sealant is not the required depth (thickness) over the backer rod.



- .5 The sealant has been installed higher than the pavement surface.

**4. FINAL CLEANUP**

- .1 Upon completion and curing of the joint sealing compound, the Contractor shall remove all remaining concrete slurry and sandblasting sand from the pavement surface.
- .2 The pavement surface shall be cleaned using high-pressure water; power brooms and vacuum trucks as required.
- .3 Debris from the cleaning process shall not be allowed to flow into the drainage system including manholes, catch basins, and drainage ditches.

**END OF SECTION**

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**PART 1 GENERAL**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 74 11 – Cleaning

**1.2 MEASUREMENT PROCEDURES**

- .1 Refer to Section 01 13 00 – Measurement for Payment.

**1.3 REFERENCES**

- .1 ASTM International
  - .1 ASTM D244-09(2017), Standard Test Methods for Emulsified Asphalts.
  - .2 ASTM D6690-21, Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
  - .3 ASTM D7116-16(2021), Standard Specification for Joint Sealants, Hot Applied, Jet-Fuel-Resistant Type for Portland Cement Concrete Pavements.
- .2 Canada Green Building Council (CaGBC)
  - .1 LEED Canada-NC Version 1.0-[2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum [2007]).
  - .2 LEED Canada-CI Version 1.0-[2007], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.
  - .3 LEED Canada 2009 for Design and Construction-[2010], LEED Canada 2009 for Design and Construction Leadership in Energy and Environmental Design Green Building Rating System Reference Guide.
  - .4 LEED Canada for Existing Buildings, Operations and Maintenance-[2009], LEED Canada 2009 Leadership In Energy and Environmental Design Green Building Rating System Reference Guide.
- .3 General Services Administration Federal Specifications (GSA) - Federal Specifications (FS)
  - .1 FS-SS-S-200-[E(2)1993], Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.

## **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for products specified and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Tests and Evaluation Reports:
  - .1 Submit manufacturer's test data and certification that sealant materials meet requirements of this Section as soon as possible after award and prior to beginning Work.

## **1.5 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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect products from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- .1 Hot poured sealant: to ASTM D6690.
  - .1 All Hot Pour Joint Sealant to be:
    - .1 Crafcro Roadsaver 522.

### **2.2 EQUIPMENT**

- .1 Heating equipment for melting sealant:
  - .1 Insulated double shell, oil jacketed kettle.

- .2 Motor driven agitator.
- .3 Totally automatic temperature control system controlling both heat transfer oil temperature and sealing compound temperature.
- .2 Pressure applicator capable of applying sealant at 100 kPa by means of hose and wand fitted with size of tip suitable for cracks.
  - .1 Capable of maintaining temperature of sealant as per manufacturer's recommendation during application.
- .3 Small diameter diamond bladed pavement saws.
- .4 Mechanical rotary routers specifically designed for following random irregular cracks without tearing, chipping or spalling edge of cracks and capable of producing clean, vertical side walls. Open "V" type grooves not permitted.
- .5 Mixer: in accordance with manufacturer's recommendations.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for pavement sealant application 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 accepted by Consultant.

#### **3.2 PREPARATION**

- .1 Provisional items to be reviewed in field with Consultant for extent of work.
- .2 Refer to Contract Drawings for extents of work.
- .3 Use joint plows or high-pressure water to remove old sealant material from designated cracks/joints.
- .4 Saw/rout cracks/joints to width and depth as specified on Contract Drawings.
- .5 Centre of sawcut/rout to deviate not more than plus or minus 10 mm from centreline of crack.

- .6 Dispose of material removed from cracks off-site.
- .7 Clean and dry sawn/routed cracks/joints using pressurized water and compressed air lance with oil-free hot compressed air, applied at minimum pressure of 600 kPa.
- .8 Obtain Consultant's acceptance of preparation of cracks/joints before application of sealant.

### **3.3 APPLICATION OF SEALANT**

- .1 Do not use sealant material that has been frozen.
- .2 Ensure cracks are clean and dry immediately before applying sealant.
- .3 Heat joint sealant slowly to application temperature in accordance with manufacturer's recommendations.
- .4 Mix two-component sealant in accordance with manufacturer's recommendations.
- .5 Fill crack with sealant immediately after cleaning. Maintain tip of cone or wand close to bottom of routed groove during filling.
- .6 Fill cracks only when air temperature is above 10°C, daily low temperature does not fall below 5°C, and no rain is forecast.
- .7 Pour sealant in crack so that cured sealant fills crack from bottom up to level 3 mm to 5 mm below pavement surface.
- .8 Keep traffic off newly sealed cracks for 4 hours or as recommended by manufacturer.

### **3.4 CLEANING**

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

**END OF SECTION**

## **PART 1 - GENERAL**

### **1. SECTION INCLUDES**

- .1 Requirements for producing and placing Portland cement concrete for roadways and airfield pavements such as PCC panels and concrete transitions to lines, grades and typical cross sections as indicated by the Contract Documents or as directed by the Consultant.
- .2 Acceptance criteria, requirements for the remedying of defects and the Contractor's responsibilities in protecting the pavement until handover to the Owner are also included.

### **2. RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 03 10 00 - Concrete Forming and Accessories.
- .3 Section 03 20 00 - Concrete Reinforcing.
- .4 Section 03 30 20 - Sawcutting and Sealing of Airfield Joints.
- .5 Section 01 32 16.07 - Construction Progress Schedule Bar (GANNT) Chart.

### **3. MEASUREMENT PROCEDURES**

- .1 Refer to Section 01 13 00 – Measurement for Payment.

### **4. REFERENCES**

- .1 All references to this Specifications, Standards, or Methods shall be understood to refer to the latest adopted revision, including all amendments.
- .2 American Concrete Institute (ACI)
  - .1 ACI 306 R-16 Cold Weather Concreting
  - .2 ACI 305 R-10 Hot Weather Concreting
- .3 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM A775/A775M-22, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
  - .2 ASTM C171-20, Specification for Sheet Materials for Curing Concrete.
  - .3 ASTM C260/C0260M-10a(2016), Standard Specification for Air-Entraining Admixtures for Concrete.
  - .4 ASTM C309-19, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

- .5 ASTM C457/C457M-23, Standard Test Method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete.
  - .6 ASTM C494/C494M-19e1, Standard Specification for Chemical Admixtures for Concrete.
  - .7 ASTM D412-16(2021), Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
  - .8 ASTM D624-00(2020), Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
  - .9 ASTM D1752-18(2023), Standard Specification for Preformed Sponge Rubber, Cork, and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
  - .10 ASTM D2628-91(2016), Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements.
  - .11 ASTM D5329-20, Standard Test Methods for Sealants and Fillers, Hot-Applied, For Joints and Cracks in Asphalt Pavements and Portland Cement Concrete Pavements.
  - .12 ASTM D6690-21, Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
- .4 Canadian Standards Association (CSA International).
- .1 CAN/CSA-A23.1:19/A23.2:19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2 CAN/CSA-A3000-18, Cementitious Materials Compendium.
  - .3 CAN/CSA G30.18:21, Carbon Steel Bars for Concrete Reinforcement.
  - .4 CAN/CSA A283:19, Qualification Code for Concrete Testing Laboratories

## 5. ACRONYMS AND TYPES

- .1 Cement: hydraulic cement or blended hydraulic cement (XXb - where b denotes blended).
  - .1 Type GU or GUb - General use cement.
- .2 Fly ash:
  - .1 Type F - with CaO content less than 15%.

## 6. SUBMITTALS

The following items shall be submitted to the Consultant a minimum of two (2) weeks prior to installation of the concrete panel overlay:

- .1 Submittals in accordance with Section 01 33 00 – Submittal Procedures
- .2 Aggregates
  - .1 Submit proposed source location and provide access for sampling if requested by the Consultant.
  - .2 Submit petrographic analysis of proposed aggregate(s). A qualified testing laboratory shall preform the petrographic analysis.
  - .3 Submit records of tests for compliance with standard requirements for deleterious materials and physical properties as specified in CAN/CSA A23.1, Table 12. The test results older than 12 months shall not be accepted.
- .3 Mix Design
  - .1 At least two weeks prior to commencing work, provide the mix design for the concrete to be used in the construction of PCC airfield paving and results of trial mix design production for review prior to commencing work.
  - .2 Provide certification that the mix proportions will produce concrete of specified durability and yield and that strength will comply with CSA-A23.1.
  - .3 Mix design documentation shall include all components of the mix, quantities of materials used and all admixtures. Proprietary concrete mixes without mix design shall not be accepted.
  - .4 Submit verification that the mix design is adjusted to mitigate alkali aggregate reactivity (AAR) in accordance with CSA A23.2-27A. In the absence of expansion testing (CSA-A23.2-14A), aggregate should be considered moderately reactive and the level of prevention 5-75 years of service life.
- .4 Material Certification
  - .1 Provide manufacturer's test data and certification by qualified independent inspection and testing laboratory that the following materials meet requirements of this section.
    - .1 Portland cement
    - .2 Supplementary Cementing Materials



- .3 Admixtures
- .4 Joint Fillers
- .5 Curing Materials
- .5 Paving Plan
  - .1 The Contractor shall submit a detailed paving plan to the Consultant for review and acceptance, detailing the following:
    - .1 A detailed plan illustrating sequence of pavement panel construction.
    - .2 A detailed concrete pavement construction schedule prepared in the format as described in Section 01 32 16.07 - Construction Progress Schedule Bar (GANTT) Chart.
    - .3 Contingency plans to deal with the interruption in concrete supply, breakdown of equipment and inclement weather conditions during paving operations.
    - .4 Modifications to the production and paving operation to accommodate production rates lower than the recommended minimum contained in this specification.
    - .5 Plan shall indicate proposed locations and methods to provide temporary drainage and pumping as necessary to keep site free from water. The plan shall also indicate proposed methods to prevent discharge of water containing suspended materials into watercourses, sewer and drainage systems.
  - .2 The paving plan shall only be changed upon review and acceptance from the Consultant.
  - .3 Acceptance of the plan by the Consultant will not relieve the Contractor of any responsibility in attaining a defect free product.
- .6 Quality Control Plan
  - .1 The Contractor shall submit a detailed Quality Control plan for review and acceptance of the Consultant, detailing the following:
    - .1 Quality Control Roles and Responsibilities with stating names and roles of each person involved on Quality Control activities.
    - .2 Name of Quality Control testing firm / laboratory that is certified by CCIL, in accordance with CSA A283:19 Advanced Concrete Certification.

- .3 Documents control, storage and handling procedure.
- .4 Testing, and reporting procedure for each material installed.
- .5 Quality Control Sampling and Testing Schedule.
- .6 Minimum requirements for quality control are provided in this Section – Table 1.
- .7 Concrete pours: submit accurate records of poured concrete items indicating date/time and location of pour, quality, air temperature and test samples taken as part of Quality Control testing.
- .8 Concrete hauling time: maximum allowable time of 90 minutes for concrete to be delivered to site of Work and discharged after batching.

## **7. QUALIFICATIONS**

- .1 Installer: Company or persons specializing in Portland Cement Concrete paving with minimum 5 years of airfield paving experience.

## **8. WASTE MANAGEMENT AND DISPOSAL**

- .1 Concrete washing and/or dumping on site is not acceptable.

## **9. CONCRETE BATCH PLANT PRODUCTION RECORDS**

- .1 For Ready-mix concrete batch plants, production records shall be made available to the Consultant upon request. The batch plant production record shall include the batch record for each individual load of concrete which shall include the following information:
  - .1 Delivery ticket number
  - .2 Concrete mix design description
  - .3 Design slump, mm,  $\pm$  mm
  - .4 Design air content, Range in air content, %
  - .5 Design flexural strength, MPa
  - .6 Batch time (of initial addition of water and cement)
  - .7 Start of mixing time
  - .8 End of mixing time
  - .9 Mixing time
  - .10 Start of discharge time

- .11 Completion of discharge time
- .12 Truck number
- .13 Target and actual batch quantities for:
  - .1 Cement
  - .2 Fly Ash
  - .3 Water
  - .4 Coarse aggregate(s)
  - .5 Fine aggregate(s)
  - .6 Admixtures
  - .7 Aggregates moisture contents.

## **PART 2 - PRODUCTS**

### **1. MATERIALS**

- .1 Portland cement: to CAN/CSA-A3000-18, Type GU or GUb cement.
- .2 Fly ash: to CAN/CSAA3000-18, Class F, maximum 20% by total mass of cementing materials.
- .3 Aggregates: to CAN/CSA A23.1:19 Table 12, and to following requirements. Adjust water as required to compensate for minor variations in aggregate moisture.
  - .1 Coarse aggregate:
    - .1 Combined grading of blended coarse aggregate to be within limits of Table 11 (Group 1) of CSA A23.1.
    - .2 Gradation: to CAN/CSA-A23.1, Table 11 (Group 1), nominal sizes 20 mm aggregate for concrete pavement.
  - .2 Fine aggregate:
    - .1 Gradation: to CAN/CSA-A23.1, Table 10 and be within limits of FA1.
- .4 Water for use in Portland cement concrete and for curing shall be clear and free from injurious amounts of oil, acid, alkali, soluble chlorides, organic matter, sediment, or any other deleterious substances. Water shall meet the requirements of CSA A23.1

- .5 Monomolecular film (Evaporation reducer) – Confirm by BASF, or accepted equivalent. Application in accordance with the manufacturer’s recommendations.
- .6 Curing compound: to ASTM C309, Type 2 (white pigmented), Class B.
- .7 See Section 03 03 20 – Sawcutting and Sealing of Airfield Panel Joints for product details.
- .8 Preformed expansion joint filler: to ASTM D1752.
- .9 Dowels and tiebars: to CSA G30.18. (NOT USED)
  - .1 Smooth Dowels: corrosion resistant, clean, straight and free from flattened or burred ends, plain round bars of grade 400 or better conforming to CSA-G30.21 and epoxy-coated to ASTM A775/A775M-22.
  - .2 Deformed Dowels: corrosion resistant, clean, straight and free from flattened or burred ends, of grade 400 or better conforming to CSA-G30.18.21 and epoxy-coated to ASTM A775/A775M-22.
  - .3 Tie-Bars: deformed steel bars of grade 400, in compliance with CSA G30.18.21 and epoxy-coated to ASTM A775/A775M-22.
- .10 Protective covers and insulation for cold weather concreting: to CAN/CSAA23.1:19, Section 7.2.2.
- .11 Hot weather concreting: to CAN/CSAA23.1:19, Section 7.2.1.
- .12 Chairs, bolsters, bar supports and spacers to CSA A23.1 and as indicated by the Contract Documents.
- .13 Adhesive for anchoring dowels and tie-bars to existing concrete shall be:
  - .1 Acrylic adhesive / epoxy pressure injected using a dual component injection gun with mixing at the nozzle.
- .14 Material used for edge spall repairs shall be compatible with the concrete mix used for paving and shall be reviewed for acceptance by the Consultant, prior to use.
- .15 Concrete Crack Repair Material:
  - .1 Material to be Delpatch Elastometric Concrete, to be installed as per manufacturer’s recommendations.
- .16 Concrete Spall Repairs
  - .1 Repair material to be Delpatch Elastometric Concrete, installed as per manufacturer’s recommendations.
- .17 Bonding Agent

- .1 Sikadur -32 Hi-Mod bonding adhesive or accepted equivalent, installed as per manufacturer's recommendations.

## 2. MIXES

- .1 Concrete mix design to be reviewed by the Consultant and shall comply with the CSA A23.1, Table 1, Table 2 and Table 4 requirements for class of exposure C-2, non-structurally reinforced concrete exposed to chlorides with or without freezing and thawing conditions. Additional requirements in Part 2, Section 2.3.
- .2 Mix Properties
  - .1 Use Type GU (general use hydraulic cement with a minimum **cement** content 310 kg/m<sup>3</sup>
  - .2 Fly ash Type F shall be utilized in concrete mix to minimize shrinkage and curling of concrete pavements, up to 20% by total mass of cementing materials.
  - .3 Maximum water to cementing materials ratio 0.45.
  - .4 Air content when tested in accordance with CAN/CSA-23.2-4C, immediately after discharge: 5% to 8% for 20mm aggregate.
  - .5 Slump at point of final placement, when tested in accordance with CSA A23.2-5C to be:
    - .1 45 mm ± 15 mm for fixed form paving with mechanical paver.
    - .2 80 mm ± 20 mm for hand placing when accepted by the Consultant.
- .3 Mix performance
  - .1 Flexural strength when tested in conformance with CSA-A23.2 – 8C: at 28 days, Modulus of Rupture to be 4.2 MPa.
  - .2 Compressive strength when tested in accordance with CAN/CSA-23.2 – 9C: average 28 day compressive strength to be minimum 32 MPa. The design of 28 day compressive strength shall be established on the trial batch testing to develop the relationship between compressive strength and specified flexural strength. Higher compressive strength than that for Class C-2 may be required to meet flexural strength requirements.
  - .3 Maximum spacing factor (ASTM C457) – 0.230 mm. No single test with the spacing factor more than 0.230mm will be accepted. The provision of CSA A23.1-19, Section 4.3.3.3.a shall not apply.
  - .4 Minimum air content in hardened concrete – 3%.

- .5 The results obtained by computerized air-void analyzers shall not be accepted.

### **3. TRIAL MIXES**

- .1 As soon as possible after commencement of the Contract, the Contractor shall undertake laboratory and plant/equipment trial mixes complying with the requirements of this specification. The results of these trial mixes shall satisfy the Consultant that the materials and designed concrete mix will be capable of proper consolidation, by machine or hand methods, for its full depth and the specified flexural and compressive strengths will be obtained. The Contractor shall pay for all costs associated with the trial mixes.
- .2 Trial mixes shall be used to develop the relationship between modulus of rupture and compressive strength when tested in accordance with CSA-A23.2 at ages of 3, 7 and 28 days. A minimum of 10 test beams and 10 test cylinders shall be made for each trial mix and tested at the described frequency, and the results shall be submitted to the Consultant. The design 28 day compressive strength shall be established based on the trial batch data and the correlation factor to achieve specified flexural strength of 4.2 MPa. If the average strength at 7 days is less than 80% of the specified minimum 28 day strength, check mix and adjust to ensure the required strength is obtained.
- .3 If the concrete in selected paving areas has to be deposited by a concrete pump requiring special mixes such as higher cement content, high sand/stone ratios and/or high slump, separate trial mixes shall be developed to assure that the quality and durability properties of the concrete are met. Trial testing results shall include the relationship between modulus of rupture and compressive strength at same ages and the same frequency described in Part 2 Section 3.3.
- .4 The Contractor shall supply results of measurements of the air-void system parameters as per ASTM C457, modified point count method. Testing shall be conducted by the testing laboratory, certified by CCIL in accordance with CSA A283:19, Advanced Concrete Certification. A mix design accepted by the Consultant shall not be varied during the course of the work unless acceptance is obtained from the Consultant in writing. Any change to the source of cementing materials, aggregate source and admixtures will require a new trial batch testing and a new correlation between the compressive and flexural strength of concrete.

### **4. SAMPLING AND TESTING**

- .1 During the progress of the work tests will be carried out on materials and workmanship in order to ensure compliance with the requirements of the specifications.
- .2 Quality Assurance Testing
- .1 The Owner shall be responsible for Quality Assurance for determination of rejection or acceptance of the work and verification purpose; however, these tests are not part of the Quality Control requirements which the Contractor shall still fulfill.

Quality assurance testing will be carried out by the testing agency designated by the Consultant. The testing agency shall be certified by CCIL in accordance with CSA A283, Advanced Concrete Certification.

### .3 Quality Control Testing

- .1 Quality control testing is the responsibility of the Contractor throughout every stage of the work, from the production of aggregates to the final accepted product. Quality Control testing shall be performed by the Contractor's designated testing laboratory to ensure conformance with the specifications. The Contractor shall be required to conform to certain minimum testing requirements, as noted in Table 1 below.
- .2 The Contractor shall use professional engineering services and a qualified testing laboratory certified by CCIL in accordance with CSA A283, Advanced Concrete Certification. The testing laboratory conducting air void characteristics (linear traverse test) shall have a CCIL or MTO certification to conduct the testing. All Quality Control technicians shall be CCIL certified to test concrete. Copies of the certification shall be provided to the Consultant.
- .3 The minimum frequencies of Quality Control testing are described in Table 1. Results of all Quality Control tests shall be tabulated and made available to the Consultant at any time. The purpose of Quality Assurance and Quality Control is not to create duplicate testing, but rather complementary.
- .4 The following is the required minimum concrete testing to be performed by the contractor's Quality Control on a continual basis throughout the duration of the project. These tests do not replace initial conformance and certification tests as outlined previously in this specification.

<b>TABLE 1</b>	
<b>Item</b>	<b>Frequency</b>
<b>CONCRETE:</b>	
Unit Weight	Every 40 m <sup>3</sup>
Slump	Every 40 m <sup>3</sup>
Air	Every 40 m <sup>3</sup>
Cylinders	6 Total
Beams	Every 80 m <sup>3</sup>

- .5 Quality Control tests shall be performed at point of discharge of mix onto accepted base or into forms. When concrete is

discharged using a concrete pump, sampling shall be at the end of a discharge hose.

## **PART 3 - EXECUTION**

### **1. TRIAL AREA – NOT USED**

- .1 Prior to placing concrete, the Contractor shall construct a trial area and shall include jointing. Jointing shall include vertical face construction joints at the commencement and termination of the trial area, transverse contraction joints and sawcutting and sealing of joints.
- .2 The trial area shall be a minimum of 60 m in length and one panel in width. NOTE – the Consultant may allow the trial area to be the outside row of the apron at the Consultant's discretion. However, if the trial area does not meet the specification requirements as noted in Item 3.1.8, the trial area shall be removed and disposed of at no cost to the Owner.
- .3 If the trial area is not in full compliance with the specifications it shall be repeated until it passes all the requirements of the specifications.
- .4 The trial area shall be used to demonstrate the capability of the machinery and methods used to produce the desired placement, installation of reinforcing tie-bars and dowels, concrete strength, surface level and tolerance, texture, and methods of joint forming and sealing. Concrete curing regimes shall be agreed with the Consultant during the trial.
- .5 During the trial the depth and timing of the initial saw cutting shall be determined by the Contractor.
- .6 Sawcutting and sealing of joints on the trial area may be scheduled to coincide with work on the other areas of the airport new pavement.
- .7 The Contractor shall extract a minimum of two eight-inch long cores from the trial area to test for the air void content characteristics in accordance with the ASTM C457 Standard Method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete.
  - .1 Each core shall be tested for surface and interior air-void system. The concrete with the satisfactory air-void system for freeze-thaw durability will have a spacing factor L not exceeding 0.230 mm. No single test with the spacing factor more than 0.230mm will be accepted. The provision of CSA A23.1-19, Section 4.3.3.3.a shall not apply.
  - .2 The air content of the core interior, and concrete surface determined on hardened concrete, shall have minimum air content of 3%.
  - .3 The testing shall be performed by a laboratory certified in CCIL Advanced Concrete Certification certified in conducting ASTM



C457 either by CCIL or MTO. The results obtained by computerized air-void analyzers shall not be accepted.

- .4 At the same time, the surface of the cores will be examined for symptoms of over finishing such as trapped air below surface, excessive amount of cement paste and surface dusting or scaling.
- .8 The Contractor shall be responsible for the costs for cores for additional trial areas if required.
- .9 The Contractor shall repeat the trial where:
  - .1 The concrete is defective as described in Part 3 Section 17 of these specifications.
  - .2 The surface levels are outside the permitted tolerances.
  - .3 The surface texture does not meet the requirements of the specifications.
  - .4 The results of the 7 day cylinder and beam tests fail to meet 80% of the specified minimum 28 day strength.
- .10 The Contractor shall allow a minimum of 10 and a maximum of 15 working days after completion of the trial for final acceptance.
- .11 In the event of deficiencies in the trial area, the Contractor shall construct a new trial area at no cost to the Owner.
- .12 After final acceptance of the test section the Contractor may proceed with placing of concrete on the project.

## 2. EQUIPMENT

- .1 The use of mobile volumetric concrete mixers shall not be allowed.
- .2 Concrete plant: certified in accordance with CAN/CSA-A23.1.
  - .1 The recommended minimum production rate for the Portland cement concrete batch plant is 80m<sup>3</sup> per hour.
  - .2 Plant must be capable of incorporating fly ash into the concrete mixer.
  - .3 Production of concrete in accordance with CSA A23.1:19, Clause 5.2.
- .3 Where fixed form paving is used provide equipment with following features:

- .1 Mechanical self-propelled spreader capable of moving concrete forward and laterally and designed to spread, consolidate and finish concrete to finished cross-section.
- .2 Vibrator locations and spacing whether surface or internal shall be installed as per manufacturer's specifications.
  - .1 Internal vibrators: frame mounted 50 mm size vibratory units with vibrating tubes extending into slab at intervals slightly less than twice manufacturers "radius of action", but not less than 600 mm clear space between tubes of units.
- .3 Mechanical, self-propelled finisher with two independently operated transverse screeds.
- .4 Provide following miscellaneous equipment where required:
  - .1 Edging tool.
  - .2 Water truck equipped with pump, hose line and fine spray nozzle.
  - .3 Self-propelled automatic spray machine spanning fresh concrete, equipped with fine spray nozzles suitable for application of membrane curing compound uniformly over surface and exposed edges, and with wind skirt to permit proper application during windy conditions.
  - .4 Self-propelled concrete saws equipped with rubber-tired wheels, readily adjustable blade depth controls, and sawing line guide pointers both front and rear. Provide adequate number of units to complete sawing at rate required and have ample supply of suitable saw blades and at least one standby sawing unit available on job site before concrete placement is started.
  - .5 Straight edges, 3.0 m in length to test finished surfaces.
- .5 Provide following equipment where required for hot poured sealant. Not applicable if cold applied joint sealer is used.
  - .1 Heating kettle or tank for heating sealing compound:
    - .1 Double boiler with space between inner and outer shells filled with oil, asphalt or other material for heat transfer.
    - .2 Equip for positive temperature control of sealing compound.
    - .3 Equip with readily calibrated device which accurately registers temperature of sealing compound.
  - .2 Pressure applicator capable of applying sealant at 100 kPa by means of hose and wand fitted with size of tip suitable for cracks.

- .1 Capable of maintaining temperature of sealant as per the manufacturer's recommendation during application.
- .3 Manual pouring cone.
- .4 Self-propelled concrete saws equipped with rubber-tired wheels, readily adjustable blade depth controls and sawing line guide pointers both front and rear.
- .5 Small diameter diamond bladed pavement saws or mechanical rotary routers specifically designed for following random irregular cracks without tearing, chipping or spalling edge of cracks and capable of producing clean, vertical side walls. Open "V" type grooves not permitted.
- .6 Mixer: in accordance with manufacturer's recommendations.

### 3. FORMWORK

- .1 Install in accordance with Section 03 10 00 - Concrete Forming and Accessories and to following requirements:
  - .1 For fixed form paving:
    - .1 Provide steel or wood forms of sufficient strength to support and keep alignment under weight of spreading and finishing machines.
    - .2 Use of wood forms for fillet areas to be accepted by Consultant.
    - .3 Set forms true to line and grade, join neatly and tightly and stake securely to resist concrete pressure and impact from tampers without springing.
      - .1 Allowable tolerance shall be 6 mm in horizontal alignment and 2 mm in vertical alignment in a 6 m panel.
    - .4 Clean and oil forms before each use.
    - .5 Obtain Consultant's acceptance of forms before placing concrete.
    - .6 Leave forms in place for minimum of 24 hours after concrete placement or as directed by the Consultant.
    - .7 Remove forms in a manner to prevent damage to concrete. Do not pry with crowbars or heavy tools against concrete edges. Use only wooden wedges to wedge between the form and the concrete.

- .8 Build-up of metal forms to meet concrete design thickness requirements not to exceed 75 mm.
- .2 For slip form paving:
  - .1 Provide sufficient length of slip form trailing behind paver to prevent slumping at slab edge. Ensure rigid lateral support. Slab sides to have a smooth dense surface finish free of segregation and exposed coarse aggregate.
  - .2 Set grade and line for laser equipment or control string or wire from bench marks/line and grade established by Consultant.

#### 4. BASE PREPARATION (NOT USED)

- .1 Soft, yielding materials or other portions of granular base that will not compact to specification shall be removed and replaced with suitable material. Base material to be brought to a firm unyielding condition with a uniform density. Base material shall be compacted in accordance with the applicable granular course section contained within these project specifications.
- .2 Base to consist of specified material and have a compacted thickness of not less than specified.
- .3 Prepared base shall be checked for conformity with the cross-section and grade tolerances. Finished surface of base shall not deviate more than 10 mm above and 10 mm below specified grade and cross-section, and surface shall not deviate more than 10 mm at any place on a 3 m template.
- .4 Repair damage to base resulting from hauling or equipment operations.
- .5 Prior to placing concrete, base shall be thoroughly wetted. Wetting shall be carried out, such that standing water is not present on grade.
- .6 Ensure surface is clean of all debris, loose granular material, dirt, water, etc.
- .7 Surface condition of base to be accepted by the Consultant before placing concrete.

#### 5. CONCRETE BASE PREPARATION

- .1 Roughen the top surface of the existing concrete panels once the 100mm depth of asphalt (and concrete in some locations) is removed from the existing concrete panel surfaces.
- .2 Apply bonding agent to the top surface immediately prior to concrete paving.

## 6. REINFORCING STEEL, DOWELS AND TIE-BARS

- .1 Place reinforcing steel, dowels and tie-bars as indicated on the contract drawings and to Section 03 20 00 Concrete Reinforcing.
- .2 Smooth Dowels: corrosion resistant, clean, straight and free from flattened or burred ends, plain round bars and epoxy-coated to ASTM A775/A775M. Smooth Dowel bars shall be coated with a bond-breaking compound such as oil, grease or a form release agent or be enclosed with a tight fitting plastic sheath.
- .3 Deformed Bars: corrosion resistant, clean, straight and free from flattened or burred ends, and epoxy-coated to ASTM A775/A775M and free from any lubricant or coating which may reduce the bond with the concrete.
- .4 Dowels and deformed bars shall be installed horizontal and aligned perpendicular to concrete face.
  - .1 Tolerances for dowel and deformed bar placement shall be a deviation of not more than one degree from alignment of the pavement and within a tolerance of  $\pm 6$  mm in the vertical and horizontal planes of the pavement.
  - .2 Dowel bars and deformed bars shall not be located within 150 mm of a panel joint.
  - .3 Place sufficient number of joint dowel and deformed bar assemblies in advance of paver to avoid delay in concrete placement.
  - .4 Where new concrete is connected to existing concrete via doweled bar or deformed bars, drill holes in mid slab of the existing concrete. Place dowels or deformed bars and pack solidly with non-shrink grout or epoxy to positively position and anchor the dowels or deformed bars.
  - .5 Fixed Form Paving:
    - .1 Dowel bars or deformed bars shall be secured in openings in the form face for fixed form paving.
  - .6 Slip-Form Paving:
    - .1 Dowel bars or deformed bars may be inserted through temporary sideforms located behind the paver, or mechanically inserted into the plastic concrete by accepted devices associated with the slip-form paver.
    - .2 Dowel bars and deformed bars shall be inserted in a manner such that no voids are created around the dowel bar and no distortion of the pavement surface occurs.

- .3 The Consultant may direct the Contractor to drill and epoxy dowel bars/deformed bars into the concrete face if satisfactory results do not occur with insertion of dowel bars/deformed bars.
  
- .5 Steel for tie bars or tie bolts shall comply with CSA-G30.18:21 and be epoxy-coated to ASTM A775/A775M. Epoxy coated tie-bars shall be free from of any lubricant or coating which may reduce the bond with the concrete.
  - .1 Tie-bars shall be located at the mid-depth of the slab as indicated with a tolerance of  $\pm 20$  mm.
  - .2 Tie-bars shall be installed horizontal and aligned perpendicular to the concrete face.
  - .3 Tie-bars shall not be located within 150 mm of a panel joint.
  - .4 Fixed Form Paving:
    - .1 Tie-bars shall be secured in openings in the form face for fixed form paving.
  - .5 Slip-Form Paving:
    - .1 Tie-bars may be inserted through temporary sideforms located behind the paver, or mechanically inserted into the plastic concrete by accepted devices associated with the slip-form paver.
    - .2 Tie-bars shall be inserted in a manner such that no voids are created around the tie-bar and no distortion of the pavement surface occurs.
    - .3 The Consultant may direct the Contractor to drill and epoxy tie-bars into the concrete face if satisfactory results do not occur with insertion of tie-bars.
  
- .6 Place sufficient number of joint dowel assemblies in advance of paver to avoid delay in concrete placement.
  
- .7 Place reinforcing steel in full reinforced panels to Section 03 20 00 Concrete Reinforcing.
  
- .8 Remove oil, grease, dirt and deleterious material from reinforcing bars before placing concrete.
  - .1 Steel placement to be accepted by the Consultant before placing concrete.

**7. TRANSPORT AND DELIVERY OF MIX**

- .1 Time from initial mixing to final placing to be not more than 90 minutes if mix is transported by agitating equipment (e.g. Ready-Mix truck) in accordance with CSA-A.23.1:19, Clause 5.2.5.21 - Delivery with Agitating Equipment.

**8. PLACING**

- .1 Commence placing operations only when air temperature is at or above 5° C and forecast is to remain at or above 5° C for 24 hours after completion of paving.
- .2 Commence placing operations only when probability of precipitation is less than 40% for the time period for the day's paving operation.
- .3 The Consultant may direct that paving operations be suspended if weather patterns detrimental to pavement construction are encountered or forecast.
- .4 Refer to Annex D of CSA 23.1:19: Guidelines for Curing and Protection. When the evaporation rate exceeds 1.0 kg/m<sup>2</sup>/hr, measures shall be taken to prevent excessive moisture loss from the surface of unhardened concrete; when the rate exceeds 0.5 kg/m<sup>2</sup>/hr, such measures may be needed.
- .5 Place concrete on a surface that is clean, dry, and free of deleterious material. See Base Preparation in this Section.
- .6 Place concrete to lines, grades, and depths as indicated.
- .7 Discharge concrete into forms as soon as practical after mixing.
- .8 If a concrete pump is used to discharge concrete into forms, it shall be proven by demonstration to be able to pump the specified concrete through required line length and at the placement rates without impairing or detracting from the specified quality and durability requirements from concrete. Pipelines made from aluminum alloys shall not be used.
- .9 Construct pavement lanes in sequence accepted by Consultant and in accordance with the accepted paving plan.
- .10 Use hand placing where machine spreading is not feasible.
- .11 Spread uniformly with accepted equipment to thickness sufficient to allow for proper consolidation and finishing. Do not apply external tractive force to paver.
- .12 Insert dowels, deformed bars, and tie bars as indicated.
- .13 When completing concrete placement for day, carry placement through to scheduled joint location.
- .14 Where concrete placement is stopped for more than 30 min due to breakdowns, weather or other reasons, construct extra bulkhead and construction joint as directed by Consultant. Bulkhead to be located at a scheduled transverse joint

location. Prior to continuing concrete placement in that lane, install load transfer devices as detailed on the drawings or as directed by the Consultant.

- .15 No concrete shall be mixed, placed, or finished when the natural light is insufficient, unless an adequate and accepted artificial lighting system is operated.
- .16 Do not place concrete on frozen surface or standing water.
- .17 No concrete shall be placed during rain.
- .18 When rain appears imminent paving operation should cease. Protect freshly laid concrete from rain damage and adverse weather condition and in accordance with CAN/CSA A23.1. Extend protective coverings over edges of concrete and arrange so as not to bear on unprotected edges.
  - .1 Protective coverings shall be fastened securely to prevent movement during high winds or jet blast.
  - .2 Contractor shall provide watchpersons as directed by the Consultant to ensure protective coverings do not impact on airport operations.
- .19 Concrete pavement placed in cool weather shall experience a minimum of 30 day air-drying period, following final curing, before first application of de-icing salts.
- .20 The Contractor shall be responsible for the quality and strength of the concrete placed during cold weather, and any concrete injured by frost action shall be removed and replaced at the Contractor's expense.

## **9. CONSOLIDATION**

- .1 Provide proper vibration to consolidate the concrete mass. Vibrate sufficiently to eliminate honeycomb effect, but do not over-vibrate which can cause segregation or elimination of entrained air content.
- .2 When internal vibrators are used:
  - .1 For slab depths up to 200 mm, mount vibrators parallel to base at mid depth. For slab depths greater than 200 mm, mount vibrators with tips minimum 50 mm above base and tops minimum 50 mm beneath pavement surface.
  - .2 Maintain minimum 150 mm surcharge of concrete above vibrators during placing and consolidation.
  - .3 Operate at between 9,000 and 12,000 vibrations per minute at minimum amplitude of 1 mm.
- .3 When surface vibrators are used:



- .1 Synchronize units on each individual screed or pan.
- .2 Operate at minimum of 3,500 vibrations per minute and minimum amplitude of 0.4 mm.
- .3 Treat each pavement section to at least one pass but not more than two passes of vibratory equipment unless otherwise directed by Consultant.
- .4 Stop vibrators when paver stops.
- .5 Use hand operated vibrator on odd shaped slabs inaccessible to frame mounted units. Do not operate vibrator in one location longer than 5 seconds.
- .6 Ensure concrete adjacent to edge forms or previously constructed slabs is thoroughly vibrated.
- .7 Do not drag hand operator vibrator to move concrete.

## **10. FINISHING**

- .1 After consolidation by vibration, finish with equipment accepted by Consultant.
- .2 When striking off concrete surface, maintain uniform roll of concrete ahead of first screed for its full length when finishing machine is on first pass.
- .3 Make two passes with transverse finishing machine. Excessive operation over a given area shall be avoided.
- .4 Where joints are formed rather than sawn, form longitudinal and transverse joints after final pass of finishing machine.
- .5 Hand finish areas inaccessible to finishing machines to same quality and surface characteristics as machine finished surfaces.
- .6 Finish concrete surface with accepted float at proper time. Operate from edge to edge with wiping motion while advancing, with each succeeding pass overlapping previous one.
- .7 Check surface with accepted 3.0m long straightedge. Correct irregularities exceeding 3 mm before concrete takes initial set.
- .8 Finish edges of slabs with edging tool to form smooth squared surface. Do not patch with cement paste.

## **11. SURFACE TEXTURING**

- .1 Commence texturing immediately after float finishing.
- .2 Use stiff bristled broom to produce nonslip concrete surface finish accepted by Consultant, with fine granular texture free from disfigurations.

- .3 Provide transverse surface texture by self-propelled machine specially designed for purpose, automatically controlled from string line reference used by paver, to produce an average surface texture as per the American Concrete Pavement Association publication – Constructing Smooth Concrete Pavement.
- .4 Texturing to be straight, precise and not damaging to pavement edges.
- .5 Whether texturing is done by machine methods or by hand, care shall be taken to avoid overlapping passes of the texturing broom such that a surface already sufficiently textured is overworked and the sharpness of the scores or grooves is deformed or the grooves filled with laitance.
- .6 The finished surface shall have a roughly grooved appearance. The quality of sharpness of the grooves shall be to the satisfaction of the Consultant.
- .7 Average textured depth to be not less than 1 mm when measured by ASTM E965 – Standard Test Method for Measuring Surface Macrotexture Depth Using a Volumetric Technique.

## 12. CURING

- .1 Curing compound:
  - .1 The curing compound shall not be applied during rainfall.
  - .2 The entire surface of the pavement shall be sprayed twice uniformly with white pigmented curing compound immediately after the finishing of the surface.
  - .3 Apply in two coats with accepted spray equipment to form complete and unbroken film on surface of concrete. Mechanically agitate compound before and during use. The spraying equipment shall be of the fully atomizing type equipped with a tank agitator.
  - .4 Hand spraying of odd widths or shapes and concrete surfaces exposed by the removal of forms will be permitted providing that a uniform coverage with curing compound is achieved.
  - .5 For hand application apply first coat immediately after texturing operations, second coat to be applied immediately after first coat in a perpendicular direction.
  - .6 For machine application curing compound to be applied in accordance with manufacturers' specifications.
  - .7 Spray slab edges immediately after removal of forms.
  - .8 Protect formed or sawed joints from evaporation during curing period.

- .9 Respray areas where membrane is damaged from any cause, including sawcutting operations.
  - .10 Sawcuts shall be hand sprayed immediately after cutting and shall include covering the vertical faces resulting from the sawcutting.
  - .11 Upon removal of side forms, the sides of the exposed slabs shall be protected immediately to provide a curing treatment equal to that provided for the surface.
- .2 Curing in Cold Weather
- .1 The requirements of ACI 306 R-10 Cold Weather Concreting and CSA A23.1:19, Section 7.2.2 shall apply.
  - .2 The concrete shall be maintained at a temperature of at least 10 °C for a period of 72 hours after placing and at a temperature above freezing for the remainder of the curing time.
    - .1 The Contractor shall be responsible for the quality and strength of the concrete placed during cold weather, and any concrete damaged by frost action shall be removed and replaced at the Contractor's expense.
- .3 Curing in Hot Weather
- .1 The requirements of ACI 305 R-20 Hot Weather Concreting and CSA A23.1:19, Section 7.2.1 shall apply.

### 13. PROTECTION

- .1 Do not open concrete pavement to traffic or construction equipment until concrete reaches 80% of specified strength and minimum of 7 days after placement.
- .2 When placing concrete in lanes adjacent to existing concrete, operate placing equipment on rubber wheels or pads to prevent damage to existing surface and saw cut joints.

### 14. TOLERANCES

- .1 Finished concrete surface to be within  $\pm 6$  mm of design grade but not uniformly high or low.
- .2 Finished concrete surface not to have irregularities exceeding 3 mm when checked with 3 m straight edge placed in any direction.
- .3 Horizontal deviations of slab edge from alignment of pavement not to exceed 10 mm.
- .4 No variations from the true surface shall be permitted across any joint in the pavement.

- .5 Except across the crown of a camber and across valleys or ridges, the surface shall be such that when tested with a 3m long supported test straight edge placed anywhere in any direction on the surface, there shall not be a gap greater than  $\pm 3$  mm between the bottom of the straight edge and the surface of the pavement.
- .6 Isolated high spots in the final pavement, not exceeding 2 m<sup>2</sup> each, which depart by more than 6 mm from the design elevations or which do not comply with the straight edge test, shall be ground down if the total area to be ground does not exceed 10 m<sup>2</sup> in any 1000 m<sup>2</sup> section of concrete pavement. When correction in the final pavement in excess of this allowance is necessary to bring it within these specified limits, the pavement shall be removed and replaced by the Contractor at his own expense.
- .7 Irrespective of the tolerances noted above, ponding of water within panels or between adjacent panels will not be accepted.

## 15. JOINTS

- .1 General:
  - .1 To Section 03 30 20 – Sawcutting and Sealing of Airfield Joints.
  - .2 Construct joints plumb, straight and square to details indicated.
  - .3 Transverse joints to coincide with those in adjacent pavement unless indicated or directed otherwise.
  - .4 Install preformed joint filler at locations and to details indicated.
  - .5 Install isolation joints around structures and features that project through, into or against pavement.
- .2 For saw cutting control joints in green concrete:
  - .1 Contractor to layout joints as indicated by the Contract Documents or as directed by the Consultant. Ensure joint alignment is straight across the entire paved area and that it aligns with the joint of the underlying concrete panels.
  - .2 Install end stakes to ensure straight joint alignment across paved area. Mark joint alignment with chalk line or other suitable guide to acceptance of the Consultant.
  - .3 Saw joints using accepted equipment and methods to produce joint dimensions indicated. Depth of sawn joints to be uniform across panel, including at the edge of panel.
  - .4 Ensure joints are sawn straight.
  - .5 Restrict speed of saw cutting to ensure proper joint alignment and to avoid damage to concrete.

- .6 Supply sufficient workers and equipment, including standby equipment, to maintain satisfactory sawing schedule.
- .7 Schedule sawing operations on 24 hour basis and consistent with concrete placing.
- .8 Make initial saw cuts in progressive manner and as soon as concrete surface has hardened sufficiently to resist ravelling as cut is made and before shrinkage cracks occurs.
- .9 If cracking occurs ahead of saw cut, stop sawing immediately. Move ahead several joints and cut one or more joints before returning to saw intermediate joints. Where cracking persists, make 1 m saw cut from one edge and complete sawing from opposite edge. Adjustments to sawing schedule to be accepted by the Consultant.
- .10 If uncontrolled cracking or other surface damage results from inadequate or improper sawing techniques, suspend further concrete operations until situation is corrected and immediately remove and replace damaged panels.
- .11 Immediately on completion of sawing, flush joints with water to remove laitance.
- .3 For saw cutting sealed joints in hardened concrete:
  - .1 Immediately on completion of sawing, flush joints with water to remove laitance.
  - .2 Sandblast joint to remove remaining residue.
  - .3 After sandblasting, clean and dry saw cut joints using lance with oil-free hot compressed air, applied at minimum pressure of 600 kPa.
  - .4 Follow manufacturer's specifications for any additional joint preparation requirements.
  - .5 Dispose of material removed from joints.
  - .6 Obtain the Consultant's acceptance of prepared sawcut joints before application of sealant.
- .4 Sealing:
  - .1 If possible, seal joints before allowing vehicular traffic on new pavement.
  - .2 Provide the Consultant with copy of sealant manufacturer's instructions for application.

- .3 Do not apply sealant in rainy weather or when ambient temperature is less than 5 °C. Do not apply joint sealant when the daily low temperature is expected to fall below 5 °C. Sealant manufacturer's requirements may have more stringent temperature limits.
- .4 Do not use sealant that has been frozen.
- .5 Prepare sealant for application as per manufacturer's instructions.
- .6 Ensure joints are clean and dry immediately before applying sealant and bond breaking material.
- .7 Insert accepted bond breaking material in joint prior to applying sealant, then fill joint from bottom up with sealant to avoid trapping air.
- .8 Fill joints with sealant immediately after cleaning. Maintain tip of cone or wand close to bottom of routed groove during filling.
- .9 Apply sealant strictly in accordance with the manufacturer's recommendations with special attention to temperature ranges for application of sealants and cleanliness of concrete to be bonded.
- .10 On completion of first application of sealant, return and top up any underfilled areas.
- .11 Pour sealant in joint so that cured sealant fills crack from the bottom up to a level 6 mm below the pavement surface for Portland Cement Concrete.
- .12 Replace sealant which fails to bond to concrete or fails to cure properly, as directed by the Consultant.

## 16. PRODUCT ACCEPTANCE

- .1 Product means concrete pavement after placement, finishing, sawcutting, and curing.
  - .1 Concrete strength test results (compressive and flexural) and the quality of the pavement (durability) shall be used as a basis for acceptance or rejection of the concrete.
  - .2 Removal and replacement of concrete panels shall be evaluated in accordance with the requirements this specification.
  - .3 Strength Tests:
    - .1 One sample, consisting of 3 test cylinders shall be taken from every 40 m<sup>3</sup> of plastic concrete delivered and placed at

the job site for determining the compressive strength. One sample, consisting of 3 beams, shall be taken from every 80m<sup>3</sup> of plastic concrete delivered to the job site for determining the flexural strength, and the results shall be submitted to the Consultant.

- .2 The average strength of all sets of three consecutive strength tests of cylinders and beams, made and tested in accordance with CAN/CSA-A23.2, should not be less than the specified minimum design 28 day compressive/flexural strength. Individual 28 day strength tests should not be less than 80% of the specified minimum 28 day flexural design strength.
- .3 There will be no appeal for the results of the concrete strength tests after verification by Quality Assurance testing.
- .4 Acceptance of pavement for strength will be determined by the Consultant.
- .4 A lot shall consist of approximately 42 m<sup>3</sup> of concrete. This is equivalent to approximately three new concrete panels with individual dimensions of 6,096 mm long x 6,096 mm wide x 380 mm thick.
- .5 Concrete strength shall be evaluated for acceptance on a lot basis. The location of any failed test shall be deemed to be the longitudinal midpoint of the defective concrete panel where the unsatisfactory test results was taken. For example, the 1 panel poured immediately prior to the panel where the failed test was taken, the panel where the failed test was taken and the 1 panel poured immediately after the panel where the failed test was taken shall be considered defective and shall be removed and replaced. Where failed tests occur the Contractor shall remove and replace the entire lot(s) affected.
- .6 Durability:
  - .1 A minimum of two eight-inch long cores may be cut from the lot as selected by the Consultant to test for the air-void characteristics. The testing shall be performed by a CCIL certified laboratory in Advanced Concrete Certification in accordance with ASTM C457 Standard Method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete.
  - .2 Each core shall be tested for surface and interior air-void system. The concrete with the satisfactory air-void system for freeze-thaw durability will have a spacing factor L not exceeding 0.230mm. No single test with the spacing factor

more than 0.230mm will be accepted. The provision of CSA A23.1:19, Section 4.3.3.4.a for no single value greater than 0.260mm shall not apply.

- .3 The air content of the core surface and core interior, determined on hardened concrete, shall have minimum air content of 3%.
- .4 At that time, the surface of the cores will be examined for symptoms of over-finishing such as trapped air below surface, excessive amount of cement paste and surface dusting or scaling.
- .5 In cases of linear traverse tests (ASTM 457) used for verification of low plastic air in concrete, the testing laboratory shall be CCIL certified in accordance with CSA A283 Advanced Concrete Certification certified by CCIL or MTO to conduct the test. If the QC testing laboratory has no ability to perform the testing in their lab, then the testing costs will be paid by the Contractor, and the acceptance will be based solely on the QA results.
- .7 Defective concrete as defined in Part 3 Section 17 is subject to rejection.

## 17. DEFECTIVE CONCRETE

- .1 Concrete is defective when it fails to meet the requirements of the specifications or when any of the following conditions exist:
  - .1 It contains cracks, honeycombing, embedded debris, uncontrolled shrinkage cracking, or other surface defects.
  - .2 The surface shows signs of over-finishing such as laitance, dusting or spalling.
  - .3 The surface levels are outside the permitted tolerances.
  - .4 It is damaged by freezing.
  - .5 It is damaged by incomplete curing.
  - .6 The average 28 day strength of any three consecutive compressive strength tests and flexural strength tests is less than target minimum 28 day strength.
  - .7 Any 28 day compressive or flexural strength test result is less than 80% of the target 28 day strength.
  - .8 An acceptance of lower compressive strength than that determined by trial testing may be considered by the Owner if the



- flexural strength requirements determined for the same lot are met.
- .9 Joints are spalled.
  - .10 It is damaged due to construction operations.
  - .11 Concrete panel cracking.
  - .12 If the requirements of CSA A23.1:19, Clause 4.3.3.2, Air-void system and Clause 4.3.3.3, Air-void parameters are not met.
- .2 If concrete is determined to be defective, it shall be removed and replaced by the Contractor. The Consultant shall define the areas of defective concrete as outlined and the Contractor shall replace or repair these areas at his own expense.
  - .3 Defective concrete shall be repaired or replaced in accordance with Part 3 Section 18 of this specification. The Contractor shall be responsible, at his own expense, to replace defective concrete as directed by the Consultant.
  - .4 Where failed tests occur the Contractor shall remove and replace the entire lot(s) affected.
  - .5 Removal and replacement of concrete panels shall be evaluated in accordance with the requirements this specification.
  - .6 Defective concrete as tested in this section is subject to removal and replacement.
  - .7 All cracked panels shall be removed and replaced.

## **18. REMOVAL/REPLACEMENT OF NEW CONCRETE PANELS**

- .1 General:
  - .1 Any new concrete panel that is defective shall be removed and replaced, as specified hereinafter, at no cost to the Owner.
  - .2 Generally, any spalls along new panel joints shall deem the panel(s) to be defective. At the discretion of the Consultant these panels may be repaired as specified in this section.
  - .3 Removal of partial panels is not permitted.
  - .4 Removal and replacement shall be full depth and for the full width of the new panel section and the limit of removal shall be normal to the paving lane and to each original transverse joint.
  - .5 Where defective concrete is identified by the Consultant during plastic condition, repair using methods acceptable to the Consultant.

.2 Repairing Spalls Along Joints:

- .1 Spall repair detail is provided on Contract Drawing C-311, Detail 5.
- .2 Where directed by the Consultant, spalls along joints of new / existing panels shall be repaired by first making a vertical saw cut at least 25 mm outside the spalled area and to a depth of at least 50 mm.
- .3 Saw cuts shall be straight lines forming rectangular areas.
- .4 Material used for edge spall repairs shall be Delpatch Elastometric Concrete, or Consultant reviewed and accepted equivalent, compatible with the existing and new concrete panels.
- .5 The concrete between the saw cut and the joint, or crack, shall be chipped out to remove all unsound concrete and at least 12 mm of visually sound concrete. The cavity thus formed shall be thoroughly cleaned with high pressure water jets or sand blasting supplemented with compressed air to remove all loose material and moisture.
- .6 The cavity shall be filled with material(s) as specified in Part 2 Section 1.18 and installed as per the manufacturer's recommendations.
- .7 Material(s) selected for repairs, or epoxy resin mortars, shall be applied using proportions and mixing and placing procedures as recommended by the manufacturer and accepted by the Consultant.
- .8 Where the spalled area abuts a joint or a working crack, an insert the width of the existing gap shall be used to prevent bond and contact at the joint face. Insert to extend a minimum of 25mm on either end of the prepared cavity and its depth should not be less than the depth of the patch materials. The medium should be neatly installed to prevent new mortar or concrete from bypassing the medium and entering the joint space. Once the repair is completed, the medium should be removed and backer rod and sealant installed as shown on the Contract Drawings.

**19. EXISTING CONCRETE PAVEMENT REMOVAL AND REPAIR**

- .1 This section applies to existing panels to be removed for the installation of other works or existing panels damaged by the Contractor's operations.
- .2 All operations shall be carefully controlled to prevent damage to the concrete pavement and to the underlying material to remain in place.
- .3 Removal of Existing Concrete Pavement Panels:

- .1 When it is necessary to remove existing concrete pavement and leave adjacent concrete in place, unless there are dowels or keys present, the joint between the removal area and adjoining pavement to stay in place, including dowels, tie bars, or keys shall first be cut full depth with a standard diamond-type concrete saw.
- .2 If it is known that keys or dowels are present at this joint, the saw cut shall be made full depth 300 mm from the joint.
- .3 The edge shall then be carefully sawed on the joint line within 25 mm of the top of the dowel or key. Next, a full depth saw cut shall be made parallel to the joint at least 600 mm from the joint and at least 300 mm from the end of any dowels, tie bars, or deformed bars.
- .4 All pavement between this last saw cut and the joint line shall be carefully broken up and removed using hand-held jackhammers, 14 kg or less, or other accepted light-duty equipment which will not cause stress to propagate across the joint saw cut and cause distress in the pavement which is to remain in place.
- .5 Where dowels or keys are present, care shall be taken to produce an even, vertical joint face below the dowels or keys. If the Contractor is unable to produce such a joint face, or if underbreak or other distress occurs, the Contractor shall saw the dowels, tie bars, deformed bars, or keys flush with the joint.
- .6 The Contractor shall then install new dowels, of the size and spacing used for other similar joints, by epoxy resin bonding them in holes drilled in the joint face as specified in Part 3 Section 6 of this specification.
- .7 The joint face shall be sawed or otherwise trimmed so that there is no abrupt offset in any direction greater than 12 mm and no gradual offset greater than 25 mm when tested in a horizontal direction with a 3.0 m straightedge.
- .8 If the presence of dowels, keys, deformed bars, or tie-bars cannot be determined the Contractor shall saw the full depth at the existing joint face through the existing dowel bars, deformed bars, tie bars, or keys.
  - .1 The Contractor shall remove the existing concrete in such a manner as not to disturb adjacent panels.
  - .2 The Contractor shall then install new dowels, of the size and spacing used for other similar joints, by epoxy resin bonding them in holes drilled in the joint face as specified in previously.

- .3 The joint face shall be sawed or otherwise trimmed so that there is no abrupt offset in any direction greater than 12 mm and no gradual offset greater than 25 mm when tested in a horizontal direction with a 3.0 m straightedge.
  - .4 All this shall be at no additional cost to the Owner.
- .4 Edge Repair
- .1 The edge of existing concrete pavement against which new pavement abuts shall be protected from damage at all times.
  - .2 Areas that are damaged during construction shall be repaired at no cost to the Owner.
  - .3 Previously damaged areas adjacent to the proposed new concrete shall be identified, mapped and recorded by the Contractor and agreed upon with the Consultant prior to start of construction.
- .1 Spall Repair: Spalls shall be repaired where indicated and where directed. Repair materials and procedures shall be as previously specified in Section Repairing Spalls Along Joints.
  - .2 Crack Repair: Cracks are to be repaired where indicated and where directed. Repair materials and procedures to follow the instructions provided on the contract drawings.
  - .3 Underbreak Repair:
    - .1 All underbreaks between 38 and 100 mm shall be repaired. If an underbreak over 100 mm occurs, the entire panel containing the underbreak shall be removed and replaced.
    - .2 First, all delaminated and loose material shall be carefully removed, and then the void shall be completely filled with paving concrete and thoroughly consolidated.
    - .3 Care shall be taken to produce an even joint face from top to bottom.
    - .4 Prior to placing concrete, the underlying material shall be thoroughly moistened.
    - .5 After placement, curing compound shall be applied to the exposed surface.
  - .2 Underlying Material:

- .1 The underlying material adjacent to the edge of or under the existing pavement which is to remain in place shall be protected from damage or disturbance during removal operations and until placement of new concrete, and shall be shaped as shown on the drawings or as directed.
- .2 The underlying material outside the joint line shall be thoroughly cleaned when new concrete is placed.

## 20. TRAFFIC ON FINISHED SURFACES

- .1 Do not open concrete pavement to traffic or construction equipment until concrete reaches 80% of specified strength and minimum of 7 days after placement.
- .2 Traffic allowed on finished concrete surfaces shall be restricted to the minimum required for the conveyance of mixed materials for the laying of the pavement immediately adjacent to the area being laid.
- .3 The Contractor shall be responsible for maintaining the finished concrete in good condition.
- .4 Protect concrete from damage from oil, fuel stains, and excessive tire marks. Repair and clean marks to provide uniform finished appearance.
- .5 The Contractor shall ensure that the tires of all construction vehicles are free from rocks, stones, pebbles, dirt and debris that could cause damage to the new concrete.

## 21. CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .2 Upon completion and curing of the joint sealing compound, the Contractor shall remove all remaining concrete slurry and sandblasting sand from the pavement surface.
- .3 The pavement surface shall be cleaned using high-pressure water, power brooms and vacuum trucks as required. The Consultant shall review and accept the proposed cleaning method.
- .4 Debris from the cleaning process shall not be allowed to flow into the drainage system including manholes, catch basins and drainage ditches.

**END OF SECTION**

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