Public Works and Government Services Canada

Requisition No. **EZZ899-180898**

Buy & Sell I.D. No. _____

SPECIFICATIONS
for
Parking Lot & Site Pavement Improvements

Kent Institution (Project No. R.082447.001)
Agassiz, B.C

June 2017

APPROVED BY:

Regional Manager, AES — Date: Dec. 9/2017

Construction Safety Coordinator — Date: 2017-08-04

TENDER:

Project Manager — Date: 2017/08/03

Real Property Services Branch, Professional and Technical Services, Pacific Region
#219-800 Burrard Street, Vancouver, B.C. V6Z 0B9

LIST OF DRAWINGS (Bound Separately)

Sheet No.	Description
01	Cover and Drawing Index
02	Kent Access Road - Asphalt Rehabilitation Plan
03	Kent Access Road - Sections
04	Parking Lot - Repairs and Paving

Braun Geotechnical Report #17-7073 - Attached for Information Only

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
R. R. ROSIN

June 19, 2017

1. CODES

.1 Perform work to CURRENT Codes, Construction Standards and Bylaws, including Amendments up to the TENDER closing date.

2. DESCRIPTION OF WORK

.1 Work under this Contract comprises construction at Kent Institution near Agassiz, BC. Work includes asphalt milling, crack repair, shoulder gravel placement, hot mix asphalt placement, and restoration of roadway and parking lot paint lines. The work will occur on existing parking and access roadways at the Kent Institution.

.2 Work to be performed under this Contract includes, but is not limited to, the following items covered further in the Contract documents:

.1 Submit Traffic Management Plan to Departmental Representative for review prior to mobilizing to site. Arrange for security clearance from CSC for all workers on site in advance.

.2 Remove existing asphalt in select locations.

.3 Prepare, re-grade, and restore asphalt shoulder gravels.

.4 Complete asphalt paving of access roadway, staff parking and select access route repairs.

.5 Complete site restorations and restore lane markings to match existing conditions.

.6 Provide the Department Representative with all test reports and final documentation.

3. CONTRACT DOCUMENTS

.1 The Contract documents, drawings and specifications are intended to complement each other, and to provide for and include everything necessary for the completion of the work.

.2 Drawings are, in general, diagrammatic and are intended to indicate the scope and general arrangement of the work.

4. OTHER CONTRACTS

.1 Cooperate with other Contractors in carrying out their respective works and carry out instructions from Departmental Representative.

.2 Coordinate work with that of other Contractors (if applicable). If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental Representative, in writing, any defects which may interfere with proper execution of this Work.

5. DIVISION OF SPECIFICATIONS

.1 The specifications are subdivided in accordance with the current 6-digit National Master Specifications System.

.2 A division may consist of the work of more than 1 subcontractor. Responsibility for determining which subcontractor provides the labour, material, equipment and services required to complete the work rests solely with the Contractor.

.3 In the event of discrepancies or conflicts when interpreting the drawings and specifications, the specifications govern.

6. TIME OF COMPLETION

.1 Total completion of the site work shall be no later than 6 weeks from contract award date.

7. HOURS OF WORK

.1 Hours of work shall accommodate operation of the Kent Institution, which is a 24/7 facility operation. To accommodate staff parking with as minimal impact as possible, milling of parking areas shall proceed after 6:00 p.m. Mill and inlay of spot repairs shall be completed within the same work day.

8. WORK SCHEDULE

.1 Carry on work as follows:

.1 Within 5 working days after Contract award, provide a schedule showing anticipated progress stages and final completion of the work within the time period required by the Contract documents. Indicate the following:

.1 Submission of shop drawings, product data, MSDS sheets and samples.

.2 Commencement and completion of work of each section of the specifications or trade for each phase as outlined.

.3 Final completion date within the time period required by the Contract documents.

.2 Do not change approved Schedule without notifying Departmental Representative.

.3 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.

9. COST BREAKDOWN

.1 Before submitting the first progress claim, submit a breakdown of the Contract unit prices in detail and as directed by the Departmental Representative and aggregating Contract price, for the details shown in the schedule of quantities provided.

10. CODES, BYLAWS, STANDARDS

.1 Perform work in accordance with the National Building Code of Canada, and other indicated Codes, Construction Standards and/or any other Code or Bylaw of local application, including MMCD (Gold) Edition.

.2 Comply with applicable local bylaws, rules and regulations enforced at the location concerned.

.3 Meet or exceed requirements of Contract documents, specified standards, codes and referenced documents.

.4 In any case of conflict or discrepancy, the most stringent requirements shall apply.

11. DOCUMENTS REQUIRED

.1 Maintain 1 copy each of the following at the job site:
- .1 Contract drawings.
- .2 Contract specifications.
- .3 Addenda to Contract documents.
- .4 Copy of approved work schedule.
- .5 Reviewed/approved shop drawings.
- .6 Change orders.
- .7 Other modifications to Contract.
- .8 Field test reports.
- .9 Reviewed/approved samples.
- .10 Manufacturers' installation and application instructions.
- .11 One set of record drawings and specifications for "as-built" purposes, and
- .12 Current construction standards of workmanship listed in technical Sections.

12. REGULATORY REQUIREMENTS

.1 Obtain and pay for - Building Permit, Certificates, Licenses and other permits required by regulatory municipal, provincial or federal authorities to complete the work.

.2 Provide inspection authorities with plans and information required for issue of acceptance certificates.

.3 Furnish inspection certificates in evidence that the work installed conforms with the requirements of the authority having jurisdiction.

13. CONTRACTOR’S USE OF SITE

.1 Site located on Kent Institution property at Agassiz, BC.

.2 Use of site:
- .1 Assume responsibilities for work areas for performance of this work.
- .2 Be responsible for coordination of all work activities on site, including the work of other contractors engaged by the Departmental Representative.

.3 Perform work in accordance with Contract documents. Ensure work is carried out in accordance with indicated phasing.
.4 Do not unreasonably encumber site with material or equipment.
.5 Accept liability for damage, safety of equipment and overloading of existing equipment.
.6 Provide portable toilet for use by crew during construction.

.3 The Kent Institution will remain fully operational during entire construction period and the contractor is expected to work with CSC to minimize any disruptions. This will include maintenance of a minimum of single lane alternating traffic on the access road, scheduling milling of the parking surfaces after 6:00 p.m. and completion of all spot repairs within the same day of commencement of the work.

.4 Co-operate with Department Representative in scheduling operations to minimize conflict with CSC or public.

.6 Execute work with least possible interference or disturbance to the operations and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

.7 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

.8 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

.9 Attend progress, safety and site security orientation meetings.

14. EXAMINATION

.1 Examine site and be familiar and conversant with existing conditions likely to affect work.

.2 Provide photographs of existing conditions, objects and structures prior to the start of the project.

15. EXISTING SERVICES

.1 Notify, Departmental 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 Departmental Representative 48 hours notice for necessary interruption throughout course of work. Minimize

duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian, vehicular traffic and tenant operations.

.3 Provide alternative routes and parking access for personnel and pedestrian and vehicular traffic as applicable.

.4 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.

.5 Submit schedule to and obtain approval from Departmental Representative 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.

.6 Provide adequate bridging over trenches which traveled areas to permit normal traffic.

.7 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.8 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.9 Record locations of maintained, re-routed and abandoned service lines.

16. LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space, and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Departmental Representative of impending installation and obtain his approval for actual location.

.4 Submit field drawings or shop drawings to indicate the relative position of various services and equipment when required by the Departmental Representative and/or as specified.

17. SETTING OUT OF WORK

.1 Assume full responsibility for and execute complete survey layout of work to locations, lines and elevations indicated.

.2 Provide devices needed to lay out and construct work.

.3 Supply such devices as templates required to facilitate Departmental Representative's inspection of work.

18. QUALITY OF WORK

.1 Ensure that quality workmanship is performed through use of skilled tradesmen, under supervision of qualified journeyman.

.2 In cases of dispute, decisions as to standard or quality of work rest solely with the Departmental Representative, whose decision is final.

19. WORKS COORDINATION

.1 Coordinate work of subtrades:
- .1 Designate one person to be responsible for review of contract documents and shop drawings and managing coordination of Work.
- .2 Convene meetings between subcontractors whose work interfaces and ensure awareness of areas and extent of interface required.

.2 Provide each subcontractor with complete plans and specifications for Contract, to assist them in planning and carrying out their respective work.

.3 Develop coordination drawings when required, illustrating potential interference between work of various trades and distribute to affected parties.
- .1 Pay particularly close attention to overhead work above ceilings and within or near to building structural elements.
- .2 Identify on coordination drawings, building elements, services lines, rough-in points and indicate location services entrance to site.
- .3 Facilitate meeting and review coordination drawings. Ensure subcontractors agree and sign off on drawings.
- .4 Publish minutes of each meeting.
- .5 Plan and coordinate work in such a way to minimize quantity of service line offsets.
- .6 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.

.4 Work cooperation:
- .1 Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of spatial interference.
- .2 Ensure that each trade provides all other trades reasonable opportunity for completion of Work and in such a way as to prevent unnecessary delays, cutting, patching and removal or replacement of completed work.

.3 Ensure disputes between subcontractors are resolved.

.5 The Departmental Representative is not responsible for, or accountable for extra costs incurred as a result of Contractor's failure to coordinate Work.

.6 Maintain efficient and continuous supervision.

20. APPROVAL OF SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

.1 In accordance with Section 013300, submit the requested shop drawings, product data, MSDS sheets and samples indicated in each of the technical Sections.

.2 Allow sufficient time for the following:
.1 Review of product data.
.2 Approval of shop drawings.
.3 Review of re-submission.

21. PROJECT MEETINGS

.1 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

22. TESTING AND INSPECTIONS

.1 See Section 01 45 00 – QUALITY CONTROL

.2 The contractor shall engage and pay for the services of an approved independent testing agency of test laboratory to complete all testing at indicated in Section 01 45 00.

.3 Employment of inspection / testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for re-testing and re-inspection.

23. AS-BUILT DOCUMENTS

.1 The Departmental Representative will provide 2 sets of drawings, 2 sets of specifications for "as-built" purposes.

.2 As work progresses, maintain accurate records to show all deviations from the Contract documents. Note on as-built specifications, drawings and shop drawings as changes occur.

.3 Closeout submittals in accordance with Section 01 78 00.

24. CLEANING	.1	Daily conduct cleaning and disposal operations. Comply with local ordinances and anti-pollution laws.
	.2	Ensure cleanup of the work areas each day after completion of work.
25. ENVIRONMENTAL PROTECTION	.1	Prepare an Erosion and Sediment Control Plan and provide monitoring and maintenance as per Section 01 35 43 - ENVIRONMENTAL PROCEDURES
	.2	Do not dispose of waste or volatile materials into water courses, storm or sanitary sewers.
	.3	Ensure proper disposal procedures in accordance with all applicable territorial regulations.
26. ADDITIONAL DRAWINGS	.1	The Departmental Representative may furnish additional drawings for clarification. These additional drawings have the same meaning and intent as if they were included with plans referred to in the Contract documents.
27. SYSTEM OF MEASUREMENT	.1	The metric system of measurement (SI) will be employed on this Contract.
28. SUBMISSION OF TENDER	.1	Submission of a tender is deemed to be confirmation of the fact that the Tenderer has analyzed the Contract documents and is fully conversant with all conditions and site requirements.

----------END OF SECTION----------

PART 1 – GENERAL

1.1 ADMINISTRATIVE

.1 Submit to the Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify the Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are coordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative’s review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.10 Keep one reviewed copy of each submission on site.

1.2 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 Contractor to illustrate details of a portion of Work.

.2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.3 Allow 5 working days for Departmental Representative's review of each submission.

.4 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.5 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.6 Accompany submissions with transmittal letter, in duplicate, containing:
- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.7 Submissions include:
- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.

.6 Standards.
.7 Operating weight.
.8 Wiring diagrams.
.9 Single line and schematic diagrams.
.10 Relationship to adjacent work.

.8 After Departmental Representative's review, distribute copies.

.9 Submit one PDF of shop drawings for each requirement requested in specification sections and as Departmental Representative may reasonably request.

.10 Delete information not applicable to project.

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

.12 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, transparency will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.13 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.
.1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit WorkSafe BC status.

1.4 APPROVALS

.1 Approval of shop drawings: refer to Section 01 11 55, clause 20.0.

PART 1 – GENERAL

1.1 RELATED SECTIONS

.1 Section 32 11 23-Aggregate Base Courses.

1.2 REFERENCES

.1 Manual of Uniform Traffic Control Devices for Streets and Highways for Canada, Transportation Association of Canada.

.2 Traffic Control Manual for Work on Roadways, BC Ministry of Transportation

1.3 PROTECTION OF PUBLIC TRAFFIC

.1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.

.2 Comply with most recent editions of the Traffic Control Manual for Work on Roadways published by the BC Ministry of Transportation and the Manual of Uniform Traffic Control Devices for Streets and Highways for Canada published by the Transportation Association of Canada.

.3 During progress of the Work, make adequate provision to accommodate normal traffic along roads and highways immediately adjacent to or crossing the works so as to cause minimum inconvenience to the general public and CSC.

.4 When working on travelled way:
.1 Place equipment in position to present minimum of interference and hazard to travelling public.
.2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
.3 Do not leave equipment on travelled way overnight.

.5 Do not close any lanes of road without prior approval of Departmental Representative. Before re-routing traffic erect suitable signs and devices in accordance with instructions reference manuals.

.6 Keep travelled way graded, free of pot holes and of sufficient width for required number of lanes of traffic.
.1 Provide minimum 4 m wide temporary roadway for traffic in one-way sections through Work and on detours.

.7 Provide and maintain road access and egress to property fronting along Work under Contract and in

other areas as indicated, unless other means of road access exist that meet approval of Departmental Representative.

1.4 INFORMATIONAL AND WARNING DEVICES

.1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.

.2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified reference manuals.

.3 Place signs and other devices in locations recommended in the reference manuals.

.4 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Departmental Representative.

.5 Continually maintain traffic control devices in use by:

.1 Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.

.2 Removing or covering signs which do not apply to conditions existing from day to day.

1.5 CONTROL OF PUBLIC TRAFFIC

.1 Provide competent flag persons, trained in accordance with, and properly equipped as specified in the reference manuals in following situations:

.1 When traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.

.2 When it is necessary to institute one-way traffic system through construction area or other blockage.

.3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.

.4 Where temporary protection is required while other traffic control devices are being erected or taken down.

.5 For emergency protection when other traffic control devices are not readily available.

.6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.

.7 At each end of restricted sections where pilot cars are required.

.8 Delays to traffic due to contractor's operators: maximum 5 minutes.

1.6 OPERATIONAL REQUIREMENTS

.1 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified and approved by Departmental Representative to protect and control traffic.

----------END OF SECTION----------

1. REFERENCES

.1 Government of Canada.
- .1 Canada Labour Code - Part II
- .2 Canada Occupational Health and Safety Regulations.

.2 National Building Code of Canada (NBC):
- .1 Part 8, Safety Measures at Construction and Demolition Sites.

.3 The Canadian Electric Code (as amended)

.4 Canadian Standards Association (CSA) as amended:
- .1 CSA Z797-2009 Code of Practice for Access Scaffold
- .2 CSA S269.1-1975 (R2003) Falsework for Construction Purposes
- .3 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures
- .4 CSA Z1006-10 Management of Work in Confined Spaces.
- .5 CSA Z462- Workplace Electrical Safety Standard

.5 National Fire Code of Canada 2010 (as amended)
- .1 Part 5 – Hazardous Processes and Operations and Division B as applicable and required.

.6 American National Standards Institute (ANSI):
- .1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.

.7 Province of British Columbia:
- .1 Workers Compensation Act Part 3-Occupational Health and Safety.
- .2 Occupational Health and Safety Regulations
- .3 B.C. Ministry of Transportation and Infrastructure Traffic Control Manual for Work on Roadways (as amended)

2. RELATED SECTIONS

.1 Refer to the following current sections as required:
- .1 Submittals procedures: Section 01 33 00
- .2 Special Procedures for Traffic Control: Section 01 35 00.06

3. WORKERS' COMPENSATION BOARD COVERAGE

.1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.

.2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

4. COMPLIANCE WITH REGULATIONS

.1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.

.2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

5. SUBMITTALS

.1 Submit to Departmental Representative submittals listed for review. (in accordance with Section 01 33 00)

.2 Work effected by submittal shall not proceed until review is complete.

.3 Submit the following:

.1 Site Specific Health and Safety Plan.
.2 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.
.3 Copies of incident and accident reports.
.4 Complete set of current Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
.5 Emergency Procedures.

.4 The Departmental Representative will review the Contractor's Site Specific Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 5 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.

.5 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.

.6 Submission of the Site Specific Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:

.1 Be construed to imply approval by the Departmental Representative.
.2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.

.3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

6. RESPONSIBILITY

.1 Assume responsibility as the Prime Contractor for work under this contract.

.2 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial, Territorial and local statutes, regulations, and ordinances, and with Site Specific Health and Safety Plan.

7. HEALTH AND SAFETY COORDINATOR

.1 The Health and Safety Coordinator:

.1 Be responsible for completing all health and safety training and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.

.2 Be responsible for implementing, revising, daily enforcing, and monitoring the Site Specific Health and Safety Plan.

.3 Be on site during execution of work.

8. GENERAL CONDITIONS

.1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.

.2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.

.1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.

.2 Secure site at night time (or provide security guard) as deemed necessary to protect site against entry.

9. PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with:

.1 Multi-employer work site.

.2 Federal employees and general public.

.3 Energized electrical services.

.4 Working in the open exposed to unpredictable weather.

.5 High volumes of vehicular and pedestrian traffic

10. UTILITY CLEARANCES

.1 The Contractor is solely responsible for all utility detection and clearances prior to starting the work

.2 The Contractor will not rely solely upon the Reference Drawings or other information provided for utility locations.

11. REGULATORY REQUIREMENTS

.1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.

.2 In event of conflict between any provision of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.

12. WORK PERMITS

.1 Obtain specialty permits related to project before start of work.

13. FILING OF NOTICE

.1 The General Contractor is to complete and submit a Notice of Project as required by Provincial authorities.

.2 Provide copies of all notices to the Departmental Representative.

14. HEALTH AND SAFETY PLAN

.1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.

.2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:

.1 Primary requirements:

- .1 Contractor's safety policy.
- .2 Identification of applicable compliance obligations.
- .3 Definition of responsibilities for project safety/organization chart for project.
- .4 General safety rules for project.
- .5 Job-specific safe work procedures.
- .6 Inspection policy and procedures.
- .7 Incident reporting and investigation policy and Procedures.
- .8 Occupational Health and Safety Committee/Representative procedures.
- .9 Occupational Health and Safety meetings.

.10 Occupational Health and Safety communications and record keeping procedures.

.2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.

.3 List hazardous materials to be brought on site as required by work.

.4 Indicate Engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.

.5 Identify personal protective equipment (PPE) to be used by workers.

.6 Identify personnel and alternates responsible for site safety and health.

.7 Identify personnel training requirements and training plan, including site orientation for new workers.

.3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.

.4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.

.5 Departmental Representative's review: the review of Site Specific Health and Safety Plan by PWGSC shall not relieve the Contractor of responsibility for errors or omissions in final Site Specific Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.

15. EMERGENCY PROCEDURES

.1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:

.1 Designated personnel from own company.

.2 Regulatory agencies applicable to work and as per legislated regulations.

.3 Local emergency resources.

.4 Departmental Representative.

.2 Include the following provisions in the emergency procedures:

.1 Notify workers and the first-aid attendant, of the nature and location of the emergency.

.2 Evacuate all workers safely.

.3 Check and confirm the safe evacuation of all workers.

.4 Notify the fire department or other emergency responders.

.5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
.6 Notify Departmental Representative.

.3 Provide written rescue/evacuation procedures as required for, but not limited to:
.1 Work at high angles.
.2 Work in confined spaces or where there is a risk of entrapment.
.3 Work with hazardous substances.
.4 Underground work.
.5 Work on, over, under and adjacent to water.
.6 Workplaces where there are persons who require physical assistance to be moved.

.4 Design and mark emergency exit routes to provide quick and unimpeded exit.

16. HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.

.2 Where use of hazardous and toxic products cannot be avoided:
.1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as per [Section 01 33 00].
.2 In conjunction with Departmental Representative, schedule to carry out work during "off hours" when tenants have left the building.
.3 Provide adequate means of ventilation in accordance with Section 01 51 00.
.4 The contractor shall ensure that the product is applied as per manufacturers recommendations.
.5 The contractor shall ensure that only pre-approved products are brought onto the work site in an adequate quantity to complete the work.

17. ASBESTOS HAZARD

.1 Carry out any activities involving asbestos in accordance with applicable Provincial Regulations.

.2 Removal and handling of asbestos will be performed as indicated.

18. ELECTRICAL SAFETY REQUIREMENTS

1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.

.1 Before undertaking any work, coordinate required energizing and de-energizing of new and existing circuits with Departmental Representative.

.2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

19. ELECTRICAL LOCKOUT

1 Develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.

.2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Departmental Representative.

.3 Keep the documents and lockout tags at the site and list in a log book for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

20. OVERLOADING

.1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

21. CONFINED SPACES

.1 Carry out work in confined spaces in compliance with Provincial Regulations.

22. FIRE SAFETY AND HOT WORK

.1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.

.2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

23. FIRE SAFETY REQUIREMENTS

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

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

.3 Portable gas and diesel fuel tanks are not permitted on most federal work sites. Approval from the DR is required prior to any gas or diesel tank being brought onto the work site

24.FIRE PROTECTION AND ALARM SYSTEM

.1 Fire protection and alarm systems shall not be:
- .1 Obstructed.
- .2 Shut off.
- .3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.

.3 Be responsible/liable for costs incurred from the fire department, the building owner and the tenants, resulting from false alarms.

25. UNFORESEEN HAZARDS

.1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and advise the Departmental Representative verbally and in writing.

26. POSTED DOCUMENTS

.1 Post legible versions of the following documents on site:
- .1 Site Specific Health and Safety Plan.
- .2 Sequence of work.
- .3 Emergency procedures.
- .4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.
- .5 Notice of Project.
- .6 Floor plans or site plans.
- .7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
- .8 Workplace Hazardous Materials Information System (WHMIS) documents.
- .9 Material Safety Data Sheets (MSDS).
- .10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.

.2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.

.3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

27. MEETINGS

.1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.

28. CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.

.3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a "stop work order".

PART 1 – GENERAL

1.1 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.

1.2 FIRES

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

1.2 DISPOSAL OF WASTES

.1 Do not bury rubbish and waste materials on site unless approved by Departmental Representative.

.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

.3 Safely dispose of wet concrete and pipe grout off-site in accordance with Municipal, Provincial and Federal authorities' requirements.

1.3 EROSION AND SEDIMENT CONTROL / DRAINAGE

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust that complies with the most stringent requirements of the authorities having jurisdiction.

.2 The contractor shall inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 All work shall be undertaken and completed in such a manner as to prevent the release of sediment, silt, or sediment laden water, concrete or concrete leachate or any other deleterious substance into any ditch or water course.

.4 Do not pump water containing suspended materials into waterways, sewer or drainage systems.

.5 The contractor shall keep all portions of the work drained during construction until completion. Where necessary, catch water ditch shall be constructed along the tops of excavations or fill slopes to prevent water flowing into or over the excavated or filled area. The contractor will be responsible for the repair for the damage, directly resulting for their operations and for the removal or dirt or debris from existing system, which may be caused by or which may result from water backing up or overflowing through, from, or along any part of the work or adjacent properties. The contractor shall bear all costs associated with these repairs until works are complete and accepted by the Department Representative.

.6 The contractor shall modify and/or provide additional silt control measures as necessary to accommodate construction activities and satisfy the requirements or the governing agencies.

.7 The contractor shall maintain all silt control facilities on an as-needed basis

.8 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

.9 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

1.4 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties where indicated.

1.5 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 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.6 NOTIFICATION

.1 Departmental Representative will notify 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 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

.3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

----------END OF SECTION----------

PART 1 – GENERAL

1.1 INSPECTION

.1 The Contractor shall as part of the work perform, or cause to be performed, all tests, inspections and approvals of the work as required by the Contract Documents, and if a test, inspection or approval requires a representative sample of materials or workmanship the Contractor shall at the Contractor's own cost supply the labour and materials necessary to provide the sample.

.2 If any portion of the work is designated for special tests, inspections or approvals (either as a requirement in the Contract Documents, or by the Department Representative's instructions, or by the laws or regulations applicable at the place of the work), then:

.1 if the Department Representative is to perform or arrange for the test, inspection or approval the Contractor shall give the Department Representative timely notice requesting such test, inspection or approval; and

.2 if other authorities are to perform the test, inspection or approval the Contractor shall arrange for such test, inspection or approval and shall give the Department Representative timely notice of the date and time for such test, inspection or approval.

.3 Department Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Department Representative shall pay cost of examination and replacement.

.4 If the Contractor disagrees with Department Representative's determination of the Work not meeting the Specifications based on the results of inspection or testing required in the Contract Documents or ordered by the Department Representative, the Contractor may elect to carry out such further inspection or testing which the Department Representative agrees is acceptable for the purpose of determining whether the work complies with the requirements of the Contract Documents If such further inspection or testing determines that the Work is not in accordance with the requirements of the Contract Documents, then the Contractor shall correct such Work and pay the costs of the inspection and testing including all

costs of the correction and further testing. If such further inspection or testing determines that the Work is in accordance with the requirements of the Contract Documents, then then Department shall pay all costs of the inspection and testing.

.5 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work at the Contractor's own expense, and Contractor shall comply with such direction.

.6 The Contractor shall promptly provide the Department Representative with 4 copies of all certificates, inspection and testing reports required by the Contract Documents or ordered by the Department Representative.

.7 The Contractor shall not undertake any Work outside the working hours, as specified in the Contract Documents, which under the Contract Documents requires tests, inspection, or approval by the Department Representative unless the Contractor obtains the Department Representative's prior approval. The Contractor shall reimburse the Department for any additional costs incurred to provide tests, inspections or approvals outside such specified working hours.

.8 Independent Inspection / Testing Agencies will be engaged by the Contractor for purpose of inspecting and/or testing portions of the Work. Cost of such services will be borne by the Contractor.

.9 Submit for approval by Departmental Representative proposed Independent Inspection / Testing Agencies.

.10 Employment of inspection / testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.11 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for re-testing and re-inspection.

1.2. ACCESS TO WORK .1 Allow Department Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

1.3 TESTING FREQUENCY

.1 The following outlines the minimum testing frequency for various components of the Work:

.1 Asphalt Cores to confirm Density and Thickness:
- .1 One per 500m^2.
- .2 For asphalt pavement areas less than 500m2, pavement is deemed to have met specifications if results from all cores average the design thickness ± 5mm with no individual core greater than 10mm less than the design thickness.
- .3 Core holes shall be reinstated to the satisfaction of the Department Representative.

.2 Road Granular Base Densities:
- .1 One per 500 sq.m.

.3 Sieve Analyses and Proctors:
- .1 One prior to commencing work.
- .2 One every 200 tonne.

.4 Asphalt Marshall Test:
- .1 One per asphalt type.
- .2 Minimum one per full paving day.

1.4 REPORTS

.1 Submit copies of inspection and test reports to Departmental Representative. The inspection and certification report are to submitted in PDF format during the construction stage with hard copies included in the Close Out documentation.

1.5 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

.2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

----------END OF SECTION----------

1.2 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Departmental Representative or other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times. Do not burn waste materials on site, unless approved by Departmental Representative.

.3 Clear snow and ice from site to provide a safe working areas.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Provide on-site containers for collection of waste materials and debris. Dispose of waste materials and debris off site.

.6 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

1.3 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds. Remove dirt and other disfiguration from exterior surfaces. Sweep and wash clean paved areas.

----------END OF SECTION----------

PART 1 – GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00-Submittal Procedures.

.2 Section 01 45 00-Quality Control

1.2 SUBMITTALS

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

.2 Copy will be returned after final inspection with Departmental Representative comments.

.3 Revise content of documents as required prior to final submittal.

.4 Furnish evidence, for type, source and quality of products provided.

.5 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.6 Pay costs of transportation.

.7 Submit to Department Representative, final copies of all test reports completed for this project including compaction tests, granular material gradations, asphatic concrete densities, thickness and marshall characteristics, a minimum 2 weeks prior to Substantial Performance of the Work.

1.3 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 216 x 279mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by process flow, under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.4 CONTENTS - EACH VOLUME .1 Table of Contents: provide title of project;

.1 Date of submission; names.
.2 Addresses, and telephone numbers of Consultant and 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. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.5 AS-BUILTS .1 Maintain, in addition to requirements in General Conditions, 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.

.2 Store record documents in field office apart from documents used for construction. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Departmental Representative.

1.6 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on set of blue line, opaque drawings, and in copy of Project Manual, provided by Departmental Representative.

.2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
- .1 Measured depths of elements of foundation in relation to finish first floor datum.
- .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
- .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
- .4 Field changes of dimension and detail.
- .5 Changes made by change orders.
- .6 Details not on original Contract Drawings.
- .7 References to related shop drawings and modifications.

.5 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.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections to provide certification that all works have been completed as specified and that works are ready for tie-in.

----------END OF SECTION----------

PART 1 - GENERAL

1.1 RELATED SECTIONS

1. Section 01 33 00-Submittal Procedures.
2. Section 32 11 23-Aggregate Base Courses.

1.2 REFERENCES

1. ASTM; AWWA; CAN – As specified in the contract document

1.3 SOURCE QUALITY CONTROL

1. Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
2. Inform Department Representative of proposed source and provide samples or access for sampling at least 2 weeks prior to commencing production.
3. If, in opinion of Department Representative, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
4. Should a change of material source be proposed during work, advise Department Representative 2 weeks in advance of proposed change to allow sampling and testing.
5. Acceptance of material does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified.
6. Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

1. Divert unused granular materials from landfill to local facility as approved by Department Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

1. Gravel to be composed of inert, durable material, reasonably uniform in quality and free from soft or disintegrated particles. In absence of satisfactory performance records over a five year period for particular source of material, soundness to be tested according to ASTM test procedure C-88 or latest revised issue. Maximum weight average losses for course and fine aggregates to be 30% when magnesium sulphate is used after five cycles.
2. All crushed gravel when tested according to ASTM C-136 and ASTM C-117, or latest revised issue, to have a generally uniform gradation and conform to following gradation limits and 60% of the material passing each sieve must have one or more fractured faces.

Determination of the amount of fractured material shall be in accordance with the Ministry of Transportation and Highways' Specification I-11, Fracture Count for Coarse Aggregate, Method "A", which determines fractured faces by count. The Plasticity Index for crushed gravel to not exceed 6.0.

2.2 NATIVE MATERIAL

1. To be any workable soil free of organic or foreign matter; any material obtained within limits of Contract may be approved by the Department Representative. Native material content or compact to specified density.

2.3 PIT RUN GRAVEL

.1 To be well graded granular material, substantially free from clay lumps, organic matter and other extraneous material, screened to remove all stones in excess of maximum diameter specified in material description (300 mm Pit Run Gravel, 200 mm Pit Run Gravel, 100 mm Pit Run Gravel). Material to compact to specified density and conform to following gradations:

Sieve Designation	Percent Passing
(300mm dia)	(100)
(200mm dia)	(100)
(100mm dia)	(100)
75mm	100
50mm	70-100
25mm	50-100
4.75mm	22-100
2.36mm	10-85
0.075mm	2-8

Recycled concrete free from contaminated and other extraneous material, conforming to the specified gradations may be used as pit run gravel.

2.4 PIT RUN SAND

1. To be well graded pit run sand, free from organic materials and conform to following gradations:

Sieve Designation	Percent Passing
12.5mm	100
4.75mm	35-100
2.36mm	20-70
1.18mm	13-50
0.600mm	8-35
0.300mm	5-25
0.150mm	2-15
0.075mm	0-6

2.5 RIVER SAND

1. River sand, to be used only where shown on Contract Drawings or otherwise specified and approved by Department Representative, to be free of organic material, salt and foreign objects and conform to following gradations:

Sieve Designation	Percent Passing
19mm	100
4.75mm	80-100
0.600mm	20-80
0.150mm	0-20
0.075mm	0-8

2.6 DRAIN ROCK

.1 To consist of clean round stone or crushed rock conforming to the following gradations:

	Percent Passing	
Sieve Designation	Course	Fine
25.0mm	100	
19.0mm	0-100	
9.5mm	0-5	100
4.75mm	0	50-100
2.36mm		5-15
1.18mm		15-38
0.600mm		0-8
0.300mm		0-5
0.150mm		0-2
0.075mm		0

.2 Drain rock to be used only where specified on Contract Drawings. Use of drain rock other than as specified requires approval of DEPARTMENT Representative after examination of soils against which drain rock will be placed.

2.7 GRANULAR PIPE BEDDING AND SURROUND MATERIAL

.1 Crushed or graded gravels to conform to following gradations:

	Percent Passing	
Sieve Designation	Type 1*	Type 2*
25.0mm	100	100
19.0mm	90-100	90-100
12.5mm	65-85	70-100
9.5mm	50-75	
4.75mm	25-50	40-70
2.36mm	10-35	25-52
1.18mm	6-26	15-38
0.600mm	3-17	6-27
0.300mm		3-20
0.075mm	0-5	0-8

Type 1* standard gradation
Type 2* to be used only in dry trench conditions and with Departmental Representative's prior approval

Recycled concrete free from contaminated and other extraneous material, conforming to the Type 1 gradations, may be used as pipe bedding and surround material.

.2 Other permissible materials: only where shown on Contract Drawings or directed by Departmental Representative shall drain rock, pit run sand or approved native material be used for bedding and pipe surround.

2.8 SELECT GRANULAR SUB-BASE 1. To be well graded granular material, substantially free from lumps and organic matter, screened if required to conform to following gradations:

Sieve Designation	Percent Passing
75mm	100
25mm	50-85
0.150mm	0-15
0.075mm	0-8

2.9 CRUSHED GRANULAR SUB-BASE .1 To be 75mm crushed gravel conforming to following gradations:

Sieve Designation	Percent Passing
80mm	
75mm	100
38mm	60-100
25.0mm	-
19.0mm	35-80
12.5mm	-
9.5mm	26-60
4.75mm	20-40
2.36mm	15-30
1.18mm	10-20
0.60um	5-15
0.30um	3-10
0.18um	-
0.15um	-
0.075um	0-5

2.10 GRANULAR BASE AND SHOULDER GRAVEL .1 To be 19mm crushed gravel conforming to following gradations:

Sieve Designation	Percent Passing
19.0mm	100
12.5mm	75-100
9.5mm	60-90
4.75mm	40-70
2.36mm	27-55
1.18mm	16-42
0.600mm	8-30
0.300mm	5-20
0.075mm	2-8

2.11 RECYCLED AGGREGATE MATERIAL

.1 Aggregates containing recycled material may be utilized if approved by the DEPARTMENT Representative. In addition to meeting all other conditions of this specification, recycled material should not reduce the quality of construction achievable with quarried materials. Recycled material should consist only of crushed Portland cement concrete; other construction and demolition materials such as asphaltic pavements, bricks, plaster, etc. are not acceptable.

PART 3 - EXECUTION

3.1 HANDLING

.1 Handle and transport aggregates to avoid segregation, contamination and degradation.

.2 Do not use intermixed or contaminated materials. Remove and dispose rejected materials within 48 h of rejection.

----------END OF SECTION----------

PART 1 – GENERAL

1.1 RELATED REQUIREMENTS

.1 Section (32 12 16 Asphalt Paving).

1.2 REFERENCE STANDARDS

.1 ASTM International
- .1 ASTM C 117-(04), Standard Test Method for Material Finer Than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
- .2 ASTM C 136-(06), Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
- .3 ASTM D 2419-(09), Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

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

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

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

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Rubberized and elasticized asphalt sealant to meet or exceed ASTM – D1190, AASHTO M173 and ASTM D3405.

.2 High float emulsified asphalt, HF1505 to Section 311 of BCMoTI General Specifications.

.3 Aggregate for crack filling: material to following requirements:
- .1 12.5 mm screened sand.
- .2 Gradations to be within limits specified.

.3 Table:

Sieve Designation	% Passing
12.5 mm	100
9.5 mm	80-100
4.75 mm	50-95
2.36 mm	30-80
0.600 mm	10-50
0.300 mm	0-25
0.075 mm	0-6

2.2 EQUIPMENT

.1 Manual pouring cones or pressure applicator.

.2 Hand tools, and rotary routers.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed are acceptable for pavement crack cleaning and filling in accordance with manufacturer's written instructions.
  .1 Visually inspect substrate in presence of Departmental Representative.
  .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 PREPARATION

.1 Clean cracks designated by Departmental Representative.

.2 Remove existing sealer and loose materials
  .1 From spalled edges and pavement surface.
  .2 To minimum depth of 50 mm.
  .3 Open "V" type grooves not permitted.

.3 Rout designated cracks to width of 19 mm using rotary routers.

.4 Rout designated cracks to depth between 19 mm and 25 mm.
  .1 Clean cracks larger than 2 mm and less than 25 mm in concrete and asphalt pavement surfaces as directed by Departmental Representative.
  .2 Rout cracks between 2 mm and 10 mm to minimum width of 20 mm and depth of 25 mm below pavement surface.
  .3 For asphalt pavements or overlays rout cracks to width of 25 mm and depth of 25 mm below pavement surface.

.5 Clean loose material from cracks with oil free compressed air.

.6 Apply soil sterilant in crack prior to placing filler material.

.7 Dispose of material removed from cracks as directed.

3.3 CRACK FILLING

.1 Ensure cracks are clean and dry immediately before filling.

.2 Fill cracks designated and approved by Departmental Representative.

.3 Do not use frozen aggregate.

.4 Fill cracks when air temperature is above 10 degrees C.
- .1 When daily low temperature does not fall below 5 degrees C.
- .2 When no rain is forecast.

.5 Finishing:
- .1 For cracks routed to width of 10 mm: place joint sealant 2 - 4 mm above pavement surface to provide an overband seal over crack.
  - .1 Ensure sealant overlaps both sides of crack by 40 mm minimum.
- .2 For cracks routed to width of 25 - 30 mm: place joint sealant to ensure that upon cooling, sealant is recessed 2 mm below pavement surface.

.6 Fill and tamp cracks with sufficient applications to ensure cured fill material is level with pavement surface.

.7 Fill cracks wider than 50 mm with hot mix asphalt concrete and tamped, immediately before placement of asphalt concrete overlay, where and when approved by Departmental Representative.

.8 Slightly overfill entire crack reservoir with filler material. Smooth with narrow V-shaped squeegee immediately after placement of filler material on each side of crack.

.9 Remove and dispose of excess filling material as directed by Departmental Representative.

.10 Road lanes to be opened to traffic only after filler material has set sufficiently that it will not pick up under traffic. Blotting material may be applied to filler material after surface has set.

3.4 CLEANING

.1 Progress Cleaning:
- .1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

1. Section 01 35 00.06 -Special Procedures for Traffic Control.

2. Section 31 05 16-Aggregate Materials.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)
- .1 ASTM C 117, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
- .2 ASTM C 131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .3 ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .4 ASTM D 698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600kN-m/m³).
- .5 ASTM D 1557-[00], Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (2,700kN-m/m³).
- .6 ASTM D 1883, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
- .7 ASTM D 4318, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

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

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Divert unused granular material from landfill to local facility as approved by Department Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Material for road base to be:
- .1 Refer to Section 31 05 16-Aggregate Materials for material specifications for shoulder ground.

PART 3 - EXECUTION

3.1 INSPECTION OF UNDERLYING SUBGRADE SURFACE

.1 Ensure underlying subbase surface true to cross-section and grade and compacted to 98% Modified Proctor Maximum Dry Density. Do not place granular subbase until subgrade is inspected and approved by Department Representative.

3.2 PLACING

1. Place material only on clean unfrozen surface, properly shaped and compacted and free from snow or ice.

2. Begin spreading sub-base material on crown line or high side of one-way slope.

3. Place granular sub-base materials using methods which do not lead to segregation or degradation.

4. Place material to full width in uniform layers not exceeding 150mm compacted thickness. Department Representative may authorize thicker lifts (layers) if specified compaction can be achieved.

5. Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

6. Remove and replace portion of layer in which material has become segregated during spreading.

3.3 COMPACTION

.1 Compaction equipment to be capable of obtaining required material densities.

.2 Compact to density of not less than 98% Modified Proctor Density.

.3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.

.4 Apply water as necessary during compaction to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is suitable for compaction.

.5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Department Representative.

3.4 SITE TOLERANCES

1. Ensure finished base within plus or minus 10 mm of specified grade and cross-section but not uniformly high or low.

2. Ensure finished surface has no irregularities exceeding 10 mm when checked with a 3 m straight edge placed in any direction.

3. Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.5 PROOF ROLLING

1. For proof rolling use fully loaded single or dual axle dump truck.

2. Department Representative may authorize use of other acceptable proof rolling equipment.

3. Proof roll top of base upon completion of fine grading and compaction.

4. Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.

5. Where proof rolling reveals area of unsuitable subgrade:
   1. Remove base, subbase and subgrade material to depth and extent as directed by Department Representative.
   2. Backfill excavated subgrade with approved embankment material and compact to specified density.
   3. Replace granular subbase material and compact.
   4. Replace base material and compact in accordance with this Section.

6. Where proof rolling reveals areas of unsuitable base or subbase, remove unsuitable materials to depth and extent directed by Department Representative and replace with new materials,at no extra cost.

3.6 MAINTENANCE

.1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by Department Representative.

----------END OF SECTION----------

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Materials and application of asphalt prime to granular base surface prior to asphalt paving.

1.2 RELATED SECTIONS

.1 Section 01 33 00-Submittal Procedures.

.2 Section 01 35 14-Special Procedures for Traffic Control.

.3 Section 32 11 23-Aggregate Base Courses.

.4 Section 32 12 16-Asphalt Paving.

1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
.1 ASTM D 140, Standard Practice for Sampling Bituminous Materials.

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-16.1, Cutback Asphalts for Road Purposes.
.2 CAN/CGSB-16.2, Emulsified Asphalts, Anionic Type, for Road Purposes.

1.4 QUALITY ASSURANCE

.1 Upon request from Department Representative, submit manufacturer's test data and certification that asphalt prime material meets requirements of this Section.

.2 Provide access on tanker for Department Representative to sample asphalt material to be incorporated into work, in accordance with ASTM D140.

1.5 DELIVERY,STORAGE AND HANDLING

.1 Deliver, store and handle materials to ASTM D 140.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Divert unused asphalt materials from landfill to local facility approved by Department Representative.

.2 Divert unused aggregate materials from landfill to local facility approved by Department Representative.

PART 2 - PRODUCTS

2.1 MATERIAL

.1 Asphalt material: to CAN/CGSB-16.1 grade: RM-20, RM-70 or CAN/CGSB-16.2 grade: SS-1h.

.2 Sand blotter: clean granular material passing 4.75mm sieve and free from organic matter or other deleterious materials.

2.2 EQUIPMENT

.1 Pressure distributor to be:
- .1 Designed, equipped, maintained and operated so that asphalt material can be:
  - .1 Maintained at even temperature.
  - .2 Applied uniformly on variable widths of surface up to 5 m.
  - .3 Applied at controlled rates from 0.2 to 5.4 L/m² with uniform pressure, and allowable variation from any specified rate not exceeding 0.1 L/m².
  - .4 Distributed in uniform spray without atomization at temperature required.
- .2 Equipped with meter registering metres of travel per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.
- .3 Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.
- .4 Equipped with easily read, accurate and sensitive device which registers temperature of liquid in reservoir.
- .5 Equipped with accurate volume measuring device or calibrated tank.
- .6 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
- .7 Equipped with nozzle spray bar, with operational height adjustment.
- .8 Cleaned if previously used with incompatible asphalt material.

.2 Hand Sprayer: For small and/or inaccessible areas, a pressurized hand-held spray wand may be used.

PART 3 - EXECUTION

3.1 APPLICATION

.1 Obtain Department Representative's approval of granular base surface before applying asphalt prime.

.2 Cutback asphalt:
- .1 Heat asphalt prime to between 60 and 70 degrees C for pumping and spraying.
- .2 Apply asphalt prime to granular base at rate as directed by Department Representative, but not to exceed 2 L/m².
- .3 Apply on dry surface unless otherwise directed by Department Representative.

.3 Emulsified asphalt:
- .1 Dilute asphalt emulsion with clean water at 1:1 ratio for application.
- .2 Mix thoroughly by pumping or other method approved by Department Representative.
- .3 Apply diluted asphalt emulsion at rate directed by Department Representative, but do not exceed 5 L/m².

.4 Apply diluted asphalt emulsion on damp surface unless otherwise directed by Department Representative.

.4 Do not apply prime when air temperature is less than 5 degrees C or when rain is forecast within 2 hours.

.5 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt prime material.

.6 Where traffic is to be maintained, treat no more than one-half width of surface in one application.

.7 Prevent overlap at junction of applications.

.8 Do not prime surfaces that will be visible when paving is complete.

.9 Apply additional material to areas not sufficiently covered as directed by Department Representative.

.10 Keep traffic off primed areas until asphalt prime has cured.

.11 Permit prime to cure before placing asphalt paving.

3.2 USE OF SAND BLOTTER .1 If asphalt prime fails to penetrate within 24 hours, spread sand blotter material in amounts required to absorb excess material.

.2 Sweep and remove excess blotter material.

----------END OF SECTION----------

PART 1 - GENERAL

1.1 RELATED SECTIONS
.1 Section 01 33 00-Submittal Procedures.
.2 Section 01 35 14-Special Procedures for Traffic Control.
.3 Section 32 12 16-Asphalt Paving.

1.2 REFERENCES
.1 American Society for Testing and Materials International, (ASTM)
.1 ASTM D 140, Standard Practice for Sampling Bituminous Materials.
.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-16.2, Emulsified Asphalts, Anionic Type, for Road Purposes.

1.3 QUALITY ASSURANCE
.1 Upon request by Department Representative, submit manufacturer's test data and certification that asphalt tack coat material meets requirements of this section.
.2 Provide access on tanker for Department Representative to sample asphalt material to be incorporated into work, in accordance with ASTM D140.

1.4 DELIVERY,STORAGE AND HANDLING
.1 Deliver, store and handle materials in accordance with ASTM D 140.

1.5 WASTE MANAGEMENT AND DISPOSAL
.1 Divert unused asphalt from landfill to facility capable of recycling materials.

PART 2 - PRODUCTS

2.1 MATERIALS
.1 Emulsified asphalt: to CAN/CGSB-16.2, grade: SS-1.

PART 3 - EXECUTION

3.1 EQUIPMENT
1. Refer to Section 32 12 14-Asphalt Prime Coats.

3.2 APPLICATION
.1 Obtain Department Representative's approval of surface before applying asphalt tack coat.
.2 Apply asphalt tack coat only on clean and dry surface.
.3 Dilute asphalt emulsion with water at 1:1 ratio for application.
.1 Mix thoroughly by pumping or other method approved by Department Representative.
.4 Apply asphalt tack coat evenly to pavement surface at rate as directed by Department Representative, but not to exceed 0.7 L/m² when diluted with water at 1:1 ratio.

.5 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt tack coat material.

.6 Do not apply asphalt tack coat when air temperature is less than 5 degrees C or when rain is forecast within 2 hours of application.

.7 Apply asphalt tack coat only on unfrozen surface.

.8 Asphalt tack oil, is toxic to aquatic life. Provide extra caution near catchbasins and storm drain inlets as all storm sewers in the worksite drain to an environmentally sensitive watercourse.

.9 Evenly distribute localized excessive deposits of tack coat by brooming as directed by Department Representative.

.10 Where traffic is to be maintained, treat no more than one half of width of surface in one application.

.11 Keep traffic off tacked areas until asphalt tack coat has set.

.12 Re-tack contaminated or disturbed areas as directed by Department Representative.

.13 Permit asphalt tack coat to set before placing asphalt pavement.

----------END OF SECTION----------

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation for asphalt concrete paving for roads and parking areas.

1.2 RELATED SECTIONS

1. Section 01 33 00-Submittal Procedures.
2. Section 01 35 14-Special Procedures for Traffic Control.
3. Section 31 05 16-Aggregate Materials.
4. Section 32 12 14-Asphalt Prime Coats
5. Section 32 12 15-Asphalt Tack Coats.

1.3 REFERENCES

.1 American Association of State Highway and Transportation Officials (AASHTO)
- .1 AASHTO M320, Standard Specification for Performance Graded Asphalt Binder.
- .2 AASHTO R29, Standard Specification for Grading or Verifying the Performance Graded of an Asphalt Binder.
- .3 AASHTO T245, Resistance to Plastic flow of Bituminous Mixtures Using Marshall Apparatus.

.2 Asphalt Institute (AI)
- .1 AI MS2 Sixth Edition, Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types.

.3 American Society for Testing and Materials International, (ASTM)
- .1 ASTM C 88, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.
- .2 ASTM C 117, Standard Test Method for Material Finer Than 0.075mm (No.200) Sieve in Mineral Aggregates by Washing.
- .3 ASTM C 123, Standard Test Method for Lightweight Particles in Aggregate.
- .4 ASTM C 127, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.
- .5 ASTM C 128, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate.
- .6 ASTM C 131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .7 ASTM C 136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
- .8 ASTM C 207, Standard Specification for Hydrated Lime for Masonry Purposes.
- .9 ASTM D 995, Standard Specification for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.

.10 ASTM D 2419, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
.11 ASTM D 3203, Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.
.12 ASTM D 4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.4 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-8.1, Sieves Testing, Woven Wire, Inch Series.
.2 CAN/CGSB-8.2, Sieves Testing, Woven Wire, Metric.
.3 CAN/CGSB-16.3, Asphalt Cements for Road Purposes.

1.4 PRODUCT DATA

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

.2 Submit manufacturer's test data and certification that asphalt cement meets requirements of this Section.

.3 Submit asphalt concrete mix design and trial mix test results to Department Representative for review at least 4 weeks prior to beginning Work.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

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

.3 Divert unused aggregate materials from landfill to facility for reuse as approved by Department Representative.

.4 Divert unused asphalt from landfill to facility capable of recycling materials.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Asphalt cement: to CAN/CGSB-16.3-M90, grade: 80-100.

.2 Reclaimed asphalt pavement:
.1 Crushed and screened so that 100% of RAP material passes 37.5 mm screen before mixing.

.3 Aggregates: in accordance with Section 31 05 16 - Aggregate Materials: General following requirements:
.1 Crushed stone or gravel consisting of hard, durable angular particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
.2 Gradations: within limits specified when tested to ASTM C 136 and ASTM C 117.

.3 Table:

Sieve Size (UC#2)	Percent Passing
12.5 mm	100
4.75 mm	55-75
2.36 mm	38-58
1.18 mm	28-47
0.600 mm	20-36
0.300 mm	10-26
0.150 mm	4-17
0.075 mm	3-8

Sieve Size (LC#2)	Percent Passing
19 mm	100
12.5 mm	84-99
9.5 mm	73-88
4.75 mm	50-68
2.36 mm	35-55
1.18 mm	27-46
0.600 mm	18-36
0.300 mm	10-26
0.150 mm	4-17
0.075 mm	3-8

.4 Coarse aggregate: aggregate retained on 4.75mm sieve and fine aggregate is aggregate passing 4.75mm sieve when tested to ASTM C 136.

.5 When dryer drum plant or plant without hot screening is used, process fine aggregate through 4.75mm sieve and stockpile separately from coarse aggregate.

.6 Do not use aggregates having known polishing characteristics in mixes for surface courses.

.7 Sand equivalent: ASTM D 2419 Min: 40.

.8 Magnesium Sulphate soundness: to ASTM C 88 Max% loss by mass after five cycles:
- .1 Coarse aggregate: 15%.
- .2 Fine aggregate: 18%.

.9 Los Angeles abrasion: Grading B, to ASTM C 131 Max % loss by mass:
- .1 Coarse aggregate, upper course: 25%
- .2 Coarse aggregate, lower course: 35%.

.10 Absorption: to ASTM C 127 Max % by mass:
- .1 Coarse aggregate, upper course: 1.75%.
- .2 Coarse aggregate, lower course: 2.00%.

.11 Loss by washing: to ASTM C 117 Max % passing 0.075 mm sieve:
- .1 Coarse aggregate, upper course: 1.5
- .2 Coarse aggregate, lower course: 2.0

.12 Flat and elongated particles: to ASTM D 4791, (with length to thickness ratio greater than 3): Max% by mass:
- .1 Coarse aggregate, upper course: 10%.
- .2 Coarse aggregate, lower course: 10%.

.13 Crushed fragments: at least 60% of particles by mass within each of following sieve designation

ranges, to have at least 2 freshly fractured face. Material to be tested according to ASTM C 136 and ASTM C117. Determination of amount of fractured material will be inaccordance with Ministry of Transportation and Highways' Specification I-11, Fracture Count for Coarse Aggregate, Method "B", which determines fractured faces by mass.

Passing		Retained on
25 mm	to	12.5mm
12.5 mm	to	4.75mm

.14 Regardless of compliance with specified physical requirements, fine aggregates may be accepted or rejected on basis of past field performance.

.4 Mineral filler:
.1 Finely ground particles of limestone, hydrated lime, Portland cement or other approved non-plastic mineral matter, thoroughly dry and free from lumps.
.2 Add mineral filler when necessary to meet job mix aggregate gradation or as directed to improve mix properties.
.3 Mineral filler to be dry and free flowing when added to aggregate.

2.2 EQUIPMENT

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

.2 Rollers: sufficient number of type and weight to obtain specified density of compacted mix.

.3 Vibratory rollers:
.1 Minimum drum diameter: 1200mm.
.2 Maximum amplitude of vibration (machine setting): 0.5mm for lifts less than 40 mm thick.

.4 Haul trucks: sufficient number and of adequate size, speed and condition to ensure orderly and continuous operation and as follows:
.1 Boxes with tight metal bottoms.
.2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
.3 In cool weather or for long hauls, insulate entire contact area of each truck box.
.4 Use only trucks which can be weighed in single operation on scales supplied.

.5 Hand tools:
.1 Lutes or rakes with covered teeth for spreading and finishing operations.
.2 Tamping irons having mass not less than 12 kg and bearing area not exceeding 310 cm^2 for compacting material along curbs, gutters and other structures

inaccessible to roller. Mechanical compaction equipment, when approved by Department Representative may be used instead of tamping irons.

.3 Straight edges, 3.0m in length, to test finished surface.

2.3 MIX DESIGN

.1 Mix design provided by the Contractor (to be developed by testing laboratory) for approval by Department Representative.

.2 Mix to contain maximum 20% by mass of RAP. Department Representative may approve higher proportion of RAP if Contractor demonstrates ability to produce mix meeting requirements of specification.

.3 Design of mix: by Marshall method to requirements below.

.1 Compaction blows on each face of test specimens: 75.

.2 Mix physical requirements:

Property	Roads	
Marshall Stability at 60°C	kN min	5.5 upper course 6.4 lower course
Flow Value	mm	2-4
Air Voids in Mixture	%	3-5 upper course 3-6 lower course
Voids in Mineral Aggregate	% min	15 upper course 2 14 lower course 2
Index of Retained Stability	% minimum	75

.3 Measure physical requirements as follows:

.1 Marshall load and flow value: to ASTM D1559.

.2 Air voids: to ASTM D3203.

.3 Index of Retained Stability: measure in accordance with Marshall Immersion Test (ASTM D1559).

.4 Do not change job-mix without prior approval of Department Representative. When change in material source proposed, new job-mix formula to be reviewed by Department Representative.

PART 3 - EXECUTION

3.1 PLANT AND MIXING REQUIREMENTS

.1 Batch and continuous mixing plants:

.1 To ASTM D 995.

.2 Feed aggregates from individual stockpiles through separate bins to cold elevator feeders. Do not load frozen materials into bins.

.3 Feed cold aggregates to plant in proportions to ensure continuous operations.

.4 Calibrate bin gate openings and conveyor speeds to ensure mix proportions are achieved.

.5 Before mixing, dry aggregates to moisture content not greater than 0.5% by mass or to lesser moisture content if required to meet mix design requirements.

.6 Immediately after drying, screen aggregates into hot storage bins in sizes to permit recombining into gradation meeting job-mix requirements.

.7 Store hot screened aggregates in manner to minimize segregation and temperature loss.

.8 Heat asphalt cement and aggregate to mixing temperature directed by Department Representative. Do not heat asphalt cement above 160 degrees C.

.9 Maintain temperature of materials within 5 degrees C of specified mix temperature during mixing.

.10 Mixing time:

.1 In batch plants, both dry and wet mixing times as directed by Department Representative. Continue wet mixing as long as necessary to obtain thoroughly blended mix but not less than 30s or more than 75s.

.2 In continuous mixing plants, mixing time as directed by Department Representative but not less than 45s.

.3 Do not alter mixing time unless directed by Department Representative.

.11 Where RAP is to be incorporated into mix:

.1 Feed from separate cold feed bin specially designed to minimize consolidation of material. Provide 37.5mm scalping screen on cold feed to remove oversized pieces of RAP.

.2 Ensure positive and accurate control of RAP cold feed by use of hydraulic motor or electric clutch and equip with anti rollback device to prevent material from sliding backward on feed belt.

.3 Combine RAP and new aggregates in proportions as directed by Department Representative. Dry mix thoroughly, until uniform temperature within plus or minus 5 degrees C of mix temperature, as directed by Department Representative Consultant is achieved prior to adding new asphalt cement. Do not add new asphalt cement where temperature of dried mix material is above 160 degrees C.

.2 Dryer drum mixing plant:

.1 To ASTM D 995.

.2 Load aggregates from individual stockpiles to separate cold feed bins. Do not load frozen materials into bins.

.3 Feed aggregates to burner end of dryer drum by means of multi-bin cold feed unit and blend to meet job-mix requirements by adjustments of variable speed feed belts and gates on each bin.

.4 Where RAP is to be incorporated into mix, dryer drum mixer is to be designed to prevent direct contact of RAP with burner flame or with exhaust gases hotter than 180 degrees C.

.5 Feed RAP from separate cold feed bin designed to minimize reconsolidation of material.

.6 Meter total flow of aggregate and RAP by an electronic weigh belt system with indicator that can be monitored by plant operator and which is interlocked with asphalt pump so that proportions of aggregate RAP and asphalt entering mixer remain constant.

.7 Provide for easy calibration of weighing systems for aggregates and RAP without having material enter mixer.

.8 Calibrate bin gate openings and conveyor speeds to ensure mix proportions are achieved. Calibrate weigh bridge on charging conveyor by weighing amount of aggregate passing over weigh bridge in set amount of time. Difference between this value and amount shown by plant computer system to differ by not more than plus or minus 2%.

.9 Make provision for conveniently sampling full flow of materials from cold feed.

.10 Provide screens or other suitable devices to reject oversize particles or lumps of aggregate and RAP from cold feed prior to entering drum.

.11 Provide system interlock stop on feed components if either asphalt or aggregate from bin stops flowing.

.12 Accomplish heating and mixing of asphalt mix in approved parallel flow dryer-mixer in which aggregate enters drum at burner end and travels parallel to flame and exhaust gas stream. Control heating to prevent fracture of aggregate or excessive oxidation of asphalt. Equip system with automatic burner controls and provide for continuous temperature sensing of asphalt mixture at discharge, with printing recorder that can be monitored by plant operator. Submit printed record of mix temperatures at end of each week, if required.

.13 Mixing period and temperature to produce uniform mixture in which particles are thoroughly coated, and moisture content of material as it leaves mixer to be less than 0.5%.

.3 Temporary storage of hot mix:

.1 Provide mix storage of sufficient capacity to permit continuous operation and designed to prevent segregation.

.2 Do not store asphalt mix in storage bins in excess of 12 hour.

.4 Mixing tolerances:
.1 Permissible variation in aggregate gradation from job mix (percent of total mass).

4.75 mm sieve and larger	5.5	
2.36 mm sieve		4.5
0.600 mm sieve		3.5
0.150 mm sieve		2.5
0.075 mm sieve	1.5	

.2 Permissible variation of asphalt cement from job mix: 0.3%.
.3 Permissible variation of mix temperature at discharge from plant: 5 degrees C.

3.2 EQUIPMENT

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

.2 Rollers: sufficient number of type and weight to obtain specified density of compacted mix.

.3 Vibratory rollers:
.1 Minimum drum diameter: 1200mm.
.2 Maximum amplitude of vibration (machine setting): 0.5mm for lifts less than 40 mm thick.

.4 Haul trucks: sufficient number and of adequate size, speed and condition to ensure orderly and continuous operation and as follows:
.1 Boxes with tight metal bottoms.
.2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
.3 In cool weather or for long hauls, insulate entire contact area of each truck box.
.4 Use only trucks which can be weighed in single operation on scales supplied.

.5 Hand tools:
.1 Lutes or rakes with covered teeth for spreading and finishing operations.
.2 Tamping irons having mass not less than 12 kg and bearing area not exceeding 310 cm² for compacting material along curbs, gutters and other structures inaccessible to roller. Mechanical compaction equipment, when approved by Department Representative may be used instead of tamping irons.
.3 Straight edges, 3.0m in length, to test finished surface.

3.3 PREPARATION

.1 Reshape granular road bed, if required.

.2 When paving over existing asphalt surface, clean pavement surface. When leveling course is not

required, patch and correct depressions and other irregularities to approval of Department Representative before beginning paving operations.

.3 Adjust existing castings to new elevations and protect from asphaltic mix.

.4 When matching new pavement with existing pavement make vertical cut between existing pavement and new pavement as shown on Contract Drawings.

.5 Apply prime coat and/or tack coat in accordance with Section 32 12 14-Asphalt Prime Coats and/or Section 32 12 15-Asphalt Tack Coats prior to paving.

.6 Prior to laying mix, clean surfaces of loose and foreign material.

3.4 TRANSPORTATION OF MIX

.1 Transport mix to job site in vehicles cleaned of foreign material.

.2 Paint or spray truck beds with limewater, soap or detergent solution, or non petroleum based commercial product, at least daily or as required. Elevate truck bed and thoroughly drain. No excess solution to remain in truck bed.

.3 Schedule delivery of material for placing in daylight, unless Department Representative approves artificial light.

.4 Deliver material to paver at uniform rate and in an amount within capacity of paving and compacting equipment.

.5 Deliver loads continuously in covered vehicles and immediately spread and compact. Deliver and place mixes at temperature within range as directed by Department Representative, but not less than 125 degrees C.

3.5 PLACING

.1 Obtain Department Representative's approval of base and existing surface and tack coat and prime coat prior to placing asphalt.

.2 Place asphalt concrete to thicknesses, grades and lines as shown on Contract Drawings.

.3 Placing conditions:

.1 Place asphalt mixtures only when air temperature is above 5 degrees C. Place overlay pavement only when air temperature is above 10 degrees C.

.2 When temperature of surface on which material is to be placed falls below 10 degrees C, provide extra rollers as necessary to obtain required compaction before cooling.

.3 Do not place hot-mix asphalt when pools of standing water exist on surface to be paved, during rain, or when surface is damp.

.4 Place asphalt concrete in compacted lifts of thickness as shown on Contract Drawings:
- .1 Levelling courses to thicknesses required but not exceeding 100mm.
- .2 Lower course in layers of 100mm each.
- .3 Surface course in layers of maximum 60mm each.

.5 Where possible do tapering and levelling where required in lower lifts. Overlap joints by not less than 300 mm.

.6 Spread and strike off mixture with self propelled mechanical finisher.
- .1 Construct longitudinal joints and edges true to line markings. Position and operate paver to follow established line closely.
- .2 When using pavers in echelon, have first paver follow marks or lines, and second paver follow edge of material placed by first paver. Work pavers as close together as possible and in no case permit them to be more than 30 m apart.
- .3 Maintain constant head of mix in auger chamber of paver during placing.
- .4 If segregation occurs, immediately suspend spreading operation until cause is determined and corrected.
- .5 Correct irregularities in alignment left by paver by trimming directly behind machine.
- .6 Correct irregularities in surface of pavement course directly behind paver. Remove by shovel or lute excess material forming high spots. Fill and smooth indented areas with hot mix. Do not broadcast material over such areas.
- .7 Do not throw surplus material on freshly screeded surfaces.

.7 When hand spreading is used:
- .1 Use approved wood or steel forms, rigidly supported to assure correct grade and cross section. Use measuring blocks and intermediate strips to aid in obtaining required cross-section.
- .2 Distribute material uniformly. Do not broadcast material.
- .3 During spreading operation, thoroughly loosen and uniformly distribute material by lutes or covered rakes. Reject material that has formed into lumps and does not break down readily.
- .4 After placing and before rolling, check surface with templates and straightedges and correct irregularities.
- .5 Provide heating equipment to keep hand tools free from asphalt. Control temperature to avoid burning material. Do not use tools at higher temperature than temperature of mix being placed.

3.6 COMPACTING

.1 Roll asphalt continuously to density not less than 97% of 75 blow Marshall density to ASTM D1559 with no individual test less than 95%.

.2 General:

.1 Provide at least two rollers and as many additional rollers as necessary to achieve specified pavement density. When more than two rollers are required, one roller must be pneumatic tired type.

.2 Start rolling operations as soon as placed mix can bear weight of roller without excess displacement of material or cracking of surface.

.3 Operate roller slowly initially to avoid displacement of material. For subsequent rolling do not exceed 5 km/h for static steel-wheeled and 8 km/h for pneumatic tired rollers.

.4 For lifts 50 mm thick and greater, adjust speed and vibration frequency of vibratory rollers to produce minimum of 20 impacts per metre of travel. For lifts less than 50 mm thick, impact spacing not to exceed compacted lift thickness.

.5 Overlap successive passes of roller by minimum of 200mm and vary pass lengths.

.6 Keep wheels of roller slightly moistened with water to prevent pick-up of material but do not over-water.

.7 Do not stop vibratory rollers on pavement that is being compacted with vibratory mechanism operating.

.8 Do not permit heavy equipment or rollers to stand on finished surface before it has been compacted and has thoroughly cooled.

.9 After traverse and longitudinal joints and outside edge have been compacted, start rolling longitudinally at low side and progress to high side. Ensure that all points across width of pavement receive essentially equal numbers of passes of compactors.

.10 When paving in echelon, leave unrolled 50 to 75 mm of edge which second paver is following and roll when joint between lanes is rolled.

.11 Where rolling causes displacement of material, loosen affected areas at once with lutes or shovels and restore to original grade of loose material before re-rolling.

.3 Breakdown rolling:

.1 Commence breakdown rolling immediately following rolling of transverse and longitudinal joint and edges.

.2 Operate rollers as close to paver as necessary to obtain adequate density without causing undue displacement.

.3 Operate breakdown roller with drive roll or wheel nearest finishing machine. Exceptions may be made when working on steep slopes or super-elevated sections.

.4 Use only experienced roller operators for this work.

.4 Second rolling:
.1 Use pneumatic-tired, steel wheel or vibratory rollers and follow breakdown rolling as closely as possible and while paving mix temperature allows maximum density from this operation.
.2 Rolling to be continuous after initial rolling until mix placed has be thoroughly compacted.

.5 Finished rolling:
.1 Accomplish finish rolling with steel wheel rollers while material is still warm enough for removal of roller marks.
.2 Conduct rolling operations in close sequence.

3.7 JOINTS

.1 General:
.1 Remove surplus material from surface of previously laid strip. Do not deposit on surface of freshly laid strip.
.2 Construct joints between asphalt concrete pavement and Portland cement concrete pavement as indicated.
.3 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.

.2 Transverse joints:
.1 Offset transverse joint in succeeding lifts by at least 600mm.
.2 Cut back to full depth vertical face and tack face with thin coat of hot asphalt prior to continuing paving.
.3 Compact transverse joints to provide smooth riding surface. Use methods to prevent rounding of compacted surface at joints.

.3 Longitudinal joints:
.1 Offset longitudinal joints in succeeding lifts by at least 150mm.
.2 Cold joint is defined as joint where asphalt mix is placed, compacted and left to cool below 100 degrees C prior to paving of adjacent lane.
.1 For airfield runway paving, avoid cold joint construction in mid 30 m of runway.
.2 If cold joint can not be avoided, tack face with thin coat of hot asphalt prior to continuing paving.
.3 Overlap previously laid strip with spreader by 100mm.
.4 Before rolling, carefully remove and discard coarse aggregate in material overlapping joint with lute or rake.
.5 Roll longitudinal joints directly behind paving operation.

.6 When rolling with static roller over onto previously placed lane inorder that 100 to150 mm of drum width rides on newly laid lane, then operate roller to pinch and press fines gradually across joint. Continue rolling until thoroughly compacted neat joint is obtained.

.7 When rolling with vibratory roller, have most of drum width ride on newly placed lane with remaining 100 to 150 mm extending onto previously placed and compacted lane.

.4 Construct feather joints so that thinner portion of joint contains fine graded material obtained by changed mix design or by raking out coarse aggregate in mix. Place and compact joint so that joint is smooth and without visible breaks in grade. Location of feather joints as indicated.

.5 Construct butt joints as indicated.

.6 Wherever practical, locate joints under future traffic markings (paint lines.)

3.8 PAVEMENT PATCHING

.1 Ensure temporary and permanent pavement patching done by handwork conforms to all standards specified for machine place asphaltic concrete.

.2 Subbase and base preparation as specified in Section 32 11 16.01 and 32 11 23, respectively, unless shown otherwise on Contract Drawings.

3.9 SIDEWALKS, DRIVEWAYS AND CURBS

.1 Hot-mix asphalt concrete sidewalks, driveways and curbs as shown on Contract Drawings.

.2 Machine place where practical.

.3 Ensure placement by handwork conforms to all standards specified for machine placed asphaltic concrete.

.4 Other than requirements relating specifically to Portland cement concrete, ensure hot-mix asphalt concrete sidewalks and curbs comply with all requirements of Section 32 16 15-Concrete Walks, Curbs and Gutters.

.5 Ensure hot-mix asphalt concrete driveways comply with all requirements of Section 32 12 16-Asphalt Paving.

3.8 FINISH TOLERANCES

.1 Finished asphalt surface to be within 6mm of design elevation but not uniformly high or low.

.2 Finished asphalt surface not to have irregularities exceeding 6mm when checked with 3 m straight edge placed in any direction.

.3 Water ponding not permitted.

.4 Against concrete gutter, finished asphalt surface to be higher than the gutter by not more than 6mm.

3.9 DEFECTIVE WORK

.1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required. If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form true and even surface and compact immediately to specified density.

.2 Repair areas showing checking, rippling, or segregation.

.3 Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.

3.10 CLEAN-UP

.1 Remove lids or covers from all castings and clean any prime, tack coat or hot-mix asphaltic concrete from frames, lids and covers of all castings.

----------END OF SECTION----------

PART 1 - GENERAL

1.1 RELATED WORK
.1 Section 01 33 00-Submittal Procedures.

1.2 REFERENCES
.1 CAN/CGSB-1.5-M91, Low Flash Petroleum Spirits Thinner.

.2 CGSB 1-GP-12c-68, Standard Paint Colours.

.3 CGSB 1-GP-71-83, Method, of Testing Paints and Pigments.

.4 CGSB 1-GP-74M-79, Paint, Traffic, Alkyd.

PART 2 - PRODUCTS

2.1 MATERIALS
.1 Paint:
.1 To CGSB 1-GP-74M, alkyd traffic paint.
.2 To CGSB 1-GP-149M, alkyd reflectorized traffic paint.
.3 Colour: to CGSB 1-GP-12C, yellow 505-308, black 512-301, white 513-301.

.2 Thinner: to CGSB-1-GP-5M.

.3 Glass beads:
.1 Overlay type: to CGSB 1-GP-74M.

.4 Temporary pavement marking tape:
.1 Self adhesive temporary pavement marking tape designed to provide reflective delineation.
.2 To consist of high quality optical glass spheres embedded into weather and traffic-resistant binder on conformable metallic backing precoated with pressure sensitive adhesive.
.3 Colour as specified.
.4 To be readily removable by methods not requiring sandblasting, solvents or grinding.

PART 3 - EXECUTION

3.1 EQUIPMENT REQUIREMENTS
.1 Paint applicator to be an approved pressure type mobile distributor capable of applying paint in single, double and dashed lines. Applicator to be capable of applying marking components uniformly, at rates specified, and to dimensions as indicated, and to have positive shut-off.

.2 Distributor to be capable of applying reflective glass beads as an overlay on freshly applied paint.

3.2 CONDITION OF SURFACES
.1 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.

3.3 APPLICATION

.1 Temporary Markings:
- .1 Application and removal to manufacturer's instructions.
- .2 Temporary traffic lines and stop bars shall be placed immediately following laying of the asphalt pavement.
- .3 The traffic line shall be a 100mm x 300mm strip of prefabricated reflective yellow tape having an adhesive backing and shall be place at 10 metre intervals along the centre of pavement.
- .4 The stop bar shall be 2 – 100mm continuous strips of prefabricated reflective white tape having an adhesive backing and placed across the travel lanes at traffic control intersections.
- .5 Remove the tape when instructed.

.2 Painted Markings:
- .1 Layout pavement markings.
- .2 Unless approved otherwise by DCC Representative, apply paint only when air temperature is above 10°C and no rain is forecast.
- .3 Apply traffic paint evenly at rate of $3m^2/L$.
- .4 Do not thin paint unless approved by DCC Representative.
- .5 Symbols and letters to conform to dimensions shown on Contract Drawings.
- .6 Ensure paint lines of uniform colour and density with sharp edges.
- .7 Thoroughly clean distributor tank before refilling with paint of different colour.
- .8 Apply glass beads at rate specified.
- .9 Apply other marking materials specified in Contract Documents.
- .10 Ensure all pavement markings in accordance with latest edition of TAC Manual of Uniform Traffic Control Devices.

3.4 TOLERANCE

.1 Paint markings to be within plus or minus 10mm of dimensions indicated.

3.5 PROTECTION OF COMPLETED WORK

.1 Protect pavement markings until dry.

----------END OF SECTION----------

March 21, 2017

Reference: 17-7073

Via email: rrosin@islengineering.com

ISL Engineering and Land Services Ltd.
#201 – 8506 200 Street
Langley, BC V2Y 0M1

Attn: Randolph R. Rosin, M.Eng., P.Eng.

Re: Geotechnical Exploration Report
Kent Institution Parking Lot Rehabilitation
4732 Cemetery Road, Agassiz, BC

1.0 INTRODUCTION

As requested, Braun Geotechnical Ltd. has completed a geotechnical exploration at the above-referenced location.

The scope of work included visual pavement condition review, pavement coring, hand pits and provision of this geotechnical/ pavement report. The scope of work was limited to the identified pavement rehabilitation area.

2.0 FIELD EXPLORATION

A total of four pavement cores (C17-01 to -04) were retrieved for thickness measurement on March 3, 2017, using a truck mounted coring rig.

Four shallow hand pits (HP17-01 to -04) were also excavated within the core location for review of the existing granular pavement structure. Hand pit and core locations are shown on the attached Location Plan (Dwg. 17-7073-01).

3.0 EXPLORATION FINDINGS

Existing asphalt pavement surfaces were observed to be in fair condition with areas of longitudinal and transverse cracking. Minor severity alligator cracking was also observed within the existing pavement at select locations.

The findings of the subsurface exploration are summarized on the attached hand pit logs. A generalized pavement section based on the hand pits is summarized below.

Braun Geotechnical
106A - 9785 192 St.
Surrey, BC
V4N 4C7
Tel: 604-513-4190
Fax: 604-513-4195
info@braungeo.com

www.braungeo.com

Foundations, Excavation & Shoring Specialists

Foundations

Excavation & Shoring

Slope Stability

Natural Hazards

Pavement Design and Management

Reinforced Soil Walls and Slopes

Asphalt:

Thickness ranged from 90 to 120mm. Top lift: 38 to 50mm.

Poor bond between lifts was observed at C17-02 & -03.

Granular Base:

Grey to grey-brown, damp, compact, 19mm minus SAND & GRAVEL with trace to some silt. Thickness ranged from 40 to 100mm.

Granular Subbase/ Fill:

Brown, damp, compact to dense, 75mm minus SAND & GRAVEL, some silt. The hand pits were terminated within this layer at the depth of 0.3m.

4.0 PAVEMENT REHABILITATION

Observations of existing pavement distress features were noted to be consistent with older age-hardened asphalt surfaces. With respect to age hardening, viscosity of the asphalt binder increases and the asphalt layer becomes more stiff and brittle.

Based on the findings, existing pavement is considered to be suitable for rehabilitation using conventional mill+inlay and/or overlay. Asphalt pavement and underlying pavement section fills would be considered to satisfy design thickness and material requirements.

The minimum recommended mill thickness is 50mm to completely remove the existing top lift with poor bond at two of four test locations. Inlay/ overlay should be completed using MMCD compliant upper course #2. It is noted that significant lowering of the lot profile for civil design considerations would likely require full depth reconstruction using the design pavement section.

Repairs to cracked areas should be carried out following milling and prior to application of the resurface overlay treatment. The asphalt repair should involve a full-depth asphalt patch for severely cracked areas. Membrane crack sealant and/or crack cleaning and filling in accordance with MMCD should be carried out for minor cracking and to reduce potential for reflective type cracking through the overlay surface.

5.0 CLOSURE

This report is prepared for the exclusive use of ISL Engineering and Land Services Ltd. and their designated representatives and may not be used by other parties without the written permission of Braun Geotechnical Ltd.

The use of this report is subject to the Report Interpretation and Limitations, which is included with the report. The reader's attention is drawn specifically to those conditions, as it is considered essential that they be followed for proper use and interpretation of this report.

We hope the above meets with your requirements. Should any questions arise, please do not hesitate to contact the undersigned.

Yours truly,

Braun Geotechnical Ltd.

MAR 21, 2017

Euraj N Vivekanandan, EIT.
Geotechnical Engineer

Braun Geotechnical Ltd.

Stuart Hrysio, P.Eng.
Geotechnical Engineer

Encl: Report Interpretation and Limitations
Location Plan
Hand Pit Logs
Pavement Core Summary

X:\2017 Projects\17-7073 Parking Lot Repavement Kent, BC\Geotechnical Report 17-7073 2017-03-21.doc

BRAUN GEOTECHNICAL LTD.

REPORT INTERPRETATION AND LIMITATIONS

1. STANDARD OF CARE

Braun Geotechnical Ltd. (Braun) has prepared this report in a manner consistent with generally accepted engineering consulting practices in this area, subject to the time and physical constraints applicable. No other warranty, expressed or implied, is made.

2. COMPLETENESS OF THIS REPORT

This Report represents a summary of paper, electronic and other documents, records, data and files and is not intended to stand alone without reference to the instructions given to Braun by the Client, communications between Braun and the Client, and/or to any other reports, writings, proposals or documents prepared by Braun for the Client relating to the specific site described herein.

This report is intended to be used and quoted in its entirety. Any references to this report must include the whole of the report and any appendices or supporting material. Braun cannot be responsible for use by any party of portions of this report without reference to the entire report.

3. BASIS OF THIS REPORT

This report has been prepared for the specific site, development, design objective, and purpose described to Braun by the Client or the Client's Representatives or Consultants. The applicability and reliability of any of the factual data, findings, recommendations or opinions expressed in this document pertain to a specific project at described in this report and are not applicable to any other project or site, and are valid only to the extent that there has been no material alteration to or variation from any of the descriptions provided to Braun. Braun cannot be responsible for use of this report, or portions thereof, unless we were specifically requested by the Client to review and revise the Report in light of any alterations or variations to the project description provided by the Client.

If the project does not commence within 18 months of the report date, the report may become invalid and further review may be required.

The recommendations of this report should only be used for design. The extent of exploration including number of test pits or test holes necessary to thoroughly investigate the site for conditions that may affect construction costs will generally be greater than that required for design purposes. Contractors should rely upon their own explorations and interpretation of the factual data provided for costing purposes, equipment requirements, construction techniques, or to establish project schedule.

The information provided in this report is based on limited exploration, for a specific project scope. Braun cannot accept responsibility for independent conclusions, interpretations, interpolations or decisions by the Client or others based on information contained in this Report. This restriction of liability includes decisions made to purchase or sell land.

4. USE OF THIS REPORT

The contents of this report, including plans, data, drawings and all other documents including electronic and hard copies remain the copyright property of Braun Geotechnical Ltd. However, we will consider any reasonable request by the Client to approve the use of this report by other parties as "Approved Users." With regard to the duplication and distribution of this Report or its contents, we authorize only the Client and Approved Users to make copies of the Report only in such quantities as are reasonably necessary for the use of this Report by those parties. The Client and "Approved Users" may not give, lend, sell or otherwise make this Report or any portion thereof available to any other party without express written permission from Braun. Any use which a third party makes of this Report – in its entirety or portions thereof – is the sole responsibility of such third parties. BRAUN GEOTECHNICAL LTD. ACCEPTS NO RESPONSIBILITY FOR DAMAGES SUFFERED BY ANY PARTY RESULTING FROM THE UNAUTHORIZED USE OF THIS REPORT.

Electronic media is susceptible to unauthorized modification or unintended alteration, and the Client should not rely on electronic versions of reports or other documents. All documents should be obtained directly from Braun.

5. INTERPRETATION OF THIS REPORT

Classification and identification of soils and rock and other geological units, including groundwater conditions have been based on exploration(s) performed in accordance with the standards set out in Paragraph 1. These tasks are judgemental in nature; despite comprehensive sampling and testing programs properly performed by experienced personnel with the appropriate equipment, some conditions may elude detection. As such, all explorations involve an inherent risk that some conditions will not be detected.

Further, all documents or records summarizing such exploration will be based on assumptions of what exists between the actual points sampled at the time of the site exploration. Actual conditions may vary

significantly between the points investigated and all persons making use of such documents or records should be aware of and accept this risk.
The Client and "Approved Users" accept that subsurface conditions may change with time and this report only represents the soil conditions encountered at the time of exploration and/or review. Soil and ground water conditions may change due to construction activity on the site or on adjacent sites, and also from other causes, including climactic conditions.
The exploration and review provided in this report were for geotechnical purposes only. Environmental aspects of soil and groundwater have not been included in the exploration or review, or addressed in any other way.
The exploration and Report is based on information provided by the Client or the Client's Consultants, and conditions observed at the time of our site reconnaissance or exploration. Braun has relied in good faith upon all information provided. Accordingly, Braun cannot accept responsibility for inaccuracies, misstatements, omissions, or deficiencies in this Report resulting from misstatements, omissions, misrepresentations or fraudulent acts of persons or sources providing this information.

6. DESIGN AND CONSTRUCTION REVIEW

This report assumes that Braun will be retained to work and coordinate design and construction with other Design Professionals and the Contractor. Further, it is assumed that Braun will be retained to provide field reviews during construction to confirm adherence to building code guidelines and generally accepted engineering practices, and the recommendations provided in this report. Field services recommended for the project represent the minimum necessary to confirm that the work is being carried out in general conformance with Braun's recommendations and generally accepted engineering standards. It is the Client's or the Client's Contractor's responsibility to provide timely notice to Braun to carry out site reviews. The Client acknowledges that unsatisfactory or unsafe conditions may be missed by intermittent site reviews by Braun. Accordingly, it is the Client's or Client's Contractor's responsibility to inform Braun of any such conditions.
Work that is covered prior to review by Braun may have to be re-exposed at considerable cost to the Client. Review of all Geotechnical aspects of the project are required for submittal of unconditional Letters of Assurance to regulatory authorities. The site reviews are not carried out for the benefit of the Contractor(s) and therefore do not in any way effect the Contractor(s) obligations to perform under the terms of his/her Contract.

7. SAMPLE DISPOSAL

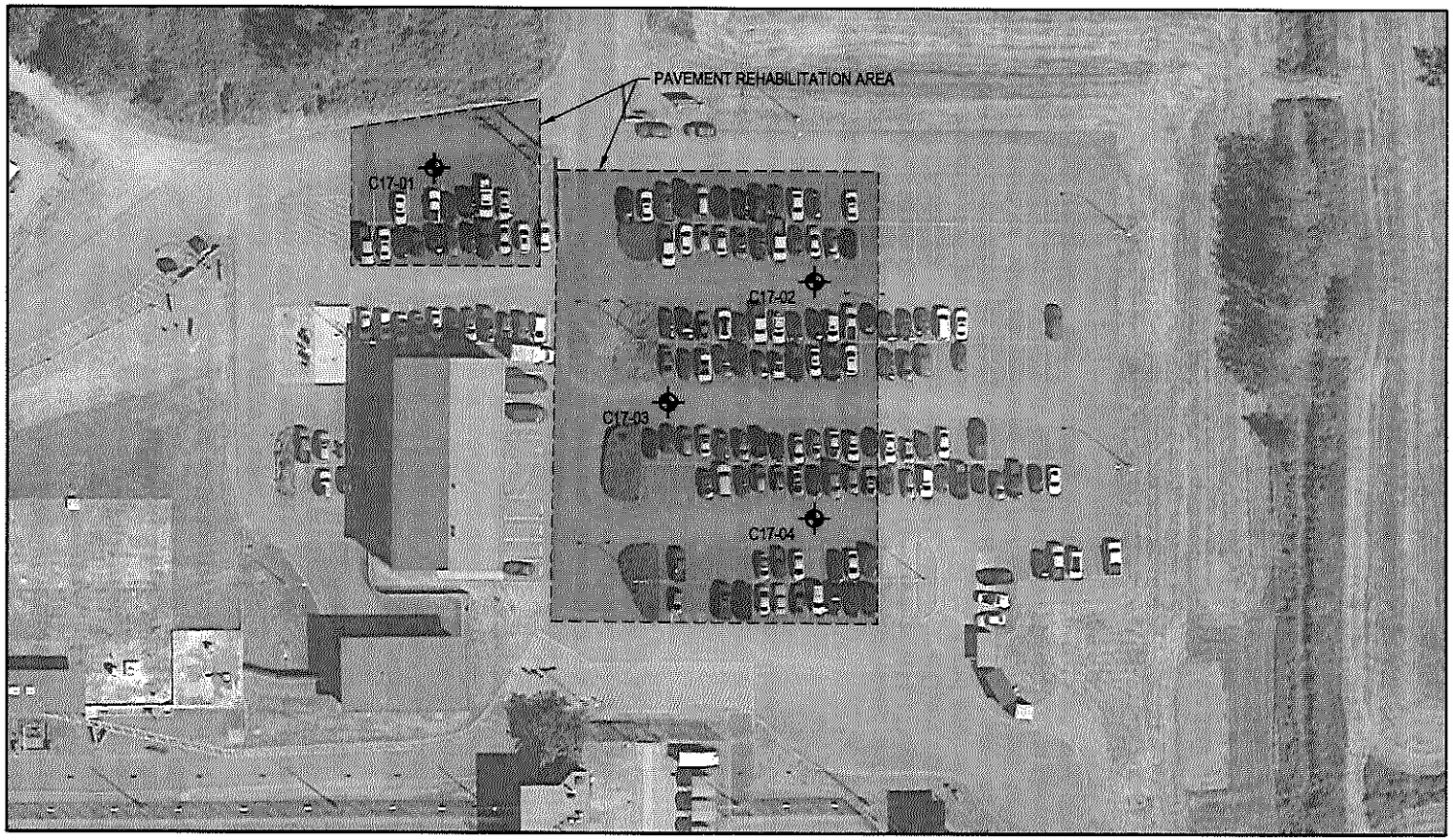
Braun will dispose of all samples 3 months after issuance of this report, or after a longer period of time at the Client's expense if requested by the Client. All contaminated samples remain the property of the Client and it will be the Client's responsibility to dispose of them properly.

8. SUBCONSULTANTS AND CONTRACTORS

Engineering studies frequently requires hiring the services of individuals and companies with special expertise and/or services which Braun Geotechnical Ltd. does not provide. These services are arranged as a convenience to our Clients, for the Client's benefit. Accordingly, the Client agrees to hold the Company harmless and to indemnify and defend Braun Geotechnical Ltd. from and against all claims arising through such Subconsultants or Contractors as though the Client had retained those services directly. This includes responsibility for payment of services rendered and the pursuit of damages for errors, omissions or negligence by those parties in carrying out their work. These conditions apply to specialized subconsultants and the use of drilling, excavation and laboratory testing services, and any other Subconsultant or Contractor.

9. SITE SAFETY

Braun Geotechnical Ltd. assumes responsibility for site safety solely for the activities of our employees on the jobsite. The Client or any Contractors on the site will be responsible for their own personnel. The Client or his representatives, Contractors or others retain control of the site. It is the Client's or the Client's Contractors responsibility to inform Braun of conditions pertaining to the safety and security of the site – hazardous or otherwise – of which the Client or Contractor is aware.
Exploration or construction activities could uncover previously unknown hazardous conditions, materials, or substances that may result in the necessity to undertake emergency procedures to protect workers, the public or the environment. Additional work may be required that is outside of any previously established budget(s). The Client agrees to reimburse Braun for fees and expenses resulting from such discoveries. The Client acknowledges that some discoveries require that certain regulatory bodies be informed. The Client agrees that notification to such bodies by Braun Geotechnical Ltd. will not be a cause for either action or dispute.



LEGEND

C17-01 ⌖ 2017 PAVEMENT CORE & HAND PIT APPROXIMATE LOCATION

BASE IMAGE OBTAINED FROM. GOOGLE EARTH IMAGE

BRAUN GEOTECHNICAL LTD.

Rev.	Description	Date

Client: ISL Engineering and Land Services Ltd.

Project: Proposed Parking Lot Rehabilitation, Kent Institution, Agassiz, BC

Title: LOCATION PLAN

Project no.	Drawn	Design	Checked	Date	Scale	Drawing no.
17-7073	DD	EV	SH	February 22, 2017	NTS	17-7073-01

Hand Pit Log: HP17-01

File: 17-7073
Project: Proposed Parking Lot Rehabilitation
Client: ISL Engineering and Land Services Ltd.
Location: Kent Institution, Agassiz, BC

BRAUN GEOTECHNICAL LTD.

Depth	Thickness (mm)	Sample	Soil Description	Sample #	Water Cont.	Remarks
0 ft / 0 m	100		ASPHALT			
	100		brown, damp, compact, 19mm minus, crushed SAND & GRAVEL, trace silt (BASE)			
1	>125		brown, damp, compact to dense, 75mm minus, rounded SAND & GRAVEL, some silt (SUBBASE)			
0.5			End of Hand Pit @ 0.3m			
2						
3 / 1						
4						
5 / 1.5						

Equipment: Coring Rig
Sampling Method: N/A

Datum: Ground Surface
Water Depth: Not Encountered

Logged By: DD/DC
Exploration Date: March 3, 2017
Dwg No.: 17-7073-HP01
Page: 1 of 1

Hand Pit Log: HP17-02

File: 17–7073
Project: Proposed Parking Lot Rehabilitation
Client: ISL Engineering and Land Services Ltd.
Location: Kent Institution, Agassiz, BC

BRAUN GEOTECHNICAL LTD.

Depth	Thickness (mm)	Sample	Soil Description	Sample #	Water Cont.	Remarks
0 ft / 0 m	100		ASPHALT			
	100		brown-grey, damp, compact SAND & GRAVEL, trace silt (BASE)			
1	>125		brown, damp, compact, 75mm minus, rounded SAND & GRAVEL, some silt (SUBBASE)			
0.5			End of Hand Pit @ 0.3m			
2						
3						
1						
4						
1.5						
5						

Equipment: Coring Rig
Sampling Method: N/A

Datum: Ground Surface
Water Depth: Not Encountered

Logged By: DD/DC
Exploration Date: March 3, 2017
Dwg No.: 17-7073-HP02
Page: 1 of 1

Hand Pit Log: HP17-03

File: 17–7073
Project: Proposed Parking Lot Rehabilitation
Client: ISL Engineering and Land Services Ltd.
Location: Kent Institution, Agassiz, BC

BRAUN GEOTECHNICAL LTD.

Depth	Thickness (mm)	Sample	Soil Description	Sample #	Water Cont.	Remarks
0 ft / 0 m	120		ASPHALT			
	55		grey-brown, damp, compact SAND & GRAVEL, trace silt (BASE)			
1	>150		brown, damp, compact, 75mm minus, rounded SAND & GRAVEL, some silt (SUBBASE)			
0.5			End of Hand Pit @ 0.3m			
2						
3						
1						
4						
1.5						
5						

Equipment: Coring Rig
Sampling Method: N/A

Datum: Ground Surface
Water Depth: Not Encountered

Logged By: DD/DC
Exploration Date: March 3, 2017
Dwg No.: 17-7073-HP03
Page: 1 of 1

Hand Pit Log: HP17-04

File: 17–7073
Project: Proposed Parking Lot Rehabilitation
Client: ISL Engineering and Land Services Ltd.
Location: Kent Institution, Agassiz, BC

BRAUN GEOTECHNICAL LTD.

Depth	Thickness (mm)	Sample	Soil Description	Sample #	Water Cont.	Remarks
0 ft / 0 m	90		ASPHALT			
	40		grey to brown, damp, compact, SAND & GRAVEL, trace silt (BASE)			
1	>205		brown, damp, compact, 75mm minus, rounded SAND & GRAVEL, some silt (SUBBASE)			
0.5			End of Hand Pit @ 0.3m			
2						
3						
1						
4						
1.5						
5						

Equipment: Coring Rig
Sampling Method: N/A

Datum: Ground Surface
Water Depth: Not Encountered

Logged By: DD/DC
Exploration Date: March 3, 2017
Dwg No.: 17-7073-HP04
Page: 1 of 1

Pavement Core Data

File: 17–7073
Project: Proposed Parking Lot Rehabilitation
Client: ISL Engineering and Land Services Ltd.
Location: Kent Institution, Agassiz, BC

BRAUN GEOTECHNICAL LTD.

CORE	TOTAL THICKNESS	BASE LIFT	INTERMEDIATE LIFT	TOP LIFT	REMARKS
CORE17-01	100mm	62mm		38mm	
CORE17-02	100mm	50mm		50mm	Poor Bond
CORE17-03	120mm	78mm		42mm	Poor Bond
CORE17-04	90mm	52mm		38mm	

Equipment: Coring Rig
Locations: See Location Plan

Exploration Date: March 3, 2017
Dwg No.: 17-7073-CORES-01