

PROJECT TITLE KINGSTON ONTARIO
CORRECTIONAL SERVICE CANADA
JOYCEVILLE INSTITUTION
HIGHWAY. 15, NO 376
RESURFACE PERIMETER ROAD

PROJECT NUMBER R.078391.001

PROJECT DATE 2016-06-27

PWGSC Ontario	List of Contents	Section 00 01 11
Region Project		Page 1
R.078391.001		2016-06-27

<u>Section</u>	<u>Title</u>	<u>Pages</u>
<u>Division 00 - Procurement and Contracting Requirements</u>		
00 00 00	SPECIFICATION TITLE SHEET	1
<u>Division 01 - General Requirements</u>		
01 11 00	SUMMARY OF WORK	3
01 14 00	WORK RESTRICTIONS	2
01 31 19	PROJECT MEETINGS	3
01 33 00	SUBMITTAL PROCEDURES	6
01 35 13	SPECIAL PROJECT PROCEDURES FOR CORRECTIONAL SERVICE CANADA SECURITY REQUIREMENT	11
01 35 29	HEALTH AND SAFETY REQUIREMENTS	5
01 35 43	ENVIRONMENTAL PROCEDURES	5
01 41 00	REGULATORY REQUIREMENTS	1
01 45 00	QUALITY CONTROL	3
01 52 00	CONSTRUCTION FACILITIES	4
01 56 00	TEMPORARY BARRIERS AND ENCLOSURES	2
01 74 20	CONSTRUCTION/DEMOLITION WASTE MANAGEMENT AND DISPOSAL	1
<u>Division 02 - Existing Conditions</u>		
02 41 13.14	ASPHALT PAVING REMOVAL	2
02 41 23	SELECTIVE SITE DEMOLITION	3
<u>Division 31 - Earthwork</u>		
31 23 33.01	EXCAVATING, TRENCHING AND BACKFILLING	8
<u>Division 32 - Exterior Improvements</u>		
32 01 16.13	RESHAPING ASPHALT PAVEMENT	3
32 11 16.01	GRANULAR SUB-BASE	3
32 11 20	GRANULAR BASE	1
32 12 16.01	ASPHALT PAVING	3
32 15 60	ROADWAY DUST CONTROL	1
32 91 19.13	TOPSOIL PLACEMENT AND GRADING	4
32 92 23	SODDING	4
<u>Division 33 - Utilities</u>		
33 05 14	MAINTENANCE HOLES AND CATCH BASINS	3
33 44 01	STORM SEWERS	4
<u>Appendix</u>		
Appendix A -	Geotechnical Investigation Report (WSP, 2016)	51
Appendix B -	Environmental Effects Evaluation for Re-paving of Perimeter Road, Joyceville Institution (Arcadis, 2016)	47

PART 1 - GENERAL

- 1.1 WORK COVERED BY CONTRACT DOCUMENTS .1 Work of this Contract comprises the upgrades of the existing perimeter patrol road. The upgrades include full depth asphalt reconstruction, full depth asphalt reclamation, storm sewer and catchbasin installation and grading as indicated on the contract drawings. Work also included Contract is further identified as PWGSC Project Number R.078391.001.
- 1.2 CONTRACT METHOD .1 Construct Work under Lump Sum Contract.
- 1.3 CONTRACTOR USE OF PREMISE .1 Co-ordinate use of premises under direction of owner.
- .2 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.
- .3 At completion of operations condition of existing work: equal to or better than that which existed before new work started.
- 1.4 OWNER OCCUPANCY .1 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.
- 1.5 DOCUMENTS REQUIRED .1 Maintain at job site, one copy each document as follows:
- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda and amendments.
- .4 Reviewed Shop Drawings.
- .5 List of Outstanding Shop Drawings.
- .6 Change Orders.
- .7 Other Modifications to Contract.
- .8 Field Test Reports.
- .9 Copy of Approved Work Schedule.
- .10 Health and Safety Plan and Other Safety Related Documents.
- .11 Other documents as specified.
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1.6 ALTERATIONS TO
EXISTING SITE

- .1 Remove and recycle, compost, anaerobically digest, sell material for reuse or dispose of items as indicated on contract drawings or as indicated by Departmental Representative.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

- 3.1 NOT USED .1 Not used.

PART 1 - GENERAL

1.1 ACCESS AND
EGRESS

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND
FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Closures: protect work temporarily until permanent enclosures are completed.

1.3 ALTERATIONS,
ADDITIONS OR
REPAIRS TO EXISTING
BUILDING

- .1 Execute work with least possible interference or disturbance to normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.4 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 Departmental Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum.
- .3 Provide for personnel pedestrian and vehicular traffic.
- .4 Construct barriers in accordance with Section 01 56 00.

1.5 SPECIAL
REQUIREMENTS

- .1 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .2 Keep within limits of work and avenues of ingress and egress.
- .3 The Contractor shall maintain unimpeded way traffic for CSC Patrol Vehicles for the duration of the Project. Traffic Control Plans shall be submitted in writing to the Departmental Representative and CSC five (5) business days in advance of the Work and/or change to the Traffic Control Plan for Review. Upon Mobilization to Site, the Contractor shall identify and report to the Departmental Representative and CSC any areas where he anticipates not being able to provide one (1) way traffic and identify on the Project Schedule when work will take place in these areas. In the event one (1) way traffic is not physically possible based on the Work, the Departmental Representative and CSC shall be notified five (5) business days in advance of the planned disruption. In all cases one (1) way traffic shall be restored at the end of the working day.

1.7 BUILDING
SMOKING ENVIRONMENT

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

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 ADMINISTRATIVE

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting 4 days in advance of meeting date to Departmental Representative.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Unless directed otherwise by Departmental Representative, record minutes of meetings. Minutes shall be circulated to attending parties and affected parties not in attendance.
- .7 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

- .1 Within 15 days after award of Contract, request meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work.
 - .3 Schedule of submission of shop drawings, samples, mock-ups, colour chips. Submit submittals in accordance with Section 01 33 00.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00.

- .5 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .6 Record drawings and specifications in accordance with Section 01 33 00.
- .7 Monthly progress claims, administrative procedures, photographs, hold backs.
- .8 Appointment of inspection and testing agencies or firms.
- .9 Insurances, transcript of policies.

1.3 PROGRESS
MEETINGS

- .1 During course of Work and prior to project completion, schedule progress meetings at two week intervals.
- .2 Contractor involved in Work and Departmental Representative and Owner are to be in attendance.
- .3 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 5 days after meeting.
- .4 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for affect on construction schedule and on completion date.
 - .12 Other business.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

1.1 ADMINISTRATIVE

- .1 Submit to 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 co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
 - .6 Notify 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 co-ordinated.
 - .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.
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- .11 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, MS Project and Autocad dwg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

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 co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .3 Allow 10 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 shall include:
 - .1 Date and revision dates.

- .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
 - .8 After Departmental Representative's review, distribute copies.
 - .9 Submit three hard copies and one electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
 - .10 Submit three hard copies and one electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
 - .11 Submit three hard copies and one electronic copy of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
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- .12 Submit three hard copies and one electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .13 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .14 Submit three hard copies and one electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .15 Delete information not applicable to project.
- .16 Supplement standard information to provide details applicable to project.
- .17 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .18 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 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

- .2 Deliver samples prepaid to address identified by Departmental Representative.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Amount. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 PHOTOGRAPHIC
DOCUMENTATION

- .1 Submit electronic colour digital photography in jpg format, standard resolution as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: 2 locations.
 - .1 Viewpoints and their location as determined by Departmental Representative.
- .4 Frequency of photographic documentation: as directed by Departmental Representative.
 - .1 Upon completion of Work, and as directed by Departmental Representative.

1.5 CERTIFICATES
AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workplace Safety and Workers' Safety and Insurance Board Experience Report.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

- 1.1 PURPOSE .1 To ensure that both the construction project and the institutional operations may proceed without undue disruption or hindrance and that the security of the Institution is maintained at all times.
- 1.2 DEFINITIONS .1 "Contraband" means:
.1 An intoxicant, including alcoholic beverages, drugs and narcotics.
.2 Tobacco or associated tobacco products.
.3 An igniting device, lighter or matches.
.4 A weapon or a component thereof, ammunition for a weapon, and anything that is designed to kill, injure or disable a person or that is altered so as to be capable of killing, injuring or disabling a person, when possessed without prior authorization.
.5 An explosive or a bomb or a component thereof.
.6 Currency over any applicable prescribed limit, \$25 when possessed by an inmate without prior authorization.
.7 Any item not described in paragraphs 1.2.1.1 to 1.2.1.6 that could jeopardize the security of a Penitentiary or the safety of persons, when that item is possessed without prior authorization.
- .2 "Unauthorized Smoking and related Items" means all smoking items including, but not limited to, cigarettes, cigars, tobacco, chewing tobacco, cigarette making machines, matches and lighters.
- .3 "Commercial Vehicle" means any motor vehicle used for the shipment of material, equipment and tools required for the construction project.
- .4 "CSC" means Correctional Service Canada.
- .5 "Director" means Director, Warden or Superintendent of the Institution as applicable.
- .6 "Construction Employees" means persons working for the General Contractor, the sub-contractors, equipment operators, material suppliers, testing and inspection companies and regulatory agencies.
- .7 "Departmental Representative" means the project manager from Public Works and Government Services Canada.
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- .8 "Perimeter" means the fenced or walled area of the Institution that restrains the movement of the inmates.
- .9 "Construction Limits" means the area as shown on the contract drawings that the Contractor will be allowed to work. This area may or may not be isolated from the security area of the Institution.

1.3 PRELIMINARY PROCEEDINGS

- .1 Prior to the commencement of work, the Contractor shall meet with the Director or his/her representative to:
 - .1 Discuss the nature and extent of all activities involved in the Project.
 - .2 Establish mutually acceptable security procedures in accordance with this instruction and the institution's particular requirements.
- .2 Contractor shall:
 - .1 Ensure that all Construction Employees are aware of the security requirements.
 - .2 Ensure that a copy of the security requirements is always prominently on display at the job site.
 - .3 Co-operate with institutional personnel in ensuring that security requirements are observed by all Construction Employees.

1.4 CONSTRUCTION EMPLOYEES

- .1 Submit to the Director a list of the names with date of birth of all Construction Employees to be employed on the construction site and a security clearance form for each employee.
 - .2 Allow two (2) weeks for processing of security clearances. Employees will not be admitted to the Institution without a valid security clearance in place and a recent picture identification such as a provincial driver's license. Security clearances obtained from other CSC Institutions are not valid at this Institution.
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- .3 The Director may require that facial photographs may be taken of Construction Employees and these photographs may be displayed at appropriate locations in the Institution or in an electronic database for identification purposes. The Director may require that Photo ID cards be provided for all Construction Employees. ID cards will then be left at the designated entrance to be picked upon arrival at the institution and shall be displayed prominently on the Construction Employees' clothing at all time while Construction Employees are in the institution.
- .4 Entry to Institutional Property will be refused to any person there may be reason to believe may be a security risk.
- .5 Any person employed on the construction site will be subject to immediate removal from Institutional Property if they:
 - .1 Appear to be under the influence of alcohol, drugs or narcotics.
 - .2 Behave in an unusual or disorderly manner.
 - .3 Are in possession of contraband.
- .6 Smoking is prohibited anywhere on CSC property.

1.5 VEHICLES

- .1 All unattended vehicles on CSC property shall have windows closed; doors and trunks shall be locked and keys removed. The keys shall be securely in the possession of the owner or an employee of the company that owns the vehicle.
 - .2 The Director may limit at any time the number and type of vehicles allowed within the Institution.
 - .3 Drivers of delivery vehicles for material required by the project will not require security clearances but must remain with their vehicle the entire time that the vehicle is in the Institution. The Director may require that these vehicles be escorted by Institutional Staff or Commissionaires while in the Institution.
 - .4 If the Director permits trailers to be left inside the secure perimeter of the Institution, these trailer doors will be locked at all times. All windows will be securely locked when left unoccupied. All trailer windows shall be covered with expanded metal mesh. All storage trailers inside and outside the perimeter shall be locked when not in use.
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1.6 PARKING .1 Parking area(s) to be used by Construction Employees will be designated by the Director. Parking in other locations will be prohibited and vehicles may be subject to removal.

1.7 SHIPMENTS .1 All shipments of project material, equipment and tools shall be addressed in the Contractor's name to avoid confusion with the Institution's own shipments. The Contractor must have his/her own employees on site to receive any deliveries or shipments. CSC staff will NOT accept receipt of deliveries or shipments of any material, equipment or tools.

1.8 TELEPHONES .1 There will be no installation of telephones, Facsimile machines and computers with Internet connections permitted within the perimeter of the Institution unless prior approval of the Director is received.

.2 The Director will ensure that approved telephones, facsimile machine and computers with internet connections are located where they are not accessible to inmates. All computers will have an approved password protection that will stop an internet connection to unauthorized personnel.

.3 Wireless cellular and digital telephones, including but not limited to devices for telephone messaging, pagers, BlackBerries, telephone used as 2-way radios, are not permitted within the Institution unless approved by the Director. If wireless cellular telephones are permitted, the user will not permit their use by any inmate.

.4 The Director may approve but limit the use of two way radios.

1.9 WORK HOURS .1 Work hours within the Institution are: Monday to Friday 08:00 a.m. to 3:30 p.m.

.2 Work will not be permitted during weekends and statutory holidays without the permission of the Director. A minimum of seven days advance notice will be required to obtain the required permission. In case of emergencies or other special circumstances, this advance notice may be waived by the Director.

- 1.10 OVERTIME WORK
- .1 No overtime work will be allowed without permission of the Director. Give a minimum forty-eight (48) hours advance notice when overtime work on the construction project is necessary and approved. If overtime work is required because of an emergency such as the completion of a concrete pour or work to make the construction safe and secure, the Contractor shall advise the Director as soon as this condition is known and follow the directions given by the Director. Costs to the Crown for such events may be attributed to the Contractor.
 - .2 When overtime work, weekend, or statutory holiday work is required and approved by the Director, extra staff members may be posted by the Director or his/her designate, to maintain the security surveillance. The Departmental Representative may post extra staff for inspection of construction activities. The actual cost of this extra staff may be subject to reclamation by the Crown.

- 1.11 TOOLS AND EQUIPMENT
- .1 Maintain a complete list of all tools and equipment to be used during the construction project. Make this inventory available for inspection when required.
 - .2 Throughout the construction project maintain up-to-date the list of tools and equipment specified above.
 - .3 Keep all tools and equipment under constant supervision, particularly power-driven and cartridge-driven tools, cartridges, files, saw blades, rod saws, wire, rope, ladders and any sort of jacking device.
 - .4 Store all tools and equipment in approved secure locations.
 - .5 Lock all tool boxes when not in use. Keys to remain in the possession of the employees of the Contractor. Scaffolding shall be secured and locked when not erected and when erected, will be secured in a manner agreed upon with the Institutional designate.
 - .6 All missing or lost tools or equipment shall be reported immediately to the Director.
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- .7 The Director will ensure that the security staff members carry out checks of the Contractor's tools and equipment against the list provided by the Contractor. These checks may be carried out at the following intervals:
 - .1 At the beginning and conclusion of every construction project.
 - .2 Weekly, when the construction project extends longer than a one week period.
 - .3 The Contractor may be subject to random checks by security staff to ensure proper storage and security of tools throughout the project.
- .8 Certain tools/equipment such as cartridges and hacksaw blades are highly controlled items. The Contractor will be given at the beginning of the day, a quantity that will permit one day's work. Used blades/cartridges will be returned to the Director's representative at the end of each day.
- .9 If propane or natural gas is used for heating the construction, the Institution will require that an employee of the Contractor supervise the construction site during non-working hours.
- .10 If torches or grinders are required tools to perform Work, Contractor must complete a Hot Work Permit as supplied by CSC. Completed original form(s) are copied and posted on the work site in a conspicuous location. Original documents are to remain with the Institution.

1.12 KEYS

- .1 Security Hardware Keys:
 - .1 The Contractor shall arrange with the security hardware supplier/installer to have the keys for the security hardware to be delivered directly to Institution, specifically the Security Maintenance Officer (SMO).
 - .2 The Security Maintenance Officer (SMO) will provide a receipt to the Contractor for security hardware keys.
 - .3 The Contractor will provide a copy of the above-mentioned receipt to the Departmental Representative.
- .2 Other Keys:
 - .1 The Contractor will use standard construction cylinders for locks for his/her use during the construction period.
 - .2 The Contractor will issue instructions to his/her employees and sub-trades, as necessary, to ensure safe custody of the construction set of keys.

.3 Upon completion of each phase of the construction, the CSC representative will, in conjunction with the lock manufacturer:

.1 Prepare an operational keying schedule.

.2 Accept the operational keys and cylinders directly from the lock manufacturer

.3 Arrange for removal and return of the construction cores and install the operational core in all locks.

.3 Upon putting operational security keys into use, the CSC construction escort shall obtain these keys as they are required from the Security Maintenance Officer (SMO) and open doors as required by the Contractor. The Contractor shall issue instructions to his/her employees advising them that all security keys shall always remain with the CSC construction escort.

1.13 SECURITY HARDWARE

.1 Turn over all removed security hardware to the Director of the Institution for disposal or for safekeeping until required for re-installation.

1.14 PRESCRIPTION DRUGS

.1 Employees of the Contractor who are required to take prescription drugs during the workday shall obtain approval of the Director to bring a one day supply only into the Institution.

1.15 SMOKING RESTRICTIONS

.1 Contractors and construction employees are not permitted to smoke inside correctional facilities or outdoors within the perimeter of a correctional facility and must not possess unauthorized smoking items within the perimeter of a correctional facility.

.2 Contractors and construction employees who are in violation of this policy will be requested to immediately cease smoking or dispose of any unauthorized smoking items and, if they persist, will be directed to leave the institution.

1.16 CONTRABAND

.1 Weapons, ammunition, explosives, alcoholic beverages, drugs and narcotics are prohibited on Institutional Property.

- .2 Discovery of Contraband on the construction site and the identification of the person(s) responsible for the Contraband shall be reported immediately to the Director.
- .3 Contractors shall be vigilant with both their staff and the staff of their sub-contractors and suppliers that the discovery of Contraband may result in cancellation of the security clearance of the affected employee. Serious infractions may result in the removal of the company from the Institution for the duration of the construction.
- .4 Presence of arms and ammunition in vehicles of Contractors, sub-contractors and suppliers or employees of these will result in the immediate cancellation of security clearances for the driver of the vehicle.

1.17 SEARCHES

- .1 All vehicles and persons entering Institutional property may be subject to search.
- .2 When the Director suspects, on reasonable grounds, that an employee of the Contractor is in possession of Contraband or unauthorized items, he/she may order that person to be searched.
- .3 All employees entering the Institution may be subject to screening of personal effects for traces of Contraband drug residue.

1.18 ACCESS TO AND REMOVAL FROM INSTITUTION PROPERTY

- .1 Construction personnel and commercial vehicles will not be admitted to the Institution after normal working hours, unless approved by the Director.

1.19 MOVEMENT OF VEHICLES

- .1 Escorted commercial vehicles will be allowed to enter or leave the Institution through the vehicle access gate during the following hours:
 - .1 08:00 a.m. to 11:00 a.m.
 - .2 1:00 p.m. to 3:30 p.m.
- .2 Construction vehicles shall not leave the Institution until an inmate count is completed.
- .3 The Contractor shall advise the Director twenty four (24) hours in advance to the arrival on the site of heavy equipment such as concrete trucks, cranes, etc.

- .4 Vehicles being loaded with soil or other debris, or any vehicle considered impossible to search, must be under continuous supervision by CSC Staff or Commissionaires working under the authority of the Director.
- .5 Commercial Vehicles will only be allowed access to Institutional Property when their contents are certified by the Contractor or his/her representative as being strictly necessary to the execution of the construction project.
- .6 Vehicles shall be refused access to Institutional Property if, in the opinion of the Director, they contain any article which may jeopardize the security of the Institution.
- .7 Private vehicles of Construction Employees will not be allowed within the security wall or fence of medium or maximum security Institutions without the permission of the Director.
- .8 With prior approval of the Director, a vehicle may be used in the morning and evening to transport a group of employees to the work site. This vehicle will not remain within the Institution the remainder of the day.
- .9 With the approval of the Director, certain equipment may be permitted to remain on the construction site overnight or over the weekend. This equipment must be securely locked, with the battery removed. The Director may require that the equipment be secured with a chain and padlock to another solid object.

1.20 MOVEMENT OF
CONSTRUCTION
EMPLOYEES ON
INSTITUTIONAL
PROPERTY

- .1 Subject to the requirements of good security, the Director will permit the Contractor and his/her employees as much freedom of action and movement as is possible.
- .2 However, notwithstanding paragraph above, the Director may:
 - .1 Prohibit or restrict access to any part of the Institution.
 - .2 Require that in certain areas of the Institution, either during the entire construction project or at certain intervals, Construction Employees only be allowed access when accompanied by a member of the CSC security staff.

- .3 During the lunch and coffee/health breaks, all employees will remain within the construction site. Employees are not permitted to eat in the officer's lounge and dining room.

1.21 SURVEILLANCE
AND INSPECTION

- .1 Construction activities and all related movement of personnel and vehicles will be subject to surveillance and inspection by CSC security staff members to ensure that established security requirements are met.
- .2 CSC staff members will ensure that an understanding of the need to carry out surveillance and inspections, as specified above, is established among Construction Employees and maintained throughout the construction project.

1.22 STOPPAGE OF
WORK

- .1 The Director may request at any time that the Contractor, his/her employees, sub-contractors and their employees not enter or leave the work site immediately due to a security situation occurring within the Institution. The Contractor's site supervisor shall note the name of the staff member making the request and the time of the request and obey the order as quickly as possible.
- .2 The Contractor shall advise the Departmental Representative within 24 hours of this delay to the progress of the work.

1.23 CONTACT WITH
INMATES

- .1 Unless specifically authorized, it is forbidden to come into contact with inmates, to talk with them, to receive objects from them or to give them objects. Any employee doing any of the above will be removed from the site and his/her security clearance revoked.
 - .2 It is forbidden to take pictures of inmates, of CSC staff members or of any part of the Institution other than those required as part of this Contract.
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<u>1.24 COMPLETION OF CONSTRUCTION PROJECT</u>	.1	Upon completion of the construction project or, when applicable, the takeover of a facility, the Contractor shall remove all remaining construction material, tools and equipment that are not specified to remain in the Institution as part of the construction contract.
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PART 2 - PRODUCTS

<u>2.1 NOT USED</u>	.1	Not used.
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PART 3 - EXECUTION

<u>3.1 NOT USED</u>	.1	Not used.
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PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA): Canada
 - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .2 National Building Code 2010 (NBC):
 - .1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.
- .3 National Fire Code 2010 (NFC):
 - .1 NFC 2010, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.
- .4 Province of Ontario:
 - .1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
 - .2 O. Reg. 490/09, Designated Substances.
 - .3 Workplace Safety and Insurance Act, 1997.
 - .4 Municipal statutes and authorities.
- .5 Treasury Board of Canada Secretariat (TBS):
 - .1 Treasury Board, Fire Protection Standard April 1, 2010 www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=17316§ion=text.

1.2 ACTION AND
INFORMATIONAL
SUBMITTALS

- .1 Submit in accordance with Section 01 33 00.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
 - .3 Measures and controls to be implemented to address identified safety hazards and risks.
- .3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 10 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 5 days after receipt of comments from Departmental Representative.

- .4 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .5 Submit one copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and authority having jurisdiction.
- .6 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.
- .7 Submit copies of incident and accident reports.
- .8 Submit Material Safety Data Sheets (MSDS).
- .9 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.

1.3 FILING OF
NOTICE

- .1 File Notice of Project with Provincial authorities prior to commencement of Work.

1.4 SAFETY
ASSESSMENT

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

1.5 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.6 REGULATORY
REQUIREMENTS

- .1 Comply with the Acts and regulations of the Province of Ontario.
- .2 Comply with specified standards and regulations to ensure safe operations at site.

1.7 GENERAL
REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns either accepting or requesting improvements.
- .3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing.

1.8 COMPLIANCE
REQUIREMENTS

- .1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter O.1, as amended.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.9 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 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.
- .3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act and Regulations for Construction Projects for the Province of Ontario.

1.10 UNFORSEEN
HAZARDS

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

- .2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.

1.11 POSTING OF
DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province of Ontario, and in consultation with Departmental Representative.
 - .1 Contractor's Safety Policy.
 - .2 Constructor's Name.
 - .3 Notice of Project.
 - .4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
 - .5 Ministry of Labour Orders and reports.
 - .6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
 - .7 Address and phone number of nearest Ministry of Labour office.
 - .8 Material Safety Data Sheets.
 - .9 Written Emergency Response Plan.
 - .10 Site Specific Safety Plan.
 - .11 Valid certificate of first aider on duty.
 - .12 WSIB "In Case of Injury At Work" poster.
 - .13 Location of toilet and cleanup facilities.

1.12 CORRECTION OF
NON-COMPLIANCE

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

1.13 BLASTING

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

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|---|----|---|
| <u>1.14 POWDER
ACTUATED DEVICES</u> | .1 | Use powder actuated devices only after receipt of written permission from Departmental Representative. |
| <u>1.15 WORK STOPPAGE</u> | .1 | Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work. |

PART 2 - PRODUCTS

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|---------------------|----|-----------|
| <u>2.1 NOT USED</u> | .1 | Not used. |
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PART 3 - EXECUTION

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|---------------------|----|-----------|
| <u>3.1 NOT USED</u> | .1 | Not used. |
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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 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00.
- .2 Prior to commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.

1.3 FIRES

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

1.4 DISPOSAL OF WASTES

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

1.5 EROSION AND SEDIMENT CONTROL (ESC)

- .1 Prevent the loss of soil during construction by receiving streams during construction.
 - .2 Prevent air pollution from dust and particulate matter during construction activities.
 - .3 The Contractor is to designate an individual to be responsible for all aspects of ESC work.
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1.6 DRAINAGE AND
DEWATERING SYSTEM

- .1 Provide erosion and sediment control plan that identifies type and location of erosion and sediment controls to be provided. Plan: include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, into waterways, sewer, drainage systems.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.

1.7 SITE CLEARING
AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties not identified for removal.
- .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas indicated or designated by Departmental Representative.

1.8 WORK ADJACENT
TO WATERWAYS

- .1 Do not dump excavated fill, waste material or debris within 5 m of waterways.

1.9 POLLUTION
CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this contract.
 - .2 Control emissions from equipment and plant to local authorities' emission requirements.
 - .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area, by providing temporary enclosures.
 - .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
-

- 1.10 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.

PART 2 - PRODUCTS

- 2.1 SILT FENCE FABRIC
- .1 Fabric to be woven and comply with OPSS 1860.07.05.03.

PART 3 - EXECUTION

- 3.1 EXAMINATION AND MITIGATION
- .1 Site verification of conditions and mitigation measures.
 - .1 Follow guidelines presented in Table 5: Environmental Effects Analysis - Mitigation Measures and Residual Effects (Appendix A)
 - .2 Confirm accessibility of site for equipment.

- 3.2 SITE-WIDE PRACTICES
- .1 Keep the main entrance road clear of any mud or earth tracked from vehicles.
 - .2 Dust Control
 - .1 Dust Control measures are to be as per OPSS 306.
 - .2 Dust suppressants other than water or calcium chloride (flake or solution) require prior approval.

3.3 INSTALLATION OF
ESC MEASURES

- .1 Installation of the ESC measures is to be conducted in such a way that downstream measures (those measures closest to water course to be protected) are to be installed prior to upstream measures.
- .2 Temporary Stabilization Measures:
 - .1 Be aware that any contamination of stockpiled material or of graded surfaces by temporary stabilization method is to be resolved at the Contractor's expense.
- .3 Sedimentation Prevention Measures:
 - .1 Catch Basin Lid Filter Cloth .1 All catch basins and catch basin manholes are to have a double layer of geotextile placed under their lids to prevent sedimentation of the storm sewer system.
 - .2 Ditch Inlet Protection:
 - .1 All ditch inlets are to be protected by a straw bale flow check immediately upstream of the ditch inlet, until all areas draining into the ditch inlet have been permanently stabilized.
 - .2 All ditch inlets are to have a double layer of geotextile placed under their lids to prevent sedimentation of the storm sewer system.
 - .3 Construction activities are to minimize disturbance to grassed areas. Any grassed areas to be used for construction activities are to be cleared and stripped and topsoil is to be stockpiled. Areas are to be stabilized after construction activities are complete.

3.4 INSPECTION OF
ESC MEASURES

- .1 Once a week, or immediately after any rainfall event of at least 12 mm, each ESC measure onsite is to be inspected in its entirety. All ESC measures are to be maintained in good working order.
 - .2 Inspection of Structural Measures:
 - .1 Silt fence:
 - .1 Silt fence is to be inspected for: depth of embedment, tears or holes, erosion around or under the fence, sagging or collapse.
 - .2 Sediment accumulation reaching 1/3 fence height is to be removed and relocated to areas onsite of low erosion potential.
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- .3 All seeded or planted areas are to be inspected to ensure vegetative growth. Where vegetation has washed away, or died off, additional seeding is to be applied. Ensure area has sufficient water to promote growth.

3.5 ESC MEASURE
REMOVAL

- .1 After all of the upstream construction work has been completed, including the removal of upstream ESC measures, all areas have been permanently stabilized according to the Landscape Drawings, and if approved by the Departmental Representative, the ESC measure may be removed.
- .2 All accumulated sediment at the ESC measure is to be removed.

PART 1 - GENERAL

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|---|--|
| <u>1.1 REFERENCES AND
CODES</u> | <p>.1 Perform Work in accordance with National Building Code of Canada (NBC) 2010, National Fire Code of Canada (NFC) 2010 and Ontario Building Code (OBC) 2012, including all amendments up to bid closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply as directed by the Departmental Representative.</p> <p>.2 Meet or exceed requirements of:
.1 Contract documents.
.2 Specified standards, codes and referenced documents.</p> |
| <u>1.2 HAZARDOUS
MATERIAL DISCOVERY</u> | <p>.1 Stop work immediately and notify Departmental Representative if materials which may contain designated substances or PCB's are discovered in course of work.</p> |
| <u>1.3 BUILDING
SMOKING ENVIRONMENT</u> | <p>.1 Comply with smoking restrictions and municipal bylaws.</p> |
| <u>1.4 TAXES</u> | <p>.1 Pay applicable Federal, Provincial and Municipal taxes.</p> |
| <u>1.5 EXAMINATION</u> | <p>.1 Examine existing conditions and determine conditions affecting work.</p> |

PART 2 - PRODUCTS

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|---------------------|---------------------|
| <u>2.1 NOT USED</u> | <p>.1 Not Used.</p> |
|---------------------|---------------------|

PART 3 - EXECUTION

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|---------------------|---------------------|
| <u>3.1 NOT USED</u> | <p>.1 Not Used.</p> |
|---------------------|---------------------|

PART 1 - GENERAL

1.1 INSPECTION

- .1 Allow Departmental 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.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative may order any 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, Departmental Representative shall pay cost of examination and replacement.

1.2 INDEPENDENT
INSPECTION AGENCIES

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

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- 1.3 ACCESS TO WORK
- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
 - .2 Co-operate to provide reasonable facilities for such access.
- 1.4 PROCEDURES
- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
 - .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
 - .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.
- 1.5 REJECTED WORK
- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
 - .2 Make good other Contractor's work damaged by such removals or replacements promptly.
 - .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative may deduct from Contract Amount difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Departmental Representative.
- 1.6 REPORTS
- .1 Submit copies of inspection and test reports to Departmental Representative.
 - .2 Provide copies to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.
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1.7 TESTS AND MIX
DESIGNS

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

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CSA 0121-08(R2013), Douglas Fir Plywood.
 - .3 CSA Z797-09(R2014), Code of practice for Access Scaffold.
 - .4 CAN/CSA-Z321-96(R2006), Signs and Symbols for the Occupational Environment, withdrawn but still available from CSA, CCOHS and Techstreet.

1.2 SUBMITTALS

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

1.3 INSTALLATION
AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Identify areas which have to be gravelled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Remove from site all such work after use.

1.4 SITE
STORAGE/LOADING

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

1.5 CONSTRUCTION
PARKING

- .1 Parking will be permitted on site within a designated area for designated number of vehicles by Departmental Representative.

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- .2 Provide and maintain adequate access to project site.
- .3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.
- 1.6 OFFICES
- .1 Provide office heated to 22°C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide a clearly marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors may provide their own offices as necessary. Direct location of these offices.
- 1.7 EQUIPMENT, TOOL AND MATERIALS STORAGE
- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.
- 1.8 SANITARY FACILITIES
- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.
- 1.9 CONSTRUCTION SIGNAGE
- .1 Locate project identification sign as directed by Departmental Representative and construct as follows:
- .1 Build concrete foundation, erect framework, and attach signboard to framing.
- .2 Paint all surfaces of signboard and framing with one coat primer and two coats enamel. Colour white on signboard face, black on other surfaces.
- .3 Apply vinyl sign face overlay to painted signboard face in accordance with installation instruction supplied.
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- .2 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall conform to CAN/CSA-Z321.
- .3 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.
- .4 No other signs or advertisements, other than warning signs are permitted on site.

1.10 PROTECTION AND
MAINTENANCE OF
TRAFFIC

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

- .12 Remove, upon completion of work, haul roads designated by Departmental Representative .

1.11 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 TEMPORARY
EROSION AND
SEDIMENTATION
CONTROL

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

PART 1 - GENERAL

<u>1.1 RELATED SECTIONS</u>	.1	Section 01 52 00 - Construction Facilities.
<u>1.2 REFERENCES</u>	.1	Canadian General Standards Board (CGSB): .1 CAN/CGSB-1.189-2000, Exterior Alkyd Primer for Wood. .2 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.
	.2	Canadian Standards Association (CSA): .1 CSA 0121-08(R2013), Douglas Fir Plywood.
<u>1.3 INSTALLATION AND REMOVAL</u>	.1	Provide temporary controls in order to execute Work expeditiously.
	.2	Remove from site all such work after use.
<u>1.4 HOARDING</u>	.1	Erect temporary site enclosure using new 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m o.c. Provide one lockable truck gate. Maintain fence in good repair.
	.2	Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.
<u>1.5 GUARD RAILS AND BARRICADES</u>	.1	Provide secure, rigid guard rails and barricades around deep excavations.
	.2	Provide as required by governing authorities .
<u>1.6 ACCESS TO SITE</u>	.1	Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.
<u>1.7 PUBLIC TRAFFIC FLOW</u>	.1	Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

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| <u>1.8 FIRE ROUTES</u> | .1 | Maintain access to property including overhead clearances for use by emergency response vehicles. |
| <u>1.9 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY</u> | .1 | Protect surrounding private and public property from damage during performance of Work. |
| | .2 | Be responsible for damage incurred. |
| <u>1.10 PROTECTION OF BUILDING FINISHES</u> | .1 | Provide protection for finished and partially finished building finishes and equipment during performance of Work. |
| | .2 | Provide necessary screens, covers, and hoardings. |
| | .3 | Confirm with Departmental Representative locations and installation schedule 3 days prior to installation. |
| | .4 | Be responsible for damage incurred due to lack of or improper protection. |

PART 2 - PRODUCTS

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|---------------------|----|-----------|
| <u>2.1 NOT USED</u> | .1 | Not Used. |
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PART 3 - EXECUTION

- | | | |
|---------------------|----|-----------|
| <u>3.1 NOT USED</u> | .1 | Not Used. |
|---------------------|----|-----------|

PART 1 - GENERAL

1.1 CONSTRUCTION & DEMOLITION WASTE

- .1 Carefully deconstruct and source separate materials/equipment and divert, from D&C waste destined for landfill to maximum extent possible. On site sales are not permitted.
- .2 Source separate waste and maintain waste audits in accordance with the Environmental Protection Act, Ontario Regulation 102/94 and Ontario Regulation 103/94.
 - .1 Provide facilities for collection, handling and storage of source separated wastes.
 - .2 Source separate the following waste:
 - .1 Brick and portland cement concrete.
 - .2 Corrugated cardboard.
 - .3 Wood, not including painted or treated wood or laminated wood.
 - .4 Gypsum board, unpainted.
 - .5 Steel.
 - .6 Items indicated in Section 02.41.13.14, Deconstruction and Waste Products Workplan Summary.
- .4 Submit proof that all waste is being disposed of at a licensed landfill site or waste transfer site. A copy of the disposal/waste transfer site's license and a letter verifying that said landfill site will accept the waste must be supplied to Departmental Representative prior to removal of waste from the demolition site.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 SECTION INCLUDES_ .1 Methods for removal of existing asphalt pavement.

1.2 WASTE MANAGEMENT AND DISPOSAL .1 Separate waste materials for recycling in accordance with Section 01 74 20.
.2 Divert unused asphalt materials from landfill to local facility.

PART 2 - PRODUCTS

2.1 EQUIPMENT .1 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of pavement surface to depths or grades indicated.

PART 3 - EXECUTION

3.1 PREPARATION .1 Prior to beginning removal operation, inspect and verify with Departmental Representative areas, depths and lines of asphalt pavement to be removed.

3.2 PROTECTION .1 Protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

3.3 REMOVAL .1 Remove existing asphalt pavement to lines and grades as indicated.
.2 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.
.3 Sawcut along lines designated on contract drawings to provide a clean true edge on existing asphalt.

- .4 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
- .5 Provide for suppression of dust generated by removal process.

3.4 FINISH
TOLERANCES

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

3.5 SWEEPING

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

PART 1 - GENERAL

<u>1.1 RELATED SECTIONS</u>	.1	Section 31 23 33.01 - Excavating, Trenching and Backfilling.
	.2	Section 02 41 13.14 Asphalt Paving Removal
<u>1.2 SUBMITTALS</u>	.1	Submittals in accordance with Section 01 33 00.
<u>1.3 QUALITY ASSURANCE</u>	.1	Site Meetings. .1 Arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work, prior to start of Work to determine extents of removal.
<u>1.4 DELIVERY, STORAGE AND HANDLING</u>	.1	Perform Work in accordance with Section 01 35 43.
	.2	Waste Management and Disposal. .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.
<u>1.5 SITE CONDITIONS</u>	.1	Site Environmental Requirements. .1 Perform work in accordance with Section 01 35 43. .2 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution. .3 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. .1 Ensure proper disposal procedures are maintained throughout the project. .4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties. .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities. .6 Protect trees, plants and foliage on site and adjacent properties where indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

3.2 REMOVAL
OPERATIONS

- .1 Remove items as indicated.
- .2 Do not disturb items designated to remain in place.
- .3 Clear & grub vegetation and remove as many trees as required during demolition.
 - .1 Obtain approval of Departmental Representative prior to removal of trees.
- .4 Disposal of Material.
 - .1 Dispose of materials not designated for salvage or reuse on site as instructed by Departmental Representative.
 - .2 Trim disposal areas to approval of Departmental Representative.
- .5 Backfill.
 - .1 Backfill in areas as indicated and in accordance with Section 31 23 33.01.

3.3 STOCKPILING

- .1 Label stockpiles, indicating material type and quantity.
- .2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.
- .3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.
- .4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.4 REMOVAL FROM
SITE

- .1 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project.

- .2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.
- .3 Transport material designated for alternate disposal using approved haulers listed in Waste Reduction Workplan and in accordance with applicable regulations.
 - .1 Written authorization from Departmental Representative is required to deviate from haulers listed in Waste Reduction Workplan.
- .4 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.
 - .1 Disposal Facilities: approved and listed in Waste Reduction Workplan.
 - .2 Written authorization from Departmental Representative is required to deviate from disposal facilities listed in Waste Reduction Workplan.

3.5 RESTORATION

- .1 Restore areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.
- .2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.6 CLEANING

- .1 Remove debris, trim surfaces and leave work site clean, upon completion of Work.
- .2 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

PART 1 - GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C117-13, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136/C136M, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422-63(2007)e1, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D698-12ae2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .5 ASTM D1557-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
 - .6 ASTM D4318-10e1, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 OPSS.PROV 1010 November 2013 Material Specification for Aggregates - Base, subbase, select subgrade, and backfill material.
- .4 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000-13, Cementitious Materials Compendium.
 - .2 CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.2 DEFINITIONS

- .1 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation, including asphalt, concrete, shrubs, roots, stones, topsoil, etc.
- .2 Topsoil:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.

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

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

.5 Unsuitable materials:

.1 Weak, chemically unstable, and compressible materials.

.2 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136/C136M.

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

1.3 SUBMITTALS

.1 Quality Control:

.1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.

.2 Submit for review by Departmental Representative proposed dewatering and sediment control methods as described in PART 3 of this Section.

.3 Submit to Departmental Representative plan for stockpiling, material storage, and staging area.

.2 Preconstruction Submittals:

.1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.

.2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field and clearance record from utility authority.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

.1 Included in balance of project.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

1.6 EXISTING CONDITIONS

- .1 Buried services:
 - .1 Before commencing work verify location of buried services on and adjacent to site. Utility locates by owner of the utility or authorities having jurisdiction are required prior to commencement of work.
 - .2 Test excavations are to be completed at all utility tie-ins and utility crossings. Excavation is to be completed and any discrepancies or conflicts with the information provided is to be submitted to the departmental representative seven (7) days in advance of work.
 - .3 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
 - .4 Remove obsolete buried services within 2 m of foundations: cap cut-offs.
 - .5 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .6 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
 - .7 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing. Costs for such Work to be paid by Owner.
 - .8 Record location of maintained, re-routed and abandoned underground lines.
- .2 Existing buildings and surface features:
 - .1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, pavement, survey bench marks and monuments which may be affected by Work.
 - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Granular A material as per OPSS.PROV 1010.
-

- .2 Granular B material, Type II as per OPSS.PROV 1010.
- .3 Select sub-grade material as per OPSS.PROV 1010.
- .4 Unshrinkable fill: proportioned and mixed to provide:
 - .1 Maximum compressive strength of 0.4 MPa at 28 days.
 - .2 Maximum cement content of 25 kg/m³ with 40 % by volume fly ash replacement: to CSA-A3001, Type GU.
 - .3 Minimum strength of 0.07 MPa at 24 h.
 - .4 Concrete aggregates: to CSA-A23.1/A23.2.
 - .5 Cement: Type GU.
 - .6 Slump: 160 to 200 mm.

PART 3 - EXECUTION

- | | |
|--|---|
| <u>3.1 GEOTECHNICAL
REPORT</u> | .1 Refer to Appendix A: Geotechnical Investigation Report (WSP, 2016) for site specific information. |
| <u>3.2 TEMPORARY
EROSION AND
SEDIMENTATION
CONTROL</u> | .1 To section 01 35 43 Environment Procedures |
| <u>3.3 SITE
PREPARATION</u> | .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Sawcut pavement or asphalt neatly along limits of proposed excavation in order that surface may break evenly and cleanly. |
| <u>3.4 PREPARATION/
PROTECTION</u> | .1 Protect existing features as required.

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

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

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

3.5 STRIPPING OF TOPSOIL

- .1 Begin topsoil stripping of areas after area has been cleared of brush and weeds and removed off site.
- .2 Do not mix topsoil with subsoil.
- .3 Stockpile in locations as directed by Departmental Representative.
 - .1 Stockpile height not to exceed 2 m and should be protected from erosion.

3.6 STOCKPILING

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

3.7 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while Work is in progress.
- .2 Provide for Departmental Representative approval details of proposed dewatering or heave prevention methods, including well points (if applicable).
- .3 Protect open excavations against flooding and damage due to surface run-off.
- .4 Dispose of water in manner not detrimental to public and private property, or portion of Work completed or under construction.
 - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits as required.

3.8 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions as indicated.
-

- .2 Remove concrete, masonry, paving, walks, demolished foundations and rubble and other obstructions encountered during excavation under this item.
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .4 Do not disturb soil within branch spread of trees or shrubs that are to remain.
 - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .5 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.
- .6 Keep excavated and stockpiled materials safe distance away from edge of trench.
- .7 Restrict vehicle operations directly adjacent to open trenches.
- .8 Do not obstruct flow of surface drainage or natural watercourses.
- .9 Excavated catchbasins, pipes, frames, concrete, etc. to be disposed off site.
- .10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .11 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
- .12 Correct unauthorized over-excavation as follows:
 - .1 Fill under bearing surfaces and footings with granular A compacted to not less than 100 % of corrected Standard Proctor maximum dry density.
 - .2 Fill under other areas with granular A fill compacted to not less than 95 % of corrected Standard Proctor maximum dry density.
- .13 Hand trim, make firm and remove loose material and debris from excavations.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

- .14 Excavated topsoil and subgrade not reused for reinstatement to be disposed off site. Coordinate with Departmental Representative

3.9 FILL TYPES AND
COMPACTION

- .1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698 and ASTM D1557.

3.10 BEDDING AND
SURROUND OF
UNDERGROUND
SERVICES

- .1 Place and compact granular "A" material for bedding and surround of underground services as per detail drawings. Cover material to extend to 300 mm above pipe obvert.
- .2 Place bedding and surround material in unfrozen condition.

3.11 BACKFILLING

- .1 Do not proceed with backfilling operations until completion of following:
 - .1 Departmental Representative has inspected and approved installations.
 - .2 Departmental Representative has inspected and approved of construction below finish grade.
 - .3 Inspection, testing, approval, and recording location of underground utilities.
 - .4 Removal of concrete formwork.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Place backfill material in uniform layers not exceeding 200 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .5 Backfilling around installations:
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Place layers simultaneously on both sides of installed Work to equalize loading.

3.12 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 20, trim slopes, and correct defects as directed by Departmental Representative.

- .2 Replace all disturbed topsoil as specified and to the satisfaction of the Departmental Representative.
- .3 Reinstate lawns to elevation which existed before excavation (or as indicated).
- .4 Reinstate pavements disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .5 Clean and reinstate areas affected by Work as directed by the Departmental Representative.
- .6 Protect newly graded areas from traffic and maintain free of trash or debris.

PART 1 - GENERAL

1.1 REFERENCES

- .1 ASTM International (ASTM)
 - .1 ASTM C117-13, Standard Test Method for Material Finer Than 75 μm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131/C131M, Standard Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136/C136M, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - .5 ASTM D1557-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2700 kN-m/m³)).
 - .6 ASTM D4318-10e1, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Granular base: material in accordance with Section 31 23 33.01

2.2 EQUIPMENT

- .1 Compaction equipment must be capable of obtaining required densities in materials on project.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for reshaping asphalt pavement installation 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 PULVERIZING AND
RESHAPING

.1 The processed depth shall be such that the blended material shall contain a maximum of 50% by mass of asphalt coated aggregate in the final blend. The operation of pulverization shall ensure that 100% of the mixed material passes the 26.5mm sieve and not more than 75% passes the 4.75mm sieve.

.2 Blade and trim pulverized pavement material to elevation and cross section dimensions as indicated.

.3 Where deficiency of pulverized material exists, add and blend in new granular base material as directed by Departmental Representative. Do not use frozen material.

.4 Surfaces of processed material that have been exposed to traffic and are to receive granular base material shall be scarified immediately prior to placement of the base course material.

3.3 COMPACTING

.1 Compact to density not less than 100% corrected maximum dry density maximum dry density in accordance with ASTM D698.

.2 Compact reshaped material in accordance with written approval of Departmental Representative.

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

.4 Apply water as necessary during compacting.

3.4 FINISH
TOLERANCES

.1 Reshape surface to within plus or minus 10 mm of elevation as indicated, but not uniformly high or low.

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

3.5 PROTECTION

- .1 Protect and maintain reshaped asphalt pavement surface in condition conforming to this section until succeeding material is applied or until after receipt of written acceptance from Departmental Representative.

PART 1 - GENERAL

<u>1.1 RELATED SECTIONS</u>	.1	Section 32 11 20 - Granular Base
	.2	Section 32 12 16.01 - Asphalt Paving
<u>1.2 REFERENCES</u>	.1	American Society for Testing and Materials (ASTM)
	.1	ASTM C117-13, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
	.2	ASTM C131/C131M, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
	.3	ASTM C136/C136M, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
	.4	ASTM D422-63(2007)e2, Standard Test Method for Particle-Size Analysis of Soils.
	.5	ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft ³) (600kN-m/m ³).
	.6	ASTM D1557-12e1, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft ³) (2,700kN-m/m ³).
	.7	ASTM D1883-16, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
	.8	ASTM D4318-10e1, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
	.2	Canadian General Standards Board (CGSB)
	.1	CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
	.2	CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
	.3	OPSS 1010.PROV April 2013 Material Specification for Aggregates - Base, Subbase, Select Subgrade and Backfill Material
<u>1.3 WASTE MANAGEMENT AND DISPOSAL</u>	.1	Separate and recycle waste materials in accordance with Section 01 74 20.
	.2	Divert unused granular material from landfill to local quarry as approved by Departmental Representative.

1.4 MEASUREMENT AND
PAYMENT PROCEDURES .1 Included in balance of project.

PART 2 - PRODUCTS

2.1 MATERIALS .1 Granular sub-base material: in accordance with following requirements:
.1 Crushed, pit run or screened stone, gravel or sand.
.2 Granulars to OPSS.PROV 1010.

PART 3 - EXECUTION

3.1 PLACING .1 Place granular sub-base after subgrade is inspected and approved by Departmental Representative.
.2 Construct granular sub-base to depth and grade in areas indicated.
.3 Ensure no frozen material is placed.
.4 Place material only on clean unfrozen surface, free from snow or ice.
.5 Place granular sub-base materials using methods which do not lead to segregation or degradation.
.6 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
.7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
.8 Remove and replace portion of layer in which material has become segregated during spreading.

3.2 COMPACTION .1 Compaction equipment to be capable of obtaining required material densities.
.2 Compact to density of not less than 100% maximum dry density in accordance with ASTM D1557.
.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.
- .5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
- .6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- .7 Compaction equipment shall be used in such a way that the utility pipes are not damaged during construction.

3.3 SITE TOLERANCES

- .1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

3.4 PROTECTION

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

PART 1 - GENERAL

1.1 RELATED SECTIONS .1 Section: 32 11 16.01 - Granular Sub-Base.

.2 Section: 32 12 16.01 - Asphalt Paving.

PART 2 - PRODUCTS

2.1 MATERIALS .1 Granular A: to OPSS.PROV 1010, April 2013.

PART 3 - EXECUTION

3.1 PLACING .1 Place on a clean surface, properly shaped and compacted and free from snow or ice.

.2 Place material in layers not exceeding 150 mm when compacted.

.3 Spread each layer uniformly using approved grading equipment and methods.

3.2 COMPACTING .1 Compact each layer to minimum 100% Standard Proctor Density.

.2 Add water as required to maintain material at or near optimum moisture content while compacting.

3.3 FINISHING .1 Finish compacted surface to within 12 mm of established grade as indicated by a 3 m straightedge placed in any direction

.2 Correct irregularities greater than 12 mm by loosening the surface and adding or removing material until surface is within specified tolerance.

3.4 FIELD QUALITY CONTROL .1 The Departmental Representative may perform field and laboratory tests for control of moisture, density and aggregate gradation. Results will control Contractor's operations.

PART 1 - GENERAL

<u>1.1 RELATED SECTIONS</u>	.1	Section 32 11 16.01 - Granular Sub-base.
	.2	Section 32 11 20 - Granular Base
<u>1.2 REFERENCES</u>	.1	American Society for Testing and Materials International, (ASTM)
	.1	ASTM D698-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³ (600 kN-m/m ³)).
	.2	ASTM D6690-15, Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Pavements.
	.2	Canadian General Standards Board (CGSB)
	.1	CAN/CGSB-1.74-2001, Alkyd Traffic Paint.
	.3	Ontario Provincial Standard Specifications (OPSS)
	.1	OPSS 302-November 2007, Construction Specification for Primary Granular Base.
	.2	OPSS 310-November 2012, Construction Specification for Hot Mixed Asphalt.
	.3	OPSS 314-November 2013, Construction Specification for Untreated Granular, Subbase, Base, Surface Shoulder and Stockpiling.
	.4	OPSS 1010.PROV-April 2013, Material Specification for Aggregates, Subbase, Select Subgrade, and backfill material.
	.5	OPSS 1103-November 2012, Material Specification for Emulsified Asphalt.
	.6	OPSS 1150-November 2010, Material Specification for Hot Mixed, Hot Laid Asphalt Concrete.
<u>1.3 SAMPLES</u>	.1	Submit to Departmental Representative, the asphalt mix design at least 2 weeks before paving work.
<u>1.4 MEASUREMENT AND PAYMENT PROCEDURES</u>	.1	Included in balance of project.
<u>1.5 WASTE MANAGEMENT AND DISPOSAL</u>	.1	Separate and recycle waste materials in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Aggregates to: OPSS 1010.PROV.
 - .1 Granular A.
 - .2 Granular B Type II.
 - .3 Select subgrade.
- .2 Prime coat: SS-1 to OPSS 1103.
- .3 Asphalt concrete:
 - .1 HL-3 to OPSS 1150.
 - .2 HL-8 to OPSS 1150.
- .4 Asphaltic joint sealant between existing and new asphalt: to ASTM D6690.
- .5 The performace grade of asphalt: PG 58-34
- .6 Traffic paint: Alkyd yellow (505-308) and white(513-301) to CAN/CGSB-1.74 and OPSS 1712.
- .7 Paint thinner: to CAN/CGSB-1.5.

PART 3 - EXECUTION

3.1 PAVEMENT
THICKNESS

- .1 As per cross section on detail drawing C-110.

3.2 PAVEMENT
CONSTRUCTION

- .1 Construction of asphalt concrete: OPSS 310.

3.3 ASPHALT
MARKINGS

- .1 Paint stop lines, centre lines and other pavement markings in accordance with manufacturers recommendations and as indicated.
- .2 Review layout with Departmental Representative prior to application.
- .3 Use paint thinner in accordance with manufacturer's requirements.
- .4 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.
- .5 Air temperature to be above 10°C, wind speed less than 60 km/h and no rain in forecast within next 4 hours.

- .6 Paint lines to be of uniform colour and density with sharp edges.
- .7 Remove incorrect markings as directed by Departmental Representative.

PART 1 - GENERAL

1.1 RELATED SECTIONS .1 Section 01 74 20.

1.2 REFERENCES .1 OPSS 2501 April 2015 Material Specification for Calcium Chloride

1.3 MEASUREMENT AND PAYMENT PROCEDURES .1 All work of this Section shall fall under the lump sum arrangement

1.4 DELIVERY STORAGE AND HANDLING .1 Supply calcium chloride in quantities and at times as directed by Department Representative.

PART 2 - PRODUCTS

2.1 MATERIALS .1 Calcium Chloride solid Grade 1, Class A as per OPSS 2501.

PART 3 - EXECUTION

3.1 APPLICATION .1 Apply calcium chloride and water with equipment approved by and as directed by Departmental Representative.

PART 1 - GENERAL

<u>1.1 RELATED SECTIONS</u>	.1	31 23 33.01 - Excavation, Trenching and Backfilling.
<u>1.2 REFERENCES</u>	.1	Agriculture and Agri-Food Canada .1 The Canadian System of Soil Classification, Third Edition, 1998.
	.2	Canadian Council of Ministers of the Environment .1 PN1340-2005, Guidelines for Compost Quality.
	.3	.1 OPSS 2501 April 2015 Material Specification for Calcium Chloride .1 OPSS 802 November 2010 Construction Specification for Topsoil
<u>1.3 WASTE MANAGEMENT AND Waste DISPOSAL</u>	.1	Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

PART 2 - PRODUCTS

<u>2.1 TOPSOIL</u>	.1	Topsoil for sodded areas as per OPSS 802.
	.2	All topsoil will be screened prior to placement. Topsoil will pass through a 25mm screen.
<u>2.2 SOIL AMENDMENTS</u>	.1	Fertilizer: .1 Fertility: major soil nutrients present in following amounts: .2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil. .3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil. .4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil. .5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation. .6 Ph value: 6.5 to 8.0.
	.2	Sand: washed coarse silica sand, medium to course textured.

- .3 Organic matter: compost in accordance with CCME PN1340, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.
- .4 Use composts meeting Category B requirements for land fill reclamation and large scale industrial applications.
- .5 Limestone:
 - .1 Ground agricultural limestone.
- .6 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

2.3 SOURCE QUALITY
CONTROL

- .1 Advise Departmental Representative of sources of topsoil to be utilized with sufficient lead time for testing.

PART 3 - EXECUTION

3.1 TEMPORARY
EROSION AND
SEDIMENTATION
CONTROL

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

3.2 STRIPPING OF
TOPSOIL

- .1 Begin topsoil stripping of areas after area has been cleared of brush weeds and grasses and removed from site.
 - .2 When stripping topsoil, avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.
 - .3 Protect stockpiles from contamination and compaction.
-

3.3 PREPARATION OF
EXISTING GRADE

- .1 Verify that grades are correct.
 - .1 If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, roots, branches, stones in excess of 25 mm diameter and other deleterious materials.
 - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
 - .2 Remove debris which protrudes more than 75 mm above surface.
 - .3 Dispose of removed material off site.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.
 - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.4 PLACING AND
SPREADING OF
TOPSOIL/PLANTING
SOIL

- .1 Place topsoil after Departmental Representative has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 150 mm.
- .3 For sodded areas keep topsoil 15 mm below finished grade.
- .4 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.5 FINISH GRADING

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage.
 - .1 Prepare loose friable bed by means of cultivation and subsequent raking.
- .2 Consolidate topsoil to required bulk density using equipment approved by a Departmental Representative.
 - .1 Leave surfaces smooth, uniform and firm against deep footprinting.

3.6 ACCEPTANCE

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

3.7 SURPLUS
MATERIAL

- .1 Dispose of surplus material off site.

3.8 CLEANING

- .1 Proceed in accordance with Section 01 74 20.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

PART 1 - GENERAL

- | | | |
|--|----|--|
| <u>1.1 RELATED
SECTIONS</u> | .1 | Section 32 91 19.13 - Topsoil Placement and Grading. |
| <u>1.2 SCHEDULING</u> | .1 | Schedule sod laying to coincide with preparation of soil surface. Sod to be applied immediately after topsoil surface is ready and accepted. |
| | .2 | Schedule sod installation when frost is not present in ground. |
| <u>1.3 MEASUREMENT
PROCEDURES</u> | .1 | Included in balance of project. |
| <u>1.4 WASTE
MANAGEMENT AND
DISPOSAL</u> | .1 | Separate and recycle waste materials in accordance with Section 01 74 20. |

PART 2 - PRODUCTS

- | | | |
|----------------------|----|---|
| <u>2.1 MATERIALS</u> | .1 | Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop. |
| | .1 | Turf Grass Nursery Sod types: <ul style="list-style-type: none">.1 Number One Kentucky Bluegrass Sod - Fescue Sod: Nursery Sod grown solely from seed mixture of cultivars of Kentucky Bluegrass and Chewing Fescue or Creeping Red Fescue, containing not less than 40% Kentucky Bluegrass cultivars and 30% Chewing Fescue or Creeping Red Fescue cultivars. |
| | .2 | Turf Grass Nursery Sod quality: <ul style="list-style-type: none">.1 Not more than 2 broadleaf weeds or 10 other weeds per 40 square metres..2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm..3 Mowing height limit: 35 to 65 mm..4 Soil portion of sod: 6 to 15 mm in thickness. |
| | .2 | Water: <ul style="list-style-type: none">.1 Supplied by contractor via off-site source. |
| | .3 | Fertilizer: |

.1 To Canada "Fertilizers Act" and "Fertilizers Regulations".

.2 Complete, synthetic, slow release with 65 % of nitrogen content in water-insoluble form.

2.2 SOURCE QUALITY CONTROL

.1 Obtain approval from Departmental Representative of sod at source.

.2 When proposed source of sod is approved, use no other source without written authorization from Departmental Representative.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Verify that grades are correct and prepared in accordance with Section 32 91 19.13. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Department Representative.

.2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.

.3 Fine grade surface free of humps and hollows to smooth, even grade, to tolerance of plus or minus 8 mm, for Turf Grass Nursery Sod, surface to drain naturally.

.4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site.

3.2 SOD PLACEMENT

.1 Lay sod within 24 hours of being lifted if air temperature exceeds 20 degrees C.

.2 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.

.3 Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.3 SOD PLACEMENT
ON SLOPES AND
PEGGING

- .1 Install and secure geotextile fabric in areas indicated, in accordance with manufacturer's instructions.
- .2 Start laying sod at bottom of slopes.
- .3 Peg sod on slopes steeper than 3 horizontal to 1 vertical, within 1 m of catch basins and within 1 m of drainage channels and ditches to following pattern:
 - .1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes.
 - .2 Not less than 3-6 pegs per square metre.
 - .3 Not less than 6-9 pegs per square metre in drainage structures. Adjust pattern as directed by. Departmental Representative.
- .4 Drive pegs to 20mm above soil surface of sod sections

3.4 MAINTENANCE
DURING
ESTABLISHMENT
PERIOD

- .1 Perform following operations from time of installation until acceptance.
- .2 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.
- .3 Cut grass to 50 mm when or prior to it reaching height of 75 mm. Remove clippings which will smother grassed areas as directed by Departmental Representative.
- .4 Maintain sodded areas weed free 95%.
- .5 Fertilize areas. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

3.5 ACCEPTANCE

- .1 Turf Grass Nursery Sod areas will be accepted by Departmental Representative provided that:
 - .1 Sodded areas are properly established.
 - .2 Sod is free of bare and dead spots.
 - .3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.
- .2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.6 MAINTENANCE
DURING WARRANTY
PERIOD

- .1 Perform following operations from time of acceptance until end of warranty period:
- .2 Repair and resod dead or bare spots to satisfaction of Departmental Representative.
- .3 Eliminate weeds by mechanical or chemical means to extent acceptable to Departmental Representative.

3.7 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers. Refer to Section 01 74 20.

PART 1 - GENERAL

1.1 RELATED
SECTIONS

- .1 Section 31 23 33.01: Excavating, Trenching and backfilling.
- .2 Section 33 44 01: Storm sewers.

1.2 SOURCE QUALITY
CONTROL

- .1 Departmental Representative will inspect material at construction site.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Cement: to CAN/CSA-A3001-13, Type GU.
- .2 Water, aggregates, admixtures: to CSA A23.1-14/A23.2-14, Concrete materials and methods of concrete construction/Test methods and standard practices for concrete.
- .3 Frames, gratings, covers: to plan dimensions and to following requirements for designated materials:
 - .1 Metal gratings and covers to bear evenly on frames. A frame with grating or cover to constitute one unit. Assemble and mark unit components before shipment.
 - .2 Maintenance hole frames and covers: cover cast with perforations and complete with two 25 mm square lifting holes to OPSD 401.010 Nov. 2013 Rev. 2, Type A B.
 - .3 Catch basin frames and covers: to OPSD 400.010 Nov. 2013 Rev. 2 .
- .4 Precast maintenance holes: to ASTM C478M-15.
- .5 Ladder rungs: to OPSD 405.010 Nov. 2013 Rev. 3.
- .6 Mortar:
 - .1 Aggregate: to CSA A179-14.
 - .2 Cement: to CAN/CSA-A3002-13.
- .7 Brick: to CAN/CSA-A82-14, Grade SW, Type FBS.
- .8 Adjustment rings: precast concrete to ASTM C478M-15.
- .9 Granular A: to OPSS.PROV 1010, April 2013.

PART 3 - EXECUTION

3.1 EXCAVATION AND
BACKFILL

- .1 Excavation and backfill to Section 31 23 33.01.
- .2 Excavation requires approval prior to installing maintenance holes or catch basins.

3.2 INSTALLATION

- .1 Construct units to details indicated, plumb and true to alignment and grade.
- .2 Pump maintenance hole excavation dry and remove soft and foreign material before placing concrete base.
- .3 Set precast concrete slab on 150 mm minimum of well compacted granular 'A' material.
- .4 Set bottom section of precast unit in place. Make each successive joint watertight with approved rubber ring gaskets, mastic joint filler, cement mortar, or combination thereof.
- .5 Clean surplus mortar and joint compounds from interior surface of unit as work progresses.
- .6 Plug lifting holes with precast concrete plugs set in cement mortar or compound.
- .7 Installing units in existing systems:
 - .1 Where new unit is within existing run of pipe, carefully remove existing pipe to dimensions required and install new unit as specified.
 - .2 Make joints watertight between new unit and existing pipe.
 - .3 Where deemed expedient to maintain service around existing pipes and when systems constructed under this project are ready to be put into operation, complete the installation with appropriate break-outs, removals, redirection of flows, blocking unused pipes or any other necessary work.
- .8 Set frame and cover to required elevation on at least 2 and not more than 4 pre-cast adjustment rings. Make joints and join frame with cement mortar, parge and make smooth and watertight.
- .9 Place frame and cover on top section to elevation indicated. If adjustment required use concrete ring.

- .10 Clean units of debris and foreign materials;
remove fins or sharp protuberances.

3.3 ADJUSTING TOPS
EXISTING UNITS

- .1 Remove existing gratings, and frames, and of
store for re-use at locations designated by
Departmental Representative.
- .2 Sectional units:
.1 Raise or lower straight walled sectional
units by adding or removing precast sections as
required.
.2 Raise or lower tapered units by removing
cone section, adding, removing, or substituting
riser sections to obtain required elevation, then
replace cone section.
- .3 Monolithic units:
.1 Raise monolithic units by roughening
existing top to ensure proper bond and extend to
required elevation with:
.1 Pre-cast concrete.
.2 Lower monolithic units with straight wall by
removing concrete to elevation indicated for
rebuilding.
.3 When monolithic units with tapered upper
section are to be lowered more than 150 mm remove
concrete for entire depth of taper plus as much
straight wall as necessary, then rebuild upper
section to required elevation with cast-in-place
concrete.
.4 Install additional maintenance hole ladder
rungs in adjusted portion of units as required.
.5 Re-use existing gratings, frames.
.6 Re-set gratings and frames to required
elevation on at least 2 and not more than 4
pre-cast adjustment rings. Make joints and join
to frame with cement mortar, parge and trowel
smooth.
.7 Re-set gratings and frames to required
elevation on full bed of cement mortar, parge and
trowel smooth.

PART 1 - GENERAL

1.1 MATERIAL
CERTIFICATION

- .1 Contractor shall verify material type and size prior to ordering/installing new storm sewer.
- .2 At least 2 weeks prior to commencing work, submit manufacturer's test data and certification that pipe materials meet requirements of this section.

1.2 SCHEDULING OF
WORK

- .1 Schedule work to minimize interruptions to existing services.
- .2 Maintain existing flow during construction and provide pumping as required.
- .3 Submit schedule of expected interruptions for review and adhere to approved schedule.

1.3 MANUFACTURER'S
INSTRUCTIONS

- .1 Make available 1 copy of manufacturer's installation instructions.

PART 2 - PRODUCTS

2.1 PLASTIC PIPE

- .1 Gravity sewer pipe and fittings: Type PSM Poly (Vinyl Chloride): to ASTM D3034-08.
 - .1 Standard Dimension Ratio (SDR): 35.
 - .2 Locked-in gasket and integral bell system.
 - .3 Nominal lengths: 4 m.

2.2 PIPE BEDDING
MATERIALS

- .1 Granular material: Granular A as per OPSS.PROV 1010.

2.3 INSULATION

- .1 HI-40 DOW rigid insulation, or approved equivalent, 50mm thick insulation boards installed as per manufacturer's specifications.

2.4 COUPLER

- .1 Use appropriate sized pipe coupler will to join existing to new storm sewer.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Clean pipes and fittings of debris and water before installation. Carefully inspect materials for defects before installing. Remove defective materials from site.

3.2 TRENCHING AND BACKFILLING

- .1 Do trenching and backfilling in accordance with Section 31 23 33.01.
- .2 Trench line and depth require approval prior to placing bedding material and pipe.
- .3 Water jetting of backfill under haunches of corrugated steel pipe may be permitted if recommended by manufacturer and approved by Departmental Representative.
- .4 If cover of 1.5 meters is not maintained, insulation must be used.

3.3 GRANULAR BEDDING

- .1 Place granular bedding materials to details indicated or directed.
- .2 Shape bed true to grade and to provide continuous, uniform bearing surface for barrel of pipe. Do not use blocks when bedding pipe.
- .3 Shape transverse depressions as required to receive bell if bell and spigot pipe is used.
- .4 Compact full width of bed to at least 100% Standard Proctor Density.
- .5 Use bedding stone in lieu of sand bedding material when directed.
- .6 Fill excavation below bottom of specified bedding adjacent to maintenance holes or catch basins with bedding material or common backfill as directed.

3.4 INSTALLATION

- .1 Lay and join pipe in accordance with manufacturer's recommendations.
 - .2 Handle pipe by approved methods. Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
-

- .3 Lay pipes on prepared bed, true to line and grade with pipe inverts smooth and free of sags or high points. Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
 - .4 Commence laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
 - .5 Do not exceed maximum joint deflection recommended by pipe manufacturer.
 - .6 Do not allow water to flow through pipes during construction except as may be permitted by Departmental Representative.
 - .7 Position and join pipes by approved methods. Do not use excavating equipment to force pipe sections together.
 - .8 Joints:
 - .1 Install gaskets in accordance with manufacturer's recommendations.
 - .2 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
 - .3 Align pipes carefully before joining.
 - .4 Maintain pipe joints free from mud, silt, gravel and other foreign material.
 - .5 Avoid displacing gasket or contaminating with dirt or other foreign material. Gaskets so disturbed shall be removed, cleaned and lubricated and replaced before joining is attempted.
 - .6 Complete each joint before laying next length of pipe.
 - .7 Minimize joint deflection after joint has been made to avoid joint damage.
 - .8 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
 - .9 When any stoppage of work occurs, block pipes as directed to prevent "creep" during down time.
 - .10 Plug lifting holes with approved prefabricated plugs set in non-shrink grout.
 - .11 Cut pipes as required for special inserts, fittings or closure pieces in a neat manner, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave a smooth end at right angles to axis of pipe.
-

- .12 Use prefabricated saddles or approved field connections for connecting pipes to existing sewer pipes. Joint to be structurally sound and watertight.
- .13 Plug open upstream ends of pipes with removable watertight concrete, steel or wooden bulkheads.

Appendix A

Geotechnical Investigation Report (WSP, 2016)

PWGSC Project No. R.078391.001

DRAFT GEOTECHNICAL INVESTIGATION REPORT

JOYCEVILLE INSTITUTION PERIMETER
ROAD

KINGSTON, ONTARIO

Prepared for:

Public Works and Government Services Canada (PWGSC)

Date: February 2016 (Rev. 1)

Report No.: 151-63310-00

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TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Context	1
1.2	Project Description	1
1.3	Objectives and Limitations	1
2	SITE INVESTIGATION	3
2.1	Scope of work	3
2.2	Investigation procedures	3
2.2.1	Desk Study	3
2.2.2	Field Investigation	3
2.2.3	Laboratory Testing	4
3	SUBSURFACE GEOTECHNICAL CONDITIONS	5
3.1	Soil Conditions	5
3.1.1	Pavement Structure	5
3.1.2	Fill	5
3.1.3	Silty Sand	5
3.1.4	Silty Clay	6
3.1.5	Auger Refusal/Bedrock	6
3.2	Groundwater Conditions	6
3.3	Summary	7

4	RECOMMENDATIONS	8
4.1	General	8
4.2	Pavement Analysis and Design	8
4.2.1	Rehabilitation options	8
4.2.2	Pavement Drainage	9
4.2.3	Construction Considerations	9
4.2.4	Recommendations	8
4.3	Site Services	10
4.3.1	Frost Protection	10
4.3.2	Bedding, Cover and Backfill	10
5	GEOTECHNICAL PROJECT TEAM	11

APPENDICES

Appendix A	Drawings and site photographs
Appendix B	Borehole Logs and Coring Photographs
Appendix C	Laboratory Testing Results
Appendix D	MOECC Well Records
Appendix E	Explanation of Terms used in Report
Appendix F	Limitations of This Report

1 INTRODUCTION

1.1 CONTEXT

WSP Canada Inc. (WSP) was retained by the Public Works and Government Services Canada (PWGSC) to conduct a geotechnical investigation as part the re-construction or rehabilitation of the Perimeter Road at Joyceville Institution in Kingston, Ontario.

The Terms of Reference (TOR) for this investigation are outlined in WSP's Proposal No. P-1510110 dated October 6, 2015 and subsequent project correspondence.

The purpose of the geotechnical investigation was to obtain subsurface information at the site by means of exploratory boreholes. This report presents the findings of the investigation and provides comments and recommendations related to the geotechnical aspects of the project.

1.2 PROJECT DESCRIPTION

The project site is located on the grounds of the Joyceville Institution, located in Kingston, ON as shown in Drawing Nos.1 and 2. It is understood that the perimeter road which surrounds the Joyceville Institution is to be resurfaced or reconstructed. The total length of the perimeter road is approximately 1.3 kilometers (km).

1.3 OBJECTIVES AND LIMITATIONS

The current report was prepared at the request and for the sole use of the Public Works and Government Services Canada according to the specific terms of the mandate given to WSP. The use of this report by a third party, as well as any decision based upon this report, is under this party's sole responsibility. WSP may not be held accountable for any possible damages resulting from third party decisions based on this report.

Furthermore, any opinions regarding conformity with laws and regulations expressed in this report are technical in nature; the report is not and shall not, in any case, be considered as a legal opinion.

Information in this report is only valid for the borehole locations as described.

Reference should be made to the Limitations of this Report, attached in Appendix F, which follows the text but forms an integral part of this document.

2 SITE INVESTIGATION

2.1 SCOPE OF WORK

The scope of work for this assignment included:

- A desk study and review of existing geotechnical information in the general area;
- Laying out the boreholes and obtaining utility locates at the project site;
- Drilling of eight exploratory boreholes along the existing perimeter road;
- In-situ soil sampling and testing, including Standard Penetration Testing (SPT);
- Obtaining soil samples for additional review and laboratory testing;
- Laboratory testing;
- Geotechnical analysis; and
- Preparation of this report which presents the results of the investigation and provides geotechnical recommendations related to the resurfacing or reconstruction of the existing perimeter road.

2.2 INVESTIGATION PROCEDURES

The geotechnical investigation was carried out in December 2015.

2.2.1 DESK STUDY

Surficial geology maps indicate that the area is underlain by fine-textured glaciolacustrine deposits consisting of silt and clay with minor deposits of sand and gravel. Bedrock geology maps indicate the rock in the general area includes sandstone of the Potsdam formation and Precambrian bedrock.

The Ministry of the Environment and Climate Change (MOECC) well record database indicates that a total of seven wells have been drilled on the grounds of the Joyceville Institution. The records, included in Appendix D, indicate the surface is underlain by a layer of silty clay underlain by the bedrock surface, at depths ranging from 1.4 metres (m) to 7.9 m below the existing ground surface. The bedrock in the general area consists of sandstone underlain by granite.

The well records indicate water levels which range from 2.4 m to 4.6 m below the existing surface elevation.

2.2.2 FIELD INVESTIGATION

The field investigation was carried out on December 16 and 17, 2015 and included the drilling of eight boreholes (BH15-1 to BH15-8) along the alignment of the existing perimeter road as shown on Drawing No. 2.

The boreholes were advanced using a truck-mounted drill rig supplied and operated by Canadian Environmental Drilling of Kingston Ontario. The boreholes were advanced using hollow-stem augers to depth of 2.1 m below the existing ground surface. Boreholes BH15-3 and BH15-4, after encountering auger refusal, were advanced to depths of 2.4 m and 2.8 m below the existing ground surface using "H" sized coring equipment. Soil samples retrieved during drilling were logged and visually classified in the field by a member of WSP's geotechnical staff. In-situ tests including Standard Penetration Testing (SPT) were carried out at regular intervals.

Water level observations were made during drilling and in the open boreholes at the completion of the drilling operations.

The borehole locations are shown in Appendix A. Borehole logs are included in Appendix B of this report.

2.2.3 LABORATORY TESTING

Upon completion of drilling and in-situ testing, soil samples were returned to WSP's laboratory for further examination, classification and testing. A laboratory testing program, carried out on selected representative soil samples, included the determination of natural water content, grain size distribution, Atterberg limits and Uniaxial Compressive Strength (USC).

The results of natural water content tests are included on the relevant borehole logs in Appendix B. The results grain size distribution, Atterberg limits (Plasticity) and Uniaxial Compressive Strength (USC) testing are summarized on the individual borehole logs and presented in Appendix C.

3

SUBSURFACE GEOTECHNICAL CONDITIONS

The subsurface soil profile at the site generally consists of an asphaltic pavement structure overlying silty clay or silty sand which extends the depth of drilling. Auger refusal was encountered at depths ranging from 0.9 m to 1.6 m below the existing ground surface. At two locations the borehole was extended past the depth of auger refusal by the use of “N” sized coring equipment. In borehole BH15-3 the refusal was shown to indicate the presence of cobble within the native material. In borehole BH15-4 sandstone bedrock was encountered at a depth of 1.2 m below the existing ground surface.

Specific descriptions of individual geological units are presented below.

3.1 SOIL CONDITIONS

3.1.1 PAVEMENT STRUCTURE

The existing pavement structure in the boreholes drilled on the perimeter road consisted of a layer of asphaltic concrete ranging between 50 millimeters (mm) and 130 mm in depth underlain by a granular road base, crushed sand and gravel with varying amounts of silt, that extended to depths ranging from 360 mm to 930 mm below the existing road surface.

Grain size curves for three selected sample of the granular road base are presented in Appendix C. A summary of these grain size distributions is also presented in the table below.

Table 1 – Results of Grain Size Analyses for Granular Road Base

Borehole No.	Sample No.	Grain Size Distribution		
		% Gravel	% Sand	% Fines
BH15-1	SS-1A	60	31	9
BH15-2	GS-1	33	51	16
BH15-6	GS-1	61	31	21

The water content within the granular road base ranged between 2 percent and 4 percent.

3.1.2 FILL

In boreholes BH15-1 and BH15-7, the pavement structure was underlain by a layer of fill consisting of silty clay. This fill was encountered to depths of 760 mm and 870 mm below the existing road surface in boreholes BH15-1 and BH15-7, respectively. This layer of fill was not encountered in any of the other boreholes drilled at the site.

3.1.3 SILTY SAND

In borehole BH15-3, underlying the pavement structure, is a layer of silty sand which extended the depth of augering, 1.6 m below the existing pavement surface. One standard penetration test carried

out within this layer gave an 'N' value of 15 blows per 305 mm of penetration indicating a compact consistency. This layer was not encountered in any of the other boreholes drilled at the site.

The water content of one sample within the silty sand was 7 percent.

3.1.4 SILTY CLAY

A deposit of native silty clay was encountered underlying the fill in boreholes BH15-1 and BH15-7, the sand in borehole BH15-3 and the pavement structure in boreholes BH15-2, BH15-4 to BH15-6 and BH15-8 and extended to the depth of drilling which ranged from 1.5 m to 2.4 m below the existing surface elevation. Standard penetration tests carried out within the silty clay gave 'N' values ranging from 3 blows to 24 blows per 305 mm of penetration indicating a soft to very stiff consistency.

The results of Atterberg limit testing carried out on two selected samples of the silty clay gave a plasticity index values of 23 percent and 27 percent and liquid limit values of 48 percent and 54 percent. This indicates a low to medium plasticity soil. The measured water contents of samples within the silty clay ranged from 21 percent to 39 percent.

3.1.5 AUGER REFUSAL/BEDROCK

Auger refusal was encountered in borehole BH15-3 at a depth of 1.6 m below the existing surface elevation and in boreholes BH15-4 and BH15-5 at a depth of 0.9 m below the existing surface elevation. Boreholes BH15-3 and BH15-4 were extended beyond the refusal depth using "H" sized diamond coring equipment. In borehole BH15-3, coring confirmed that the refusal indicated the presence of a layer of cobbles underlain by what is inferred to be silty clay based on the drilling resistance and return. Coring was terminated at 2.4 m below the existing surface elevation. In borehole BH15-4 auger refusal was encountered at 0.9 m below the existing surface and based on the drilling resistance this refusal can be inferred to also indicate the presence of sand and gravel with cobbles. At a depth of 1.2 m below the existing pavement surface sandstone bedrock was encountered.

The rock encountered in the borehole BH15-4 consisted of fresh sandstone with a Rock Quality Designation (RQD) of 100% indicating a rock quality of "excellent". One sample of intact rock (obtained through coring) was tested in uniaxial compression and the result is summarized in the table below.

Table 2 – Results of Intact Rock Strength

Borehole No.	Depth (m)	Unit Weight (kN/m ³)	UCS (MPa)
BH15-4	1.4	23.5	92

3.2 GROUNDWATER CONDITIONS

Water level observations were made during drilling and in the open boreholes at the completion of the drilling operations. In all eight boreholes no signs of seepage or water accumulation were noted during drilling.

A review of the well installation records of the MOECC indicated that the static water level, at the time of the respective investigations, ranged between 2.4 m and 4.6 m below the existing surface elevation.

3.3 SUMMARY

A summary of the soil conditions encountered along the existing perimeter road are presented in the table below.

Table 3 – Simplified Stratigraphy

Borehole	Simplified Stratigraphy (in metres)						Notes
	Asphalt	Road Base	Fill	Silty Sand	Silty Clay	Bedrock	
BH15-1	0 - 60 mm	60 mm - 360 mm	360 mm - 900 m		900 mm - 2.1 m	--	Augering ended at 2.1 m
BH15-2	0 - 100 mm	100 mm - 460 mm	--		460 mm - 1.5 m	--	Augering ended at 1.5 m
BH15-3	0 - 130 mm	130 mm - 600 mm	--	600 mm - 1.6 m (Cobble 1.6 m to 1.8 m)	1.8 m - 2.4 m	--	Auger refusal at 1.6 m. Switch to NQ coring
BH15-4	0 - 90 mm	90 mm - 900 mm	--	--	--	(Poss. Cobble 900 mm to 1200 mm) 1.2 m - 2.8 m	Auger refusal at 0.9 m. Switch to NQ coring
BH15-5	0 - 50 mm	50 mm - 910 mm	--	--	--	--	Auger refusal at 0.9 m
BH15-6	0 - 120 mm	120 mm - 800 mm	--	--	800 mm - 1.5 m	--	Augering ended at 1.5 m
BH15-7	0 - 50 mm	50 mm - 360 mm	360 mm - 750 mm	--	750 mm - 1.5 m	--	Augering ended at 1.5 m
BH15-8	0 - 70 mm	70 mm - 800 mm	--	--	800 mm - 1.5 m	--	Augering ended at 1.5 m

4 RECOMMENDATIONS

4.1 GENERAL

This section of the report provides engineering guidelines on the geotechnical design aspects of the project based on our interpretation of the available information described herein and project requirements. Contractors bidding on or undertaking the works should examine the factual results of the investigation, satisfy themselves as to the adequacy of the factual information for construction, and make their own interpretation of the factual data as it affects their proposed construction techniques, schedule, safety, and equipment capabilities.

4.2 PAVEMENT ANALYSIS AND DESIGN

4.2.1 REHABILITATION OPTIONS

A review of the existing pavement shows rutting in some areas, however, most of the existing pavement distresses appear to be non-structural in nature and appear to be related to drainage and/or grading issues. These pavement distresses include potholes, settlement/grade depressions and longitudinal/transverse cracking. There is also evidence that additional lifts of asphaltic concrete have been added to the existing pavement structure presumably in order to address previous issues. Several localized repairs have also been noted. Photographs of the pavement at the time of drilling are included in Appendix A. Based on the current condition of the road, a couple of rehabilitation options are available. Full depth reconstruction, which consists of the complete removal of the old pavement structure and replacement with a new pavement structure, is not considered warranted. In-place processing where the existing asphaltic cement is pulverized and blended with asphalt cement is also not recommended.

Two feasible options for this project are:

- Full Depth Reclamation; and,
- Milling and Resurfacing.

4.2.2 RECOMMENDATIONS

FULL DEPTH RECLAMATION

Full depth reclamation is when the existing asphaltic concrete pavement is pulverized and blended with the underlying granular road base. This blended material is then graded and compacted. Full depth reclamation for this project would consist of the following activities:

- Reclaim the full depth of the existing asphaltic concrete;
- Reclaim the existing granular base to a depth of 250 mm;
- Provide 150 mm Granular A road base for grading and drainage improvements;
- Provide asphaltic concrete as below based on the type of traffic loading.

The following table provides a typical pavement structures for light duty trucks and heavy duty vehicle access and is based on experience with similar projects (and conservatively allows for silty clay subgrade soil).

Table 4: Recommended Pavement Structure Thickness

Pavement Layer	Light Duty Traffic	Heavy Duty Roads (Delivery Trucks, Fire Routes, Access Roads, etc.)
Asphaltic Concrete	30 mm HL3 50 mm HL8 or MDB	50 mm HL3 70 mm HL8 or MDB
OPSS Granular A Base	150 mm	150 mm
Pulverized Pavement	250 mm	250 mm

Traffic data has not been provided at this stage, however a Traffic Category of Level B is assumed to be adequate for a low-volume road. The asphaltic cement should be PG 58-34.

All tie-ins should include frost tapers between the existing pavement structures and the new pavement. Longitudinal connections with the existing pavement structure should be milled back a distance of 300 mm and a depth matching the new surface course. A tack coat should be provided and the new surface course asphaltic concrete placed over the milled surface to form the new pavement joint.

This option will raise the grade, depending on which asphaltic concrete structure is chosen by 230 mm or 270 mm. During construction the new subgrade must be proof rolled in order to identify local soft spots and these areas will need to be addressed prior to paving. This option would also allow the cross slope of the roadway to be corrected (if required) to address any drainage issues.

MILLING AND AN ASPHALTIC CONCRETE OVERLAY

Milling the existing surface of the asphaltic concrete and placing the new an asphaltic concrete overlay involves:

- Milling the asphaltic concrete to a predetermined depth;
- Applying a tack coat and a new layer of asphaltic concrete.

This method will address some of the existing pavement distress issues and provide a smooth driving surface. It however will not allow for the re-sloping of the cross slope and address the existing drainage issues or rutting. It should also be noted that the existing road base does not generally meet the gradation requirements for a Granular A or Granular B material.

4.2.3 PAVEMENT DRAINAGE

The surface of the subgrade should be sloped to promote drainage of the granular base and sub-base, and to prevent ponding of water. Perforated pipe sub-drains should be provided along the sides of the roadway connected to catch basins or with an outlet in the adjacent ditch such that the pavement structure will be positively drained. The sub-drains should be installed in accordance with OPSS 405.

4.2.4 CONSTRUCTION CONSIDERATIONS

The granular base and sub-base materials should be uniformly compacted to 100 percent SPMDD using suitable vibratory compaction equipment. Compaction of the asphaltic concrete should be in

accordance with City of Kingston and OPSS specifications. The existing granular road base does not generally meet the gradation requirements for a Granular A or Granular B material.

The above pavement design is based on the assumption that the subgrade has been adequately prepared. If localized organics or soft soils are encountered it may be necessary to sub-excavate and replace with additional granular fill. All pavement subgrades should be reviewed by WSP during construction prior to placement of granular subbase.

The most severe loading conditions on paved areas and subgrades may occur during construction. Consequently, special provisions such as restricted access lanes, half-loads during paving, etc. may be required, especially if construction is carried out during unfavourable weather conditions.

4.3 SITE SERVICES

It is understood that during the construction that the connections to the existing catch basins may be replaced.

4.3.1 FROST PROTECTION

The depth of frost penetration for the site can be assumed to be 1.5 m. Water services should have a minimum cover of 1.7 m in accordance with Utilities Kingston standard drawings. Sewer services constructed in the same trench would typically be installed lower than the water service and would therefore also have a minimum of 1.7 m cover. If these depths cannot be accommodated then insulation may be considered in place of earth cover.

4.3.2 BEDDING, COVER AND BACKFILL

Bedding for site services should consist of OPSS Granular 'A' compacted to 95% SPMDD in layers not exceeding 150 mm loose thickness. Bedding for the various services should be the greater of 150 mm or 0.15 times the diameter of the pipe. In areas where soils are present any loose or disturbed subgrade soils should be removed and replaced with additional compacted granular fill prior to placement of the bedding layer.

Cover for the services should also consist of OPSS Granular 'A' compacted to 95% SPMDD. Cover should extend to a minimum of 300 mm above the pipe and 300 mm laterally between the pipe and the trench walls. Above the minimum cover, backfill should consist of suitable portions of the existing soils or approved imported fill material. To the extent possible, backfill in the frost zone should be made to match the existing soils exposed. Both the native and imported backfill materials should be approved by the contract administrator prior to reuse. All backfill should be free of frozen soils, cinders, ash, organic matter, cobbles and boulders over 150 mm diameter and other deleterious material.

Backfill should be placed in uniform layers not exceeding 200 mm in loose thickness and compacted to 95% SPMDD at a water content within +/- 2% of the soils optimum water content. Failure to properly moisture condition backfill soils will likely lead to difficulty achieving the required compaction.

5 GEOTECHNICAL PROJECT TEAM

WSP Canada Inc.

Project Manager	Daniel Wall, E.I.T
Geotechnical Investigation Manager	Chris Hendry P. Eng., M. Eng.
Site Investigation	Derek Robertson
Geotechnical laboratory testing	W.A.McLaughlin, Geo. Tech., C. Tech

Contractors

Canadian Environnemental Drilling

Report prepared by:

Reviewed by:


Daniel Wall, E.I.T
Geotechnical Engineer

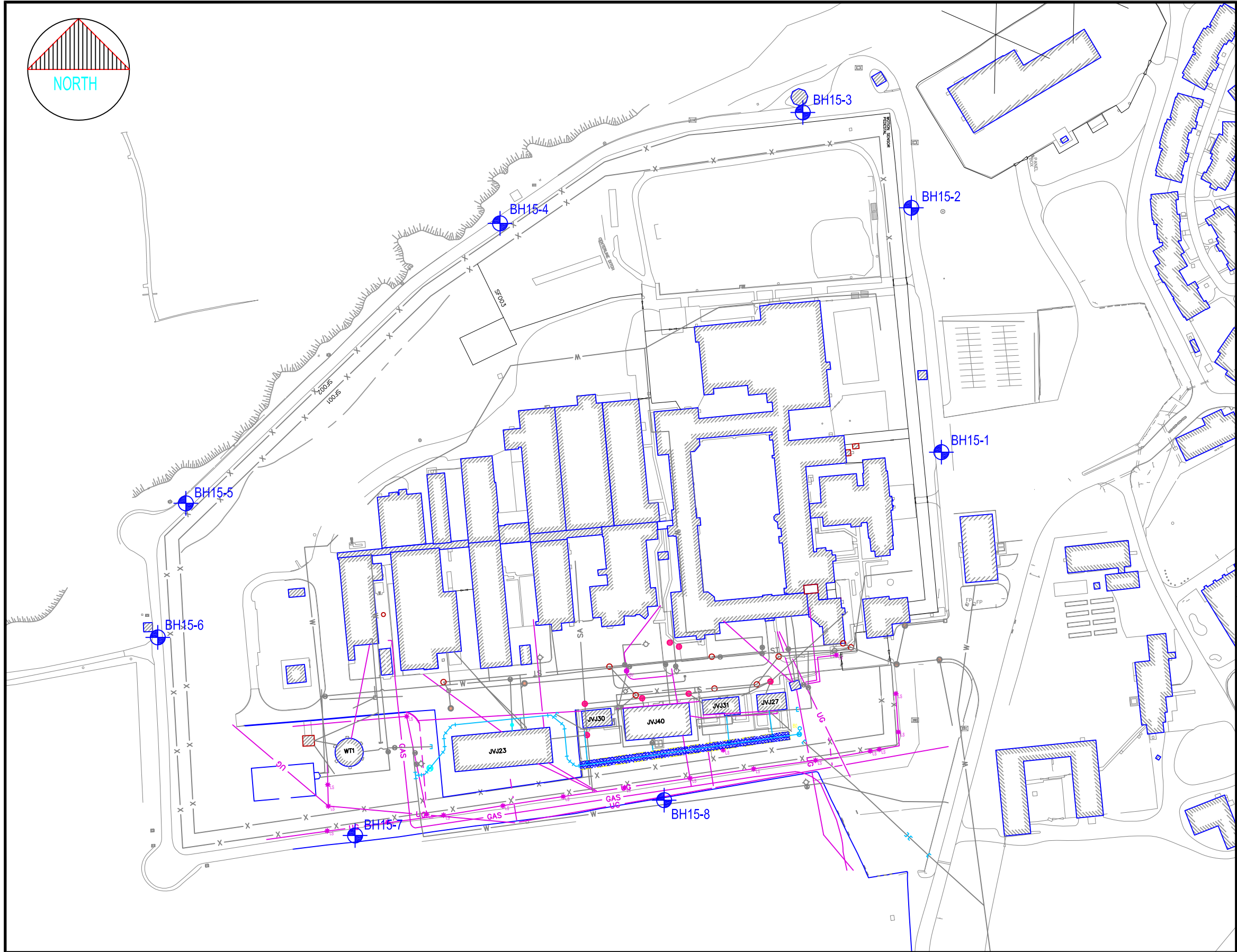
Bruce Goddard P. Eng.
Senior Geotechnical Engineer

Appendix A


**DRAWINGS
SITE PHOTOS**



Client: Public Works and Government Services Canada		Title: Site Location Plan	
Project#:	151-63310-00	DWG #:	1
Drawn:	DW	Approved:	CH
Date:	January 2016	Scale:	N. T. S.
Size:	Letter	Rev:	0
		Project: Geotechnical Investigation Joyville Perimeter Road 	



1224 GARDINERS ROAD, SUITE 201
KINGSTON, ONTARIO
CANADA K7P 0G2
PHONE: 613-634-7373 FAX: 613-634-3523
WWW.WSPGROUP.COM


CLIENT:  Public Works and
Government Services Canada
Travaux publics et
Services gouvernementaux Canada

CLIENT REF. #:
PROJECT:

JOYCEVILLE INSTITUTION PERIMETER ROAD

ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
1		01/11/2016	Borehole Location Plan

PROJECT NO: 151-63310-00	DATE: JANUARY 2016
ORIGINAL SCALE: 1:1000	IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTING SCALE.  25mm
DESIGNED BY: DW	
DRAWN BY: DW	
CHECKED BY: BG	

DISCIPLINE:
Geotechnical

TITLE: Geotechnical Investigation - Joyceville Perimeter Road

SHEET NUMBER: SHEET # 2 OF 2	REV # 0
ISSUE: 1	
DATE OF: January 11, 2016	



Borehole BH15-1



Borehole BH15-2



Borehole BH15-3



Borehole BH15-4



Borehole BH15-5



Borehole BH15-6



Borehole BH15-7



Borehole BH15-8

Appendix B

BOREHOLE LOGS



LOG OF BOREHOLE BH15-1

Project: Joyceville Perimeter Road
 Client: WSP
 Project Location: Joyceville Institution, Kingston, ON
 Datum: n/a
 BH Location: See Borehole Location Plan

DRILLING DATA
 Rig Type:
 Method: Hollow Stem Auger Drilling
 Borehole Diameter: 203 mm
 Core Diameter:

Project No.: 151-63310-00
 Date Started: 12/16/2015
 Supervisor:
 Reviewer:

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					POCKET PEN (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)				
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)											
								20	40	60	80	100							
												</							

WSP SOIL LOG - OTTAWA JOYCEVILLE PERIMETER ROAD GINT.GPJ SPL.GDT 1/13/16

GROUNDWATER ELEVATIONS

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ s=3% Strain at Failure

Sheet No. 1 of 1

Shallow/ Single Installation ▽ ▽ Deep/Dual Installation ▽ ▽



LOG OF BOREHOLE BH15-2

Project: Joyceville Perimeter Road

Client: WSP

Project Location: Joyceville Institution, Kingston, ON

Datum: n/a

BH Location: See Borehole Location Plan

DRILLING DATA

Rig Type:

Method: Hollow Stem Auger Drilling

Borehole Diameter: 203 mm

Core Diameter:

Project No.: 151-63310-00

Date Started: 12/16/2015

Supervisor:

Reviewer:

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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GROUNDWATER ELEVATIONS

Shallow/ Single Installation Deep/Dual Installation

GRAPH NOTES

+ 3, x 3: Numbers refer to Sensitivity

○ s=3% Strain at Failure



LOG OF BOREHOLE BH15-3

Project: Joyceville Perimeter Road
 Client: WSP
 Project Location: Joyceville Institution, Kingston, ON
 Datum: n/a
 BH Location: See Borehole Location Plan

DRILLING DATA
 Rig Type:
 Method: Hollow Stem Auger Drilling
 Borehole Diameter: 203 mm
 Core Diameter: 76 mm

Project No.: 151-63310-00
 Date Started: 12/16/2015
 Supervisor:
 Reviewer:

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	POCKET PEN (C _u) (kPa)	NATURAL UNIT WT (kN/m ³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL			
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)											WATER CONTENT (%)		
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE													
0.0	ASPHALT - 130 mm							20	40	60	80	100									
0.1	CRUSHED SAND AND GRAVEL some silt, brown, moist, very dense (ROAD BASE)		1	SS	53																
0.6	SILTY SAND red brown, moist, compact																				
			2	SS	15																
			3	SS	50/ 25 mm																
1.6	COBBLE																				
1.8	SILTY CLAY (Inferred)		1	CORE																	
2.4	End of Borehole Notes: 1) Auger refusal at 1.6 m below existing road surface, swith to NQ coring 2) Upon completion of augering borehole is dry 3) Coring terminated at 2.4 m below existing road surface																				

GROUNDWATER ELEVATIONS

Shallow/ Single Installation Deep/Dual Installation

GRAPH
NOTES

+ 3, × 3: Numbers refer
to Sensitivity

○ s=3% Strain at Failure

Sheet No. 1 of 1

WSP SOIL LOG - OTTAWA JOYCEVILLE PERIMETER ROAD GINT.GPJ SPL.GDT 1/13/16



LOG OF BOREHOLE BH15-4

Project: Joyceville Perimeter Road
 Client: WSP
 Project Location: Joyceville Institution, Kingston, ON
 Datum: n/a
 BH Location: See Borehole Location Plan

DRILLING DATA
 Rig Type:
 Method: Hollow Stem Auger Drilling
 Borehole Diameter: 203 mm
 Core Diameter: 76 mm

Project No.: 151-63310-00
 Date Started: 12/16/2015
 Supervisor:
 Reviewer:

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	POCKET PEN (C _u) (kPa)	NATURAL UNIT WT (kN/m ³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m													
SHEAR STRENGTH (kPa)																		
○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE																		
0.0	ASPHALT - 90 mm							20	40	60	80	100	25	50	75			GR SA SI CL
0.1	CRUSHED SAND AND GRAVEL some silt, light brown, moist (ROAD BASE)		1	GRAB														
			2	GRAB														
			3	GRAB														
1.0	SAND AND GRAVEL with COBBLES (Inferred)																	
1.2	SANDSTONE thinly to very thinly bedded, red grey, fresh TCR - 100% SCR - 100% RQD - 100%		1	CORE														
2.8	End of Borehole Notes: 1) Auger refusal at 0.9 m below the existing road surface. Switch to NQ coring. 2) Upon completion of augering borehole is dry. 3) NQ coring terminated at 2.8 m below the existing road surface.																	

WSP SOIL LOG - OTTAWA JOYCEVILLE PERIMETER ROAD.GPJ SPL.GDT 1/13/16

GROUNDWATER ELEVATIONS

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ ε=3% Strain at Failure

Sheet No. 1 of 1

Shallow/ Single Installation Deep/Dual Installation



LOG OF BOREHOLE BH15-5

Project: Joyceville Perimeter Road

Client: WSP

Project Location: Joyceville Institution, Kingston, ON

Datum: n/a

BH Location: See Borehole Location Plan

DRILLING DATA

Rig Type:

Method: Hollow Stem Auger Drilling

Borehole Diameter: 203 mm

Core Diameter:

Project No.: 151-63310-00

Date Started: 12/16/2015

Supervisor:

Reviewer:

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					POCKET PEN (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)							
								20	40	60	80	100			
								FIELD VANE & Sensitivity							
								LAB VANE							
								25	50	75	100	125			

GROUNDWATER ELEVATIONS

GRAPH
NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ s=3% Strain at Failure

Sheet No. 1 of 1

Shallow/ Single Installation ▽ ▽ Deep/Dual Installation ▽ ▽



LOG OF BOREHOLE BH15-6

Project: Joyceville Perimeter Road

Client: WSP

Project Location: Joyceville Institution, Kingston, ON

Datum: n/a

BH Location: See Borehole Location Plan

DRILLING DATA

Rig Type:

Method: Hollow Stem Auger Drilling

Borehole Diameter: 203 mm

Core Diameter:

Project No.: 151-63310-00

Date Started: 12/16/2015

Supervisor:

Reviewer:

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT		POCKET PEN (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)		
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)					WATER CONTENT (%)	
								20 40 60 80 100	PLASTIC LIMIT w _p				NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L
						○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE								
0.0	ASPHALT - 120 mm													
0.1	CRUSHED SILTY SAND AND GRAVEL light brown, moist (ROAD BASE)		1	GRAB								61 31 (21)		
			2	GRAB										
			3	GRAB										
0.8	SILTY CLAY trace sand, brown grey, moist													
			4	GRAB										
1.5	End of Borehole Notes: 1) Upon completion of augering borehole is dry													

GROUNDWATER ELEVATIONS

Shallow/ Single Installation Deep/Dual Installation

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ s=3% Strain at Failure

Sheet No. 1 of 1

WSP SOIL LOG - OTTAWA JOYCEVILLE PERIMETER ROAD GINT.GPJ SPL.GDT 1/13/16



LOG OF BOREHOLE BH15-7

Project: Joyceville Perimeter Road
 Client: WSP
 Project Location: Joyceville Institution, Kingston, ON
 Datum: n/a
 BH Location: See Borehole Location Plan

DRILLING DATA
 Rig Type:
 Method: Hollow Stem Auger Drilling
 Borehole Diameter: 203 mm
 Core Diameter:

Project No.: 151-63310-00
 Date Started: 12/17/2015
 Supervisor:
 Reviewer:

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT		POCKET PEN (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)				
0.0	ASPHALT - 50 mm											
0.1	CRUSHED SAND AND GRAVEL some silt, light brown, moist (ROAD BASE)		1	SS	15							
0.4	SILTY CLAY trace sand, trace gravel, brown grey, moist (FILL)											
0.8	SILTY CLAY trace sand, brown grey, moist, stiff		2	SS	9							
1.5	End of Borehole Notes: 1) Upon completion of augering borehole is dry		3	SS	50/ 25 mm							

WSP SOIL LOG - OTTAWA JOYCEVILLE PERIMETER ROAD GINT.GPJ SPL.GDT 1/13/16

GROUNDWATER ELEVATIONS

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ s=3% Strain at Failure

Sheet No. 1 of 1

Shallow/ Single Installation Deep/Dual Installation



LOG OF BOREHOLE BH15-8

Project: Joyceville Perimeter Road
 Client: WSP
 Project Location: Joyceville Institution, Kingston, ON
 Datum: n/a
 BH Location: See Borehole Location Plan

DRILLING DATA
 Rig Type:
 Method: Hollow Stem Auger Drilling
 Borehole Diameter: 203 mm
 Core Diameter:

Project No.: 151-63310-00
 Date Started: 12/17/2015
 Supervisor:
 Reviewer:

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					POCKET PEN (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)							
								20	40	60	80	100			
							○ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE & Sensitivity × LAB VANE							GR SA SI CL
0.0	ASPHALT - 70 mm														
0.1	CRUSHED SAND AND GRAVEL some silt, brown, moist (ROAD BASE) - larger gravel		1	GRAB											
			2	GRAB											
			3	GRAB											
0.8	SILTY CLAY brown grey, moist		4	GRAB											
1.5	End of Borehole Notes: 1) Upon completion of augering borehole is dry														

WSP SOIL LOG - OTTAWA JOYCEVILLE PERIMETER ROAD GINT.GPJ SPL.GDT 1/13/16

GROUNDWATER ELEVATIONS

Shallow/ Single Installation Deep/Dual Installation

GRAPH
NOTES

+ 3, × 3: Numbers refer
to Sensitivity

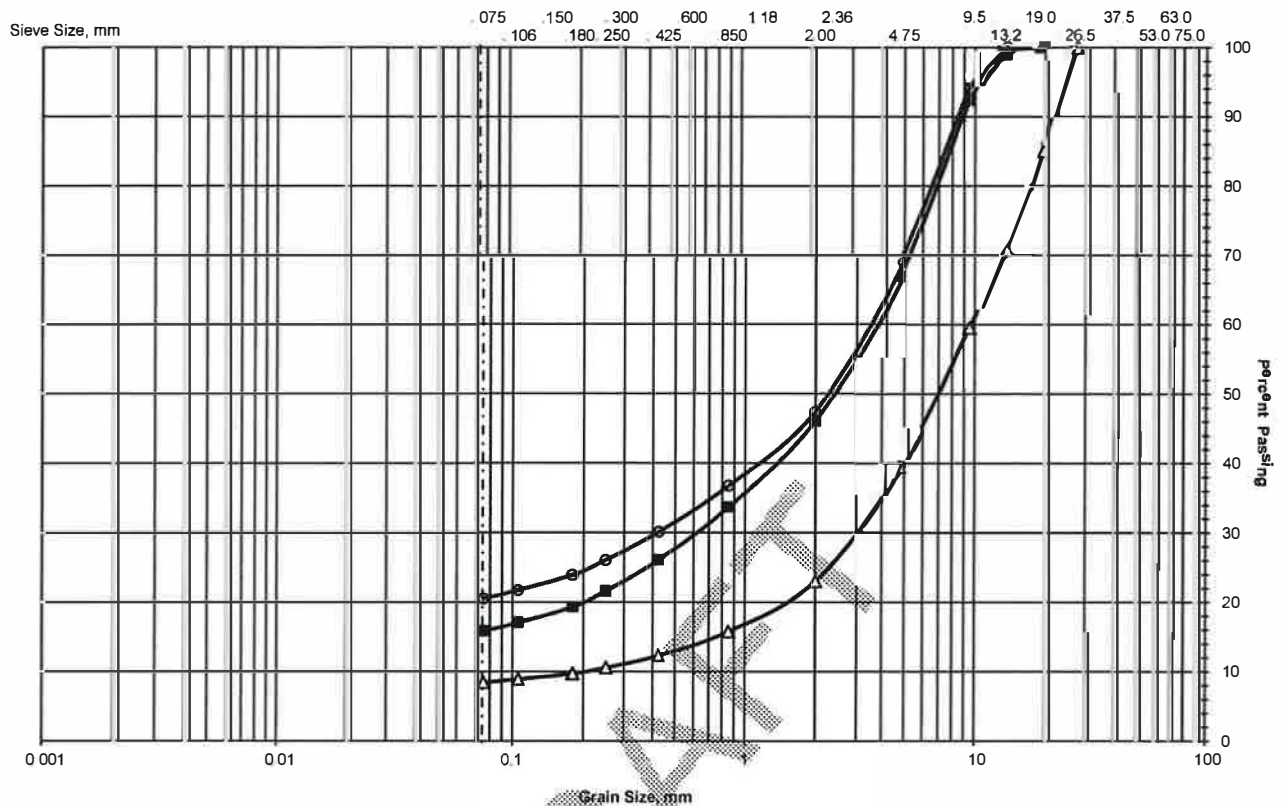
○ s=3% Strain at Failure

Sheet No. 1 of 1

Appendix C

LABORATORY TESTING RESULTS

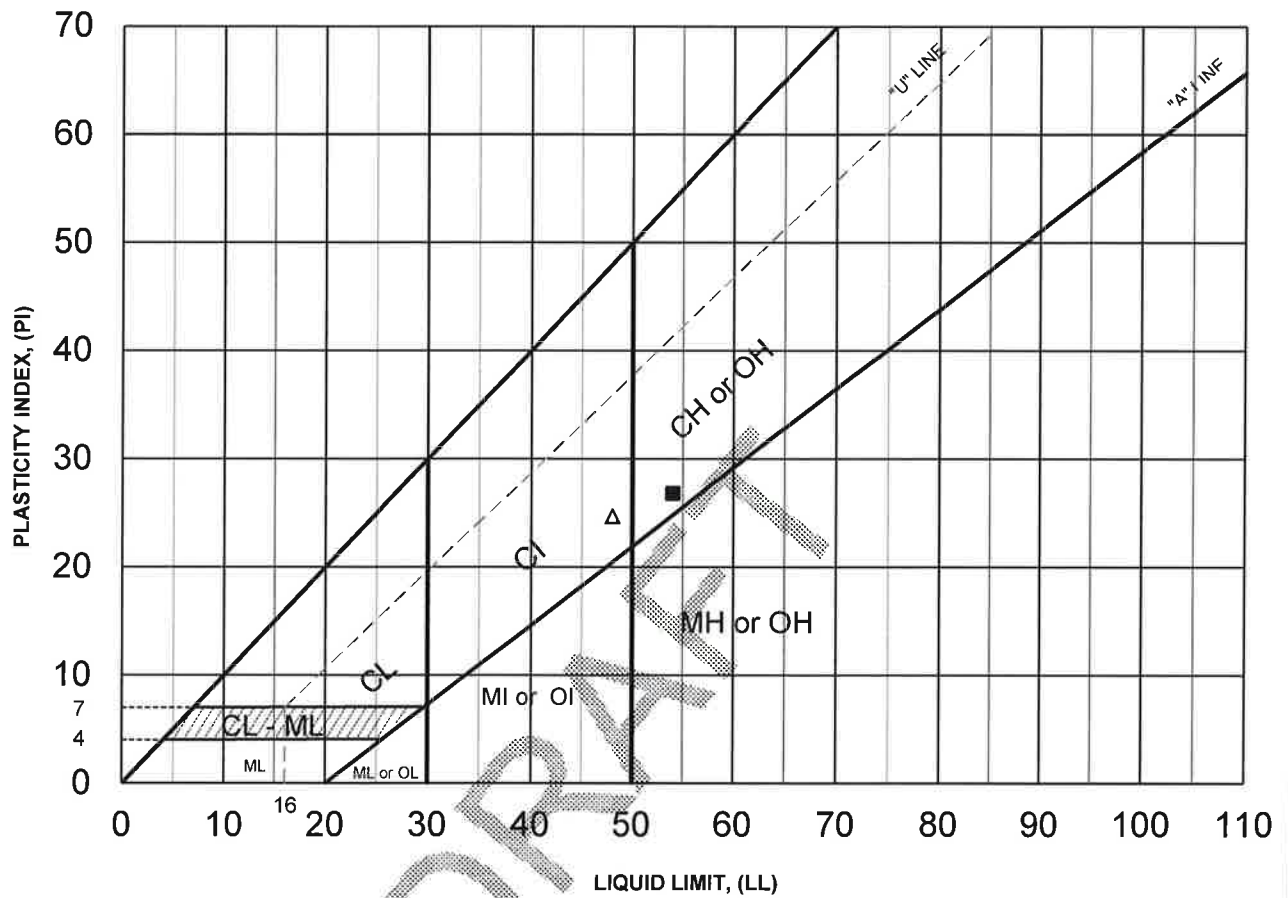
GRAIN SIZE DISTRIBUTION



CLAY and SILT	FINE	MEDIUM	COARSE	FINE	COARSE
	SAND			GRAVEL	
UNIFIED SOIL CLASSIFICATION SYSTEM					

BH/AH	Sample	Depth (m)	Legend
15-1	SS-1A	0.00 - 0.61	△
15-2	GS-1	0.10 - 0.25	■
15-6	GS-1	0.15 - 0.35	○

PLASTICITY CHART



Auger Hole	Sample	Depth (m)	Legend
15-6	GS-4	1.20 - 1.50	△
15-7	SS-2	0.76 - 1.37	■

Appendix D

MOECC Well Records

UTM 4 9 R 8 3 5 5 E N

Elev. 9 R 8 3 5 5

Basin 3 A 1 5



The Water-well Drillers Act, 1954
Department of Mines

RECEIVED
DEC 6 1956
GEOLOGICAL BRANCH
DEPARTMENT OF MINES
32 No 8075

Water-Well Record

County or Territorial District Frontenac Township, Village, Town or City Pittsburg
Con. 5 Lot 15 Street and Number (if in Village, Town or City)
Owner DEPARTMENT of Justice Address Goyseville Ont
Date completed 3 (day) 11 (month) 56 (year)

Pipe and Casing Record

Pumping Test

Casing diameter(s) 6 in
Length(s) 32 ft
Type of screen
Length of screen
Static level 15 ft
Pumping rate 85 gal per min
Pumping level 140 ft
Duration of test 48 hr

Well Log

Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth (s) at which water (s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
<u>red sandy clay</u> <u>hard sand stone</u>	<u>0 ft</u>	<u>20 ft</u> <u>200 ft</u>	<u>50 ft</u>	<u>185'</u>	<u>fresh</u>
(Title WEBC- TOLD- To- BILL- A 200 Well. This well No Pumping Tests on the 200' reached) Inspector- W.G.C.					

For what purpose(s) is the water to be used?

New Penitentiary

Is water clear or cloudy? clear

Is well on upland, in valley, or on hillside? upland

Drilling firm C. Havelburg

Address Verona Ont

Name of Driller George Babcock

Address Washington Ont

Licence Number 391

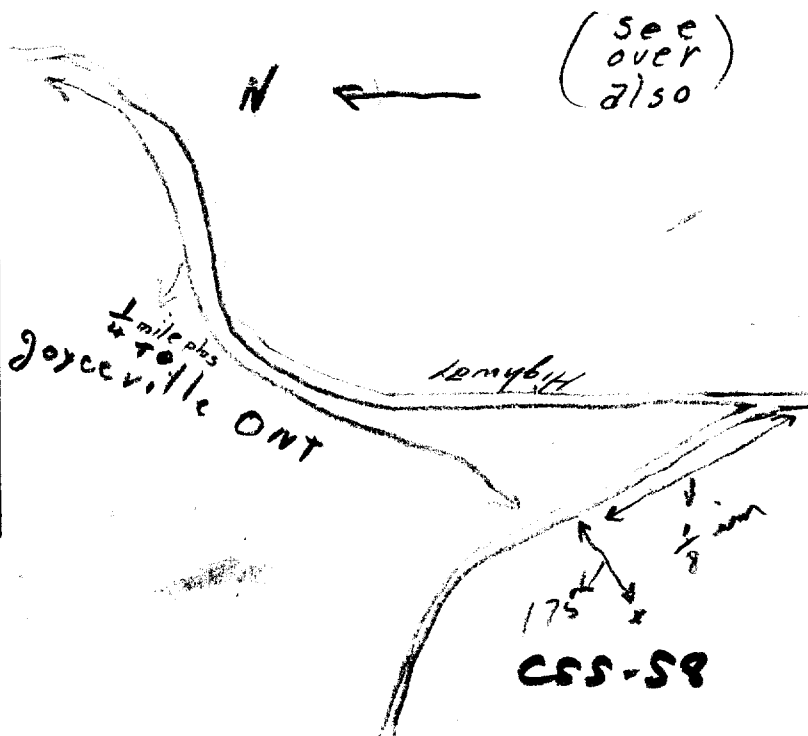
I certify that the foregoing statements of fact are true.

Date Dec 3/56 George Babcock

Signature of Licensee

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



Basin 24 7



GROUND WATER BRANCH

22nd No.

OCT 29 1957

SECRET

The Water-well Drillers Act, 1954

Department of Mines

Water-Well Record

County or Territorial District...*Montenac*.....Township, Village, Town or City...*Pittsburgh*.....

Con. 2 Lot 15 Street and Number (if in Village, Town or City) 8

Owner Dept of Justice Address Gayville

Date completed 1/18 JULY 57
(day) (month) (year)

Pipe and Casing Record

Pumping Test

Casing diameter (s) 8 Static level 12

Length (s) 10 Pumping rate 12.75 gal per min

Type of screen NONE Pumping level bellman

Length of screen Duration of test 4 ms.

Well Log

Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth (s) at which water (s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
hard clay	0	4 1/2	24		
hard white sandstone	4 1/2	11	47	38	fresh
" yellow " "	11	13			
" grey " "	13	24			
white & grey	24	39			
soft black granite					
hard hard frozen sandstone	39	48			
hard red & black granite	52	96			
black & grey granite	96	100			
hard white sandstone	48	52			

For what purpose(s) is the water to be used?

penitentiary

Is water clear or cloudy?.....Cloudy.....

Is well on upland, in valley, or on hillside?.....

upland

Drilling firm W. H. Navy & Son.....

Address *Verona!*

Name of Driller H. Navy 4

Address *Verona*

.....

Licence Number.....369.....

**I certify that the foregoing
statements of fact are true.**

Date..... Bill Nava Jr.

Signature of Licensee

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.

No 11 49 /

#1


Diagram on wood

22 No 3077
GROUND WATER BOARD
OCT 29 1957

Elev. 2^R 0355

The Water-well Drillers Act, 1954

Department of Mines

Basin 24 

Water-Well Record

County or Territorial District. Thomson.....Township, Village, Town or City. Thomson.....

Con. 5 Lot 15 Street and Number (if in Village, Town or City) 15

Owner Dept of Justice Address Yonkers

Date completed 11/2 AUG 57
(day) (month) (year)

Pipe and Casing Record

Pumping Test

Casing diameter (s) Static level

Length (s) *pulled* Pumping rate *DRY*

Type of screen Pumping level no

Length of screen Duration of test

Well Log

Water Record

[illegible]

For what purpose(s) is the water to be used?

penitentes

Is water clear or cloudy?.....

Is well on upland, in valley, or on hillside?.....

island

Drilling firm M. H. Newby & Son

Address *Verona*

.....

Name of Driller M. Navas

Address *Verona*

.....

Licence Number.....369.....

**I certify that the foregoing
statements of fact are true.**

Date..... 11 Nov 68

Signature of Licensee

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.

For location see Well #1
same owner same plot
July 10, 197

Wc #2

45-58

UTM 3 2 9 R 0 3 5 5
Elev. 9 R 0 3 5 5
Basin 2 4



The Water-well Drillers Act, 1954
Department of Mines

22 No 3078
GROUND WATER BRANCH
OCT 29 1957

Water-Well Record

County or Territorial District Montreal Township, Village, Town or City Pittsburgh
Con. V Lot 15 Street and Number (if in Village, Town or City)
Owner Dept of Justice Address Quebec
Date completed 19 Aug 57
(day) (month) (year)

Pipe and Casing Record

Pumping Test

Casing diameter(s) 8" Static level 9'
Length(s) 31' Pumping rate 8 gals per min
Type of screen NONE Pumping level Bottom
Length of screen Duration of test 2 hr

Well Log

Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth (s) at which water (s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
<u>hard grey and blue clay</u>	<u>0</u>	<u>26</u>			
<u>soft red sandstone</u>	<u>26</u>	<u>30</u>			
<u>grey sandstone</u>	<u>30</u>	<u>36</u>	<u>36</u>	<u>36</u>	<u>fresh</u>
<u>broken granite</u>					
<u>some yellow sandstone</u>	<u>36</u>	<u>41</u>			
<u>hard red granite</u>	<u>41</u>	<u>45</u>			

For what purpose(s) is the water to be used?
penitentiary
Is water clear or cloudy? clear
Is well on upland, in valley, or on hillside?
upland
Drilling firm J. H. Davy & Son
Address Quebec
Name of Driller J. Davy J
Address Quebec
Licence Number 369

I certify that the foregoing statements of fact are true.

Date Bill Davy J
Signature of Licensee

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.

For location see Well Log record same source and place July 12, 1957.

Well # 3

Form 5

Basin 24



Department of Mines

GROUND WATER 8080
22 N.
OCT 29 1957

(day) (month) (year)

Length of screen Duration of test 48 HRS

Appendix E

Explanation of Terms used in Report

Explanation of Terms Used in the Record of Boreholes

Sample Type

AS	Auger sample
BS	Block sample
CS	Chunk sample
DO	Drive open
DS	Dimension type sample
FS	Foil sample
RC	Rock core
SC	Soil core
SS	Spoon sample
SH	Shelby tube Sample
ST	Slotted tube
TO	Thin-walled, open
TP	Thin-walled, piston
WS	Wash sample

Penetration Resistance

Standard Penetration Resistance (SPT), N:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in) required to drive a 50 mm (2 in) drive open sampler for a distance of 300 mm (12 in).

WH – Samples sinks under “weight of hammer”

Dynamic Cone Penetration Resistance, N_d :

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in) to drive uncased a 50 mm (2 in) diameter, 60° cone attached to “A” size drill rods for a distance of 300 mm (12 in).

Textural Classification of Soils

Classification	Particle Size
Boulders	> 200 mm
Cobbles	75 mm - 200 mm
Gravel	4.75 mm - 75 mm
Sand	0.075 mm – 4.75 mm
Silt	0.002 mm-0.075 mm
Clay	<0.002 mm

Coarse Grain Soil Description (50% greater than 0.075 mm)

Terminology	Proportion
Trace	0-10%
Some	10-20%
Adjective (e.g. silty or sandy)	20-35%
And (e.g. sand and gravel)	> 35%

Soil Description

a) Cohesive Soils(*)

Consistency	Undrained Shear Strength (kPa)	SPT “N” Value
Very soft	<12	0-2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very stiff	100-200	15-30
Hard	>200	>30

(*) Hierarchy of Shear Strength prediction

1. Lab triaxial test
2. Field vane shear test
3. Lab. vane shear test
4. SPT “N” value
5. Pocket penetrometer

b) Cohesionless Soils

Density Index (Relative Density)	SPT “N” Value
Very loose	<4
Loose	4-10
Compact	10-30
Dense	30-50
Very dense	>50

Soil Tests

w	Water content
w _p	Plastic limit
w _l	Liquid limit
C	Consolidation (oedometer) test
CID	Consolidated isotropically drained triaxial test
CIU	consolidated isotropically undrained triaxial test with porewater pressure measurement
D _R	Relative density (specific gravity, G _s)
DS	Direct shear test
ENV	Environmental/ chemical analysis
M	Sieve analysis for particle size
MH	Combined sieve and hydrometer (H) analysis
MPC	Modified proctor compaction test
SPC	Standard proctor compaction test
OC	Organic content test
U	Unconsolidated Undrained Triaxial Test
V	Field vane (LV-laboratory vane test)
γ	Unit weight

Appendix F

Limitations of This Report

LIMITATIONS OF REPORT

This report is intended solely for the Client named. The material in it reflects our best judgment in light of the information available to SPL Consultants Limited at the time of preparation. Unless otherwise agreed in writing by SPL Consultants Limited, it shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. No portion of this report may be used as a separate entity, it is written to be read in its entirety.

The conclusions and recommendations given in this report are based on information determined at the test hole locations. The information contained herein in no way reflects on the environment aspects of the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the test holes may differ from those encountered at the test hole locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation. The benchmark and elevations used in this report are primarily to establish relative elevation differences between the test hole locations and should not be used for other purposes, such as grading, excavating, planning, development, etc.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report.

The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of test holes may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the subsurface conditions may affect their work. This work has been undertaken in accordance with normally accepted geotechnical engineering practices.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SPL Consultants Limited accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time.

Appendix B

Environmental Effects Evaluation for Re-paving of Perimeter Road, Joyceville Institution (Arcadis, 2016)

PWGSC Project No. R.078391.001

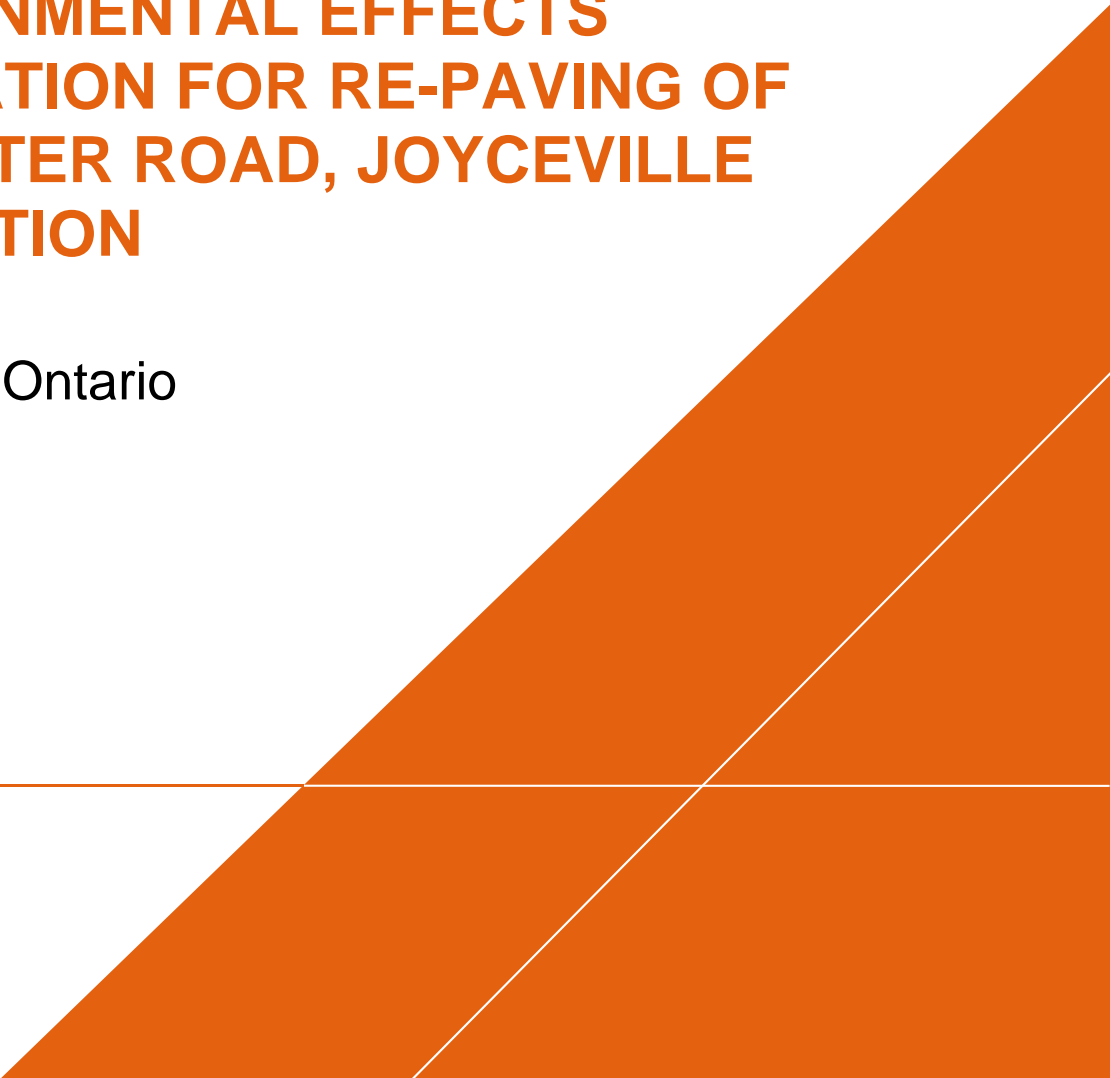
Public Works and Government Services Canada and
Correctional Services Canada

FINAL

ENVIRONMENTAL EFFECTS EVALUATION FOR RE-PAVING OF PERIMETER ROAD, JOYCEVILLE INSTITUTION

Joyceville, Ontario

March, 2016

A large, solid orange geometric shape, resembling a stylized triangle or a section of a larger triangle, is positioned in the bottom right corner of the page. It is composed of two overlapping triangles, creating a complex, angular form that extends from the bottom edge towards the top right corner.

**ENVIRONMENTAL
EFFECTS
EVALUATION,
JOYCEVILLE
INSTITUTION**



Barbara Hard, Ph.D., P.Biol, QPRA
Senior Biologist



Fred Bernard, M.A.
Project Manager

Joyceville, Ontario

FINAL

Prepared for:

Ms. Selina Chowdhury

Senior Environmental Specialist

Environmental Services and Contaminated
Sites

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4900 Yonge Street

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Tel 905 721 0555

Our Ref.:

351173-005

Date:

March 2016

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CONTENTS

EXECUTIVE SUMMARY.....	ES-1
1.0 INTRODUCTION	1-1
1.1 Scope of Work.....	1-4
1.2 Regulatory Framework.....	1-4
1.3 Site Visit	1-5
2.0 PROJECT DESCRIPTION.....	2-1
3.0 NATURAL ENVIRONMENT DESCRIPTION	3-1
3.1 Topography	3-1
3.2 Terrestrial Environment.....	3-1
3.3 Aquatic Environment	3-2
3.4 Wetlands	3-4
3.5 Areas of Natural and Scientific Interest and Provincially Significant Wetlands	3-4
3.6 Wildlife.....	3-4
3.7 Species at Risk.....	3-4
3.8 Migratory Birds	3-6
3.9 Socio-economic and Cultural Environment	3-6
3.10 Structures or Entities of Historical, Archaeological, Paleontological or Architectural Significance	3-7
3.11 Disturbances	3-7
4.0 POTENTIAL EFFECTS OR INDIRECT ENVIRONMENTAL EFFECTS	4-1
5.0 MITIGATION MEASURES.....	5-1
6.0 ENVIRONMENTAL EFFECTS CHECKLIST	6-1
7.0 REFERENCES	7-1

TABLES

Table 2.1	Project Component Identification	2-2
Table 3.1	Species at Risk	3-5
Table 4.1	Project-Environment Interaction and Potential Effects Matrix	4-4
Table 5.1	Effects of Project on Natural Environment Components and Recommended Mitigation	5-1
Table 6.1	Environmental Effects Checklist	6-1
Table 6.2	Mitigation Table Summary	6-2

FIGURES

Figure 1.1	Site Location	1-2
Figure 1.2	Site Plan.....	1-3
Figure 3.1	Ecological Land Classification	3-3
Figure 3.2	Areas of Disturbance	3-8

IMAGES

Image 1	River Styx, Looking North from Perimeter Road	3-1
Image 2	Cultural Meadow Adjacent to Perimeter Road	3-1
Image 3	Deciduous Forest Adjacent to Perimeter Road	3-2
Image 4	River Styx, View from Perimeter Road	3-2
Image 5	Wetland Area South of Perimeter Road	3-4

APPENDIX

Appendix A Photo Documentation

Appendix B Species at Risk Photos for Contractors

EXECUTIVE SUMMARY

Arcadis Canada Inc. was retained by Public Works and Government Services Canada (PWGSC) on behalf of Correctional Services Canada (CSC) to complete an Environmental Effects Evaluation (EEE) for the re-paving of the perimeter road that fully encircles the Joyceville Institution. As part of a separate contract with PWGSC, WSP Canada Inc. (WSP) was retained to undertake the conceptual and detailed design for the resurfacing of the perimeter road. Fieldwork completed by WSP in December 2015 identified various types of asphalt distress and failure including cracking, rutting, ponding, and potholes.

Joyceville Institution is a medium and minimum security correctional facility located in the City of Kingston (in the former Township of Pittsburgh), in the County of Frontenac, south central Ontario. The medium security section has a capacity to house 452 inmates while the minimum section has a capacity of 250. The facility is situated north of the 401 and immediately north of Highway 15, just west of the Hamlet of Joyceville. It is located mid-way between the City of Kingston urban centre and the Town of Gananoque.

The Joyceville Institution perimeter road is approximately 1.2 km long and roughly 5.0 m wide (approximately 6,000 square metres). WSP's preferred rehabilitation approach is full depth reclamation and repaving with a heavy duty asphalt structure for the entire perimeter road. Existing catch basins along the perimeter road will be cleaned to improve drainage. Construction activities for the road re-paving are expected to begin in late May/June 2016, and it is estimated that it will be completed in approximately two months from the start date.

The goal of the EEE is to identify and mitigate possible adverse environmental impacts of the perimeter road re-paving project as early as possible in the project design stage, so as to ensure that irrevocable decisions are not made without due consideration to environmental consequences. Additionally, this EEE has been undertaken within the context of the *Canadian Environmental Assessment Act (CEAA) 2012* legislation (CEAA, 2012a). Since the CSC project will be taking place on federally owned land, CSC must meet their Section 67 requirements to ensure that the project does not result in significant environmental effects.

This EEE has determined that there are no adverse or significant environmental effects resulting from the re-paving of the perimeter road project. A few minor environmental effects have been identified, which can be controlled by utilizing mitigation measures and following best construction practices.

1.0 INTRODUCTION

Arcadis Canada Inc. (Arcadis) was retained by Public Works and Government Services Canada (PWGSC) on behalf of Correctional Services Canada (CSC) to complete an Environmental Effects Evaluation (EEE) for the re-paving of the perimeter road at Joyceville Institution, located in Kingston, Ontario. The EEE identifies and provides mitigation options for potential environmental impacts of the project.

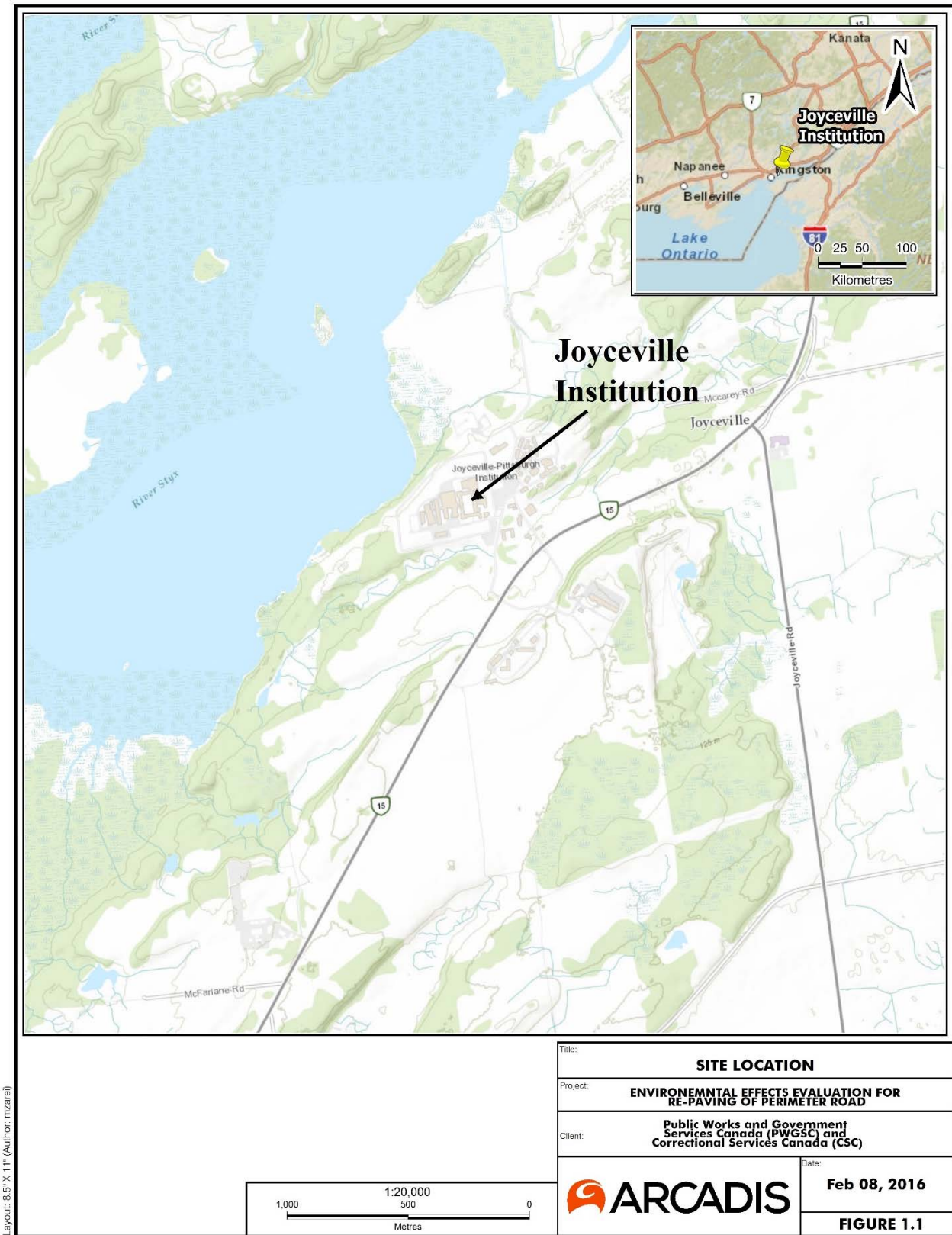
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The Joyceville Institution perimeter road is approximately 1.2 km long and roughly 5.0 m wide (approximately 6,000 square metres). Construction activities for the road re-paving are expected to begin in late May/June 2016, and it is estimated that it will be completed in approximately two months from the start date. The site preparation for this project will include establishing a lay down area for equipment and materials required to carry out the repaving of the road. Once the site preparation is completed, an asphalt road cover will be applied and installed on the existing road.

The goal of the EEE is to identify and mitigate possible adverse environmental impacts of the perimeter road re-paving project as early as possible in the project design stage, so as to ensure that irrevocable decisions are not made without due consideration to environmental consequences.

Additionally, this EEE has been undertaken within the context of the *Canadian Environmental Assessment Act (CEAA) 2012* legislation (CEAA, 2012a). Since the CSC project will be taking place on federally owned land, CSC must meet their Section 67 requirements to ensure that the project does not result in significant environmental effects.

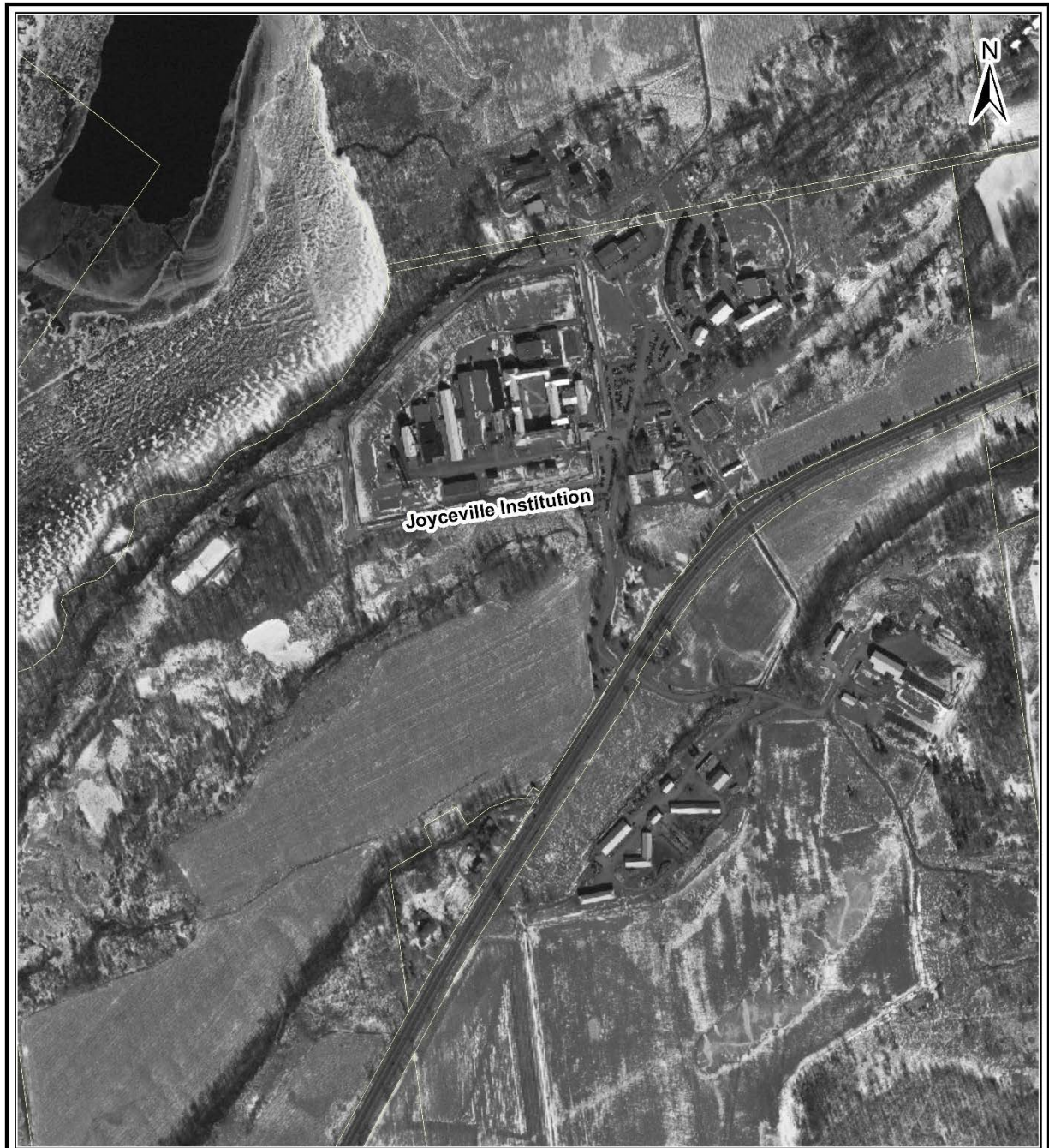
ENVIRONMENTAL EFFECTS EVALUATION, JOYCEVILLE INSTITUTION



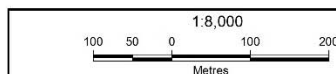
Reference: ESRI ArcGIS Online Base Layers

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ENVIRONMENTAL EFFECTS EVALUATION, JOYCEVILLE INSTITUTION



Layout: 8.5" X 11" (Author: mzare)



Reference: ESRI ArcGIS Online Base Layers

Title: SITE PLAN	
Project: ENVIRONMENTAL EFFECTS EVALUATION FOR RE-PAVING OF PERIMETER ROAD	
Client: Public Works and Government Services Canada (PWGSC) and Correctional Services Canada (CSC)	
	Date: Feb 08, 2016
	FIGURE 1.2

{TG\hshahsavand\ D:\300000 Projects\351173-005\Site Plan_08FEB2016.mxd}

1.1 Scope of Work

The Scope of Work for this EEE included:

- Review of background information.
- Preparation of a Health and Safety Plan.
- A site visit to walk the perimeter road and adjacent areas and compile notes on the natural heritage features, including Ecological Land Classification (ELC) and potential habitat for Species at Risk (SAR) and conduct interviews with staff at the Institution.
- Assessment of effects of the proposed project and development of mitigation measures.
- Preparation of an Environmental Effects Checklist.
- QA/QC procedures included senior technical review of all documentation, including the draft and final reports.

1.2 Regulatory Framework

CEAA 2012 distinguishes between designated projects¹ and projects (*CEAA, 2012a*). A formal environmental assessment under *CEAA 2012* is required by section 10(b) or by section 13 or 14 in respect of certain designated projects but is never required in respect of a project. Although a project is never the subject of a formal environmental assessment under *CEAA 2012*, an authority is nonetheless required by section 67 of *CEAA 2012* to determine the likelihood of significant adverse environmental effects that might result from a project being carried out on federal lands. As the Joyceville Institution is located on federal lands, therefore, the proposed project has to be carried out in compliance with *CEAA 2012* legislation. CSC must meet Section 67 requirements which stipulate that federal projects cannot result in significant environmental effects.

While each authority is encouraged to develop or utilize elements of a known environmental management process that meets its mandate and unique circumstances, the approach and depth of analysis is flexible and should be commensurate with the risk and likelihood of significant adverse environmental effects associated with carrying out the project (*CEAA, 2012b*).

Appendix A of the Statement of Work (SOW) for this assignment specifies the following key components to be included in the EEE:

- a project description;
- a matrix outlining the various anticipated project tasks for all project components/phases, associated environmental risks, and recommended mitigation measures to address these risks;
- an environmental description including avian, terrestrial or aquatic environment, socio-economic and cultural environment, Species-at-Risk (SAR) survey – desktop review, etc.;
- identification of potential environmental effect;

- documentation of mitigation measures to reduce or eliminate adverse effects for the project;
- provision of a conclusion on the significance or risk factor for each effect; and
- preparation of contractor checklist based on matrix outlining required mitigation measures.

These and other aspects are addressed in the remaining chapters of this report.

Note that, due to the nature of this project, formal public/stakeholder engagement and aboriginal consultation is not required. This is due to the location of the perimeter road, situated within the site boundaries of Joyceville Institution.

1.3 Site Visit

Arcadis Senior Biologist Barbara Hard carried out a site visit to Joyceville Institution on Wednesday, December 23, 2015. The site visit included a reconnaissance of the road and adjacent areas and discussions with Joyceville Institution staff. The objectives of the site visit were to document existing natural and socio-cultural environmental conditions at the subject site and its surroundings, make observations, to obtain a better understand of the specific project site layout and other features, and to obtain details of the proposed paving project through discussions with Joyceville Institution staff.

Key observations from the site visit are included in throughout the rest of the document and photo documentation of the site visit can be found in Appendix A.

2.0 PROJECT DESCRIPTION

The proposed project, the re-paving of the perimeter road at Joyceville Institution is comprised of a number of project components which are shown in Table 2.1. Details of these components were obtained through discussions with Joyceville Institution staff familiar with the proposed project, as well as details provided in a WSP February 8, 2016 Memorandum with the Subject line “Evaluation of Resurfacing Alternatives”.

As noted above, the perimeter road has various types of asphalt distress and failure including cracking, rutting, ponding, and potholes. Based on its evaluation, as reported in the February 8, 2016 Memorandum, WSP has determined that a milling and surfacing approach which involves milling the existing asphalt to a predetermined depth and applying new asphalt, would be less than adequate for rehabilitating the perimeter road at the Joyceville Institution. While this option provides a smooth driving surface, it does not allow for addressing existing structural or drainage problems.

WSP’s preferred rehabilitation approach for the perimeter road is full depth reclamation and repaving with a heavy duty asphalt structure. Full depth reclamation involves the rebuilding of the entire damaged asphalt pavement by recycling the existing roadway. The old asphalt and base materials are uniformly pulverized and blended to provide a stronger, homogeneous material. In addition, existing catch basins along the perimeter road will be cleaned to improve drainage. This approach will ensure the structural integrity of the road by making improvements to the entire asphalt structure, correcting any areas with insufficient asphalt depth, and ensuring that the entire perimeter road has an adequate and uniform asphalt structure.

The road will be rehabilitated in such a manner as to always allow one half to remain open for traffic. Therefore, there will be no need to create a temporary roadway or bypass.

Most of the refuelling of the heavy equipment involved in construction would be done directly from a fuel truck.

The project is scheduled to start in May/June 2016 and is scheduled to be completed in approximately two months.

Table 2.1 Project Component Identification

Project Phase	Project Components	
	Core Project Components	Ancillary Works Other Projects and Activities
Construction	<ul style="list-style-type: none"> • Contractor Equipment Mobilization • Establishment of an equipment and materials lay down area • Site Preparation • Pulverize and blend existing asphalt pavement • Repave entire roadway • Clean existing catch basins • Contractor Equipment Demobilization 	<ul style="list-style-type: none"> • Development of a Health and Safety Plan • Development of a Spills Prevention and Spills Response Plan • Soil testing • Installation of Erosion and Sediment Control measures • Grading (as needed) • Digging out badly degraded areas of the road and removal offsite • Compaction testing
Operation and Maintenance	<ul style="list-style-type: none"> • Regular maintenance checks and inspection by staff • Repairs to cracks as needed • Maintenance of drainage catch basins, ditches and culverts to keep them debris free • Sanding and salting during winter months • Keeping road and areas adjacent to the road garbage free 	<ul style="list-style-type: none"> • Avoiding dumping of building and construction materials adjacent to the road • Cutting of landscape grass

3.0 NATURAL ENVIRONMENT DESCRIPTION

Mapping and aerial photographs from various sources were reviewed as part of the background information review. These included the Ministry of Natural Resources and Forestry (MNR), Natural Resources Information Centre (NHIC), the Cataraqui Region Conservation Authority (CRCA), Site Assessment reports provided by CSC/PWGSC and images from Google Earth.

3.1 Topography

The Site including the perimeter road is relatively flat. A steep, rocky, wooded slope is located west of the perimeter road. A wetland and watercourse are located in a low lying area south of the perimeter road. Culverts under the road drain from the areas inside the perimeter fence to the wooded slope and the wetland to the south of the Site. Groundwater flow is inferred towards the River Styx as shown in Image 1.



Image 1 River Styx, Looking North from Perimeter Road

3.2 Terrestrial Environment

The terrestrial environment at the site outside of the perimeter fence consists of woodlots, vacant lands and a steep, wooded slope as shown in Image 2.



Image 2 Cultural Meadow Adjacent to Perimeter Road

Vegetation adjacent to the road along the perimeter fence consists of manicured lawn which appears to be cut regularly (Appendix A – Photo 1). Vegetation on the outside of the road on top of the rocky slope to the edge and the vacant lot to the west is typical of road sides, disturbed and vacant lands and includes staghorn sumac (*Rhus typhina*), red-osier dogwood (*Cornus stolonifera*), reed-canary grass (*Phalaris arundinacea*), milkweed (*Asclepias syriaca*), Queen Anne's lace (*Daucus carota*), chickory (*Cichorium intybus*), vetch (*Vicia gracca*), goldenrod (*Solidago canadensis*), Canada thistle (*Cirsium avense*), viper's bugloss (*Echium vulgare*), wild grape (*Vitis riparia*), mullein (*Verbascum thaspus*), sweet yellow

clover (*Melilotus officinalis*), strawberry (*Fragaria virginiana*), common evening primrose (*Oenothera biennis*), aster (*Aster* spp.) and grasses (*Poa* spp.) (Appendix A - Photos 2 and 3).

Figure 3.1 shows the Ecological Land Classification (ELC). Vegetation communities along the edge of the slope, roadside and the vacant lot to the west are cultural meadows, Dry-Moist Old Field Meadow (CUM1-1) (Appendix A - Photo 6). Although a high percentage of typical non-native species were present in the cultural thicket and cultural meadow, invasive species were not noted at this time.



Image 3 Deciduous Forest Adjacent to Perimeter Road

The woodlot on the rocky slope to the north and west and on level ground south of the site shows characteristics of Dry-fresh sugar maple oak deciduous forest (FOD 5-3) as shown in Image 3; however, because of the timing of the site visit (winter) and limited access to the slope, this ELC classification should be confirmed at a more suitable survey time, e.g., late spring or summer as some of the understory cannot be identified which is a component required to classify ELC communities. Trees present include sugar maple (*Acer saccharum* ssp. *saccharum*), red oak (*Acer rubrum*), large toothed aspen (*Populus grandidentata*) (Appendix A - Photos 4 and 5).

3.3 Aquatic Environment

There are no surface waterbodies on the site. The River Styx (Rideau Canal) which is part of the Great Cataraqui River watershed is located 40 m from the perimeter road to the west at the bottom of a steep, rocky slope as shown in Image 4. The River is considered fish habitat.

A small watercourse is present offsite south of the perimeter road in a wetland area (see Section 3.4). It is Arcadis' understanding that the watercourse is not located on CSC lands.



Image 4 River Styx, View from Perimeter Road

ENVIRONMENTAL EFFECTS EVALUATION, JOYCEVILLE INSTITUTION



3.4 Wetlands

NHIC mapping shows unevaluated wetlands to the north, west and south of the site. None of these wetlands are immediately adjacent to the site. The wetland to the north is approximately 90 m from the site, at the bottom of the slope, adjacent to the river.

As shown in Image 5, a wetland is present adjacent to the southern site boundary; however, this wetland is not included in the NHIC mapping (Appendix A – Photos 7 and 8). A watercourse traverses the wetland, but doesn't enter the site. The wetland is a Reed-canary Grass Mineral Meadow Marsh (MAM2-2). Vegetation includes reed-canary grass and cattails (*Thypha* sp.) with milkweed and sumac.



Image 5 Wetland Area South of Perimeter Road

3.5 Areas of Natural and Scientific Interest and Provincially Significant Wetlands

NHIC mapping did not identify Areas of Natural and Scientific Interest (ANSIs) or Provincially Significant Wetlands (PSWs) on or in the vicinity of the site (MNRF, 2016). CRCA mapping did not show Conservation Areas or Conservation Lands in the general area surrounding the site (CRCA, 2016).

3.6 Wildlife

The perimeter road and manicured areas inside the Institution and along the perimeter fence provide limited habitat for wildlife, however, different birds and mammals may use those areas occasionally for foraging. The densely wooded slope, the cultural thicket and cultural meadow as well as the meadow marsh wetland provide suitable habitat for birds and mammals. Wildlife species observed by CSC staff on and in the vicinity of the site include Canada goose (*Branta canadensis*), seagull (*Larus* spp.), red-tailed hawk (*Buteo jamaicensis*), pigeon (*Columba livia domestica*), eagle (*Haliaeetus* sp.), osprey (*Pandion haliaetus*), crow (*Corvus brachyrhynchos*), white-tailed deer (*Odocoileus virginianus*) and groundhog (*Marmota monax*).

3.7 Species at Risk

The SAR which are known to occur in the vicinity of the Site are shown in Table 3.1 below (SARO, 2016, COSEWIC, 2016, Government of Canada, 2016).

Table 3.1 Species at Risk

Common Name	Scientific Name	SARO	S Rank	COESWIC	SARA
Bald Eagle	<i>Haliaeetus leucocephalus</i>	SC	S2N, S4B	NAR	-
Barn Swallow	<i>Hirundo rustica</i>	THR	S4B	THR	-
Black Tern	<i>Chlidonias niger</i>	SC	S3B	NAR	-
Bobolink	<i>Dolichonyx oryzivorus</i>	THR	S4B	THR	-
Cerulean Warbler	<i>Dendroica cerulea</i>	THR	S3B	END	SC
Eastern Meadowlark	<i>Sturnella magna</i>	THR	S4B	SC	SC
Golden Eagle	<i>Aquila chrysaetos</i>	END	S2B	NAR	-
Henslow's Sparrow	<i>Ammodramus henslowii</i>	END	SHB	END	END
King Rail	<i>Rallus elegans</i>	END	S2B	END	END
Least Bittern	<i>Ixobrychus exilis</i>	THR	S4B	THR	THR
Loggerhead Shrike	<i>Lanius ludovicianus</i>	END	S2B	END	-
Louisiana Waterthrush	<i>Seiurus motacilla</i>	SC	S3B	THR	SC
Peregrine Falcon	<i>Falco peregrinus</i>	SC	S3B	SC	SC
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	SC	S4B	THR	THR
Lake Sturgeon	<i>Acipenser fulvescens</i>	THR	S2	THR	THR
Blunt-lobed Woodsia	<i>Woodsia obtusa</i>	END	S1	THR	THR
Broad Beech Fern	<i>Phegopteris hexagonoptera</i>	SC	S3	SC	SC
Butternut	<i>Juglans cinerea</i>	END	S3?	END	END
Pale-bellied Frost Lichen	<i>Physconia subpallida</i>	END	S2	END	END
Purple Twayblade	<i>Liparis liliifolia</i>	THR	S2	THR	END
Common Five-lined Skink	<i>Plestiodon fasciatus</i>	SC	S3	SC	SC
Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	SC	S3	SC	SC
Gray Ratsnake	<i>Pantherophis spiloides</i>	THR	S3	THR	THR
Milksnake	<i>Lampropeltis triangulum triangulum</i>	SC	S3	SC	SC
Blanding's Turtle	<i>Emydoidea blandingii</i>	THR	S3	END	END
Eastern Musk Turtle	<i>Sternotherus odoratus</i>	THR	S3	SC	THR
Northern Map Turtle	<i>Graptemys geographica</i>	SC	S3	SC	SC
Snapping Turtle	<i>Chelydra serpentina</i>	SC	S3	SC	SC
Spiny Softshell	<i>Apalone spinifera spinifera</i>	THR	S3	THR	THR

Legend:

SARO = Species at Risk Ontario END = endangered

SC = special concern

THR = threatened

S Rank (Provincial Rank)

S1 = Critically Imperiled. Extremely rare in Ontario; usually 5 or fewer occurrences in the province or very few remaining individuals; often especially vulnerable to extirpation.

S2 = Very rare in Ontario; usually between 5 and 20 occurrences in the province or with many individuals in fewer occurrences; often susceptible to extirpation.

S3 = Rare to uncommon in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances. Most species with an S3 rank are assigned to the watch list, unless they have a relatively high global rank.

S4 = Common and apparently secure in Ontario; usually with more than 100 occurrences in the province.

SH = Historically known from Ontario, but not verified recently (typically not recorded in the province in the last 20 years); however suitable habitat is thought to be still present in the province and there is reasonable expectation that the species may be rediscovered.

S3? = Rank uncertain

B = Confirmed Breeder

N = Non Breeder (breeding not confirmed)

COSEWIC = Committee on the Status of Wildlife in Canada

SARA = Species at Risk Act

NAR = Not at Risk

- = no status/not listed

SAR were not observed during the site visit and the road and immediate adjacent areas (shoulder of the road) do not provide habitat for SAR. Milkweed was present along the roadside and there is the possibility that monarch butterflies (*Danaus plexippus*) which depends on milkweed in its life cycle may be using the site during the summer and fall seasons.

The wooded areas have the potential to provide habitat for SAR birds, including red-headed woodpecker (*Melanerpes erythrocephalus*), Cerulean warbler (*Dendroica cerulea*) and Peregrine falcon (*Falco peregrinus*) which could potentially use the rocky ledges of the steep slopes for nesting. CSC staff reported that eagles had been observed in the vicinity of the site, however, the species of eagle are not known.

The old field meadow located west of the perimeter road is potential habitat for milksnake (*Lampropeltis triangulum triangulum*). It is therefore not recommended to use this area as lay down area for equipment and material for construction.

Photos of these SAR are shown in Appendix B. These photos can be used by project contractors to identify SAR.

3.8 Migratory Birds

The *Migratory Birds Convention Act (1994)* and Regulations under the *Act* provide protection of migratory birds, their nests and eggs. The *Act* states in Section 5.1 that “no person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area”. Migratory birds are known to use the area surrounding the site, and as such mitigation measures relating to the breeding times and the prevention of the potential for deleterious substance to enter the waters adjacent to the perimeter road will be addressed.

3.9 Socio-economic and Cultural Environment

Joyceville Institution is a minimum and medium security correctional facility for male offenders. The medium security section of the Institution was opened in 1959 and has capacity for 452 offenders, the minimum security section was opened in 1963 and has capacity for 250 offenders (CSC, 2014). The perimeter road is patrolled by truck by CSC staff 24 hours a day, 7 days a week.

The town of Joyceville is at a distance of approximately 1.5 km and the City of Kingston approximately 18 km from the Joyceville Institution. There are no residences, public institutions (e.g., schools, churches, hospitals), or businesses in the immediate vicinity of the Joyceville Institution.

3.10 Structures or Entities of Historical, Archaeological, Paleontological or Architectural Significance

There are no structures or entities of historical, archaeological, paleontological or architectural significance present on the Site.

3.11 Disturbances

During the Site reconnaissance it was noted that significant amounts of garbage, including water and pop bottles, pop cans, plastic bags, paper cups and other household type waste were present in three areas along the perimeter road (Figure 3.2).

Construction debris, including bricks, concrete and wood was observed in a vacant lot on the west side of the perimeter road.

Sand from road salting and sanding during winter months has accumulated in a number of areas on the road.

ENVIRONMENTAL EFFECTS EVALUATION, JOYCEVILLE INSTITUTION



4.0 POTENTIAL EFFECTS OR INDIRECT ENVIRONMENTAL EFFECTS

Projects and their components interact with the environment and these interactions can result in negative and/or positive effects during different phases of the project.

Table 4.1 below shows project component interaction with the environment, if any and where potential effects (negative or positive) may occur. Negative effects require mitigation to ensure that environment components are protected and that no negative residual effects remain after the project is completed.

It is our understanding that the proposed project will entail standard road construction practices and that no blasting or pile driving is involved. Most of the potential environmental effects are likely to occur during the construction phase of the project. Furthermore, it should be reiterated that the overall project duration is short (only about two months), and environmental effects are expected to be temporary in nature.

It is anticipated that most, if not all, of the equipment to be utilized for the proposed construction phase will be transported to the project site by the construction contractor. The heavy equipment would be either driven to the site or transported by means of flat-bed truck. Some temporary noise and air emissions are anticipated during this mobilization phase, but this would be very short duration, a day or so. Disturbance to SAR and Migratory Birds would be temporary and are not considered significant.

Establishment of lay-down area for equipment and materials could potentially have an impact on natural environment components, depending on where it is established. Particularly, if areas adjacent to the rocky slope, deciduous forest and wetland area are used for lay-down there is a potential for negative effects from runoff from material storage such as sand and gravel, accidental fuel spills and noise disturbance. Terrain and vegetation may be affected if surface preparation of the lay-down area requires the removal of vegetation and land grading. Surface water, groundwater, soils, vegetation, fish habitat, SAR and wildlife could potentially be negatively impacted from runoff from material piles and fuel, oil and lubricant spills. The drainage water collected at the Institution flows through the culverts underneath the perimeter road down the slope and into the wetland (which has the creek in the middle). In addition, there are a number of catch basins and manholes along the perimeter road. There is a potential that any spillage adjacent to the perimeter road could in theory end up in the drainage which opens into the river or the wetland. Wildlife, migratory birds and SAR could potentially be impacted by temporary disturbances from noise/vibration and decreases in air quality.

Based on WSP's stated preference for full depth reclamation for this proposed project, it is anticipated that the actual construction work would consist primarily of pulverizing and blending of the existing asphalt surface, and readying it for repaving. There may be quantities of asphalt that are not recycled, and are to be handled as waste material. Some minor excavation is

expected to establish curbing, and drainage within the road right-of-way (ROW). The project does not involve any realignment of the roadway ROW, so no new or undisturbed areas will be affected, and there would be no removal of vegetation. However, the pulverizing and blending pre-paving work could potentially result in temporary effects such as localized noise/vibration, dust and air emissions from operational heavy equipment. There is also the potential for accidental spillage of fuel, oil or lubricant from heavy equipment during this work that could potentially affect surface water, groundwater, soils, vegetation, fish habitat, SAR and wildlife. Transportation will be temporarily affected as areas of the perimeter road will not be available for patrol during this work.

The paving activities are likely to cause short term localized noise and air emission, including odour from the asphalt being laid, from trucks either transporting or spreading of hot mix asphalt and from the asphalt pavers which could affect wildlife, migratory birds and SAR. There is also the potential for accidental spillage of fuel, oil or lubricant, and asphalt from heavy equipment during this work that could potentially affect surface water, groundwater, soils, vegetation, fish habitat, Species at Risk and wildlife. Transportation will be temporarily affected as areas of the perimeter road will not be available for patrol during paving activities.

The demobilization of equipment from the site could result in very limited and localized effects on the environment. It is expected that equipment would be moved from the work site once they are no longer needed for on-site work, therefore, no mass removal of equipment is expected, but rather a gradual demobilization. Minor noise and air emissions are expected as single, or a few pieces of equipment are removed at a time, but the noise and air emissions from these would be significantly less compared to when such equipment were operating as part of the on-site construction activities. Disturbance to SAR and Migratory Birds would be temporary and are not considered significant.

Sanding and salting are the two operation and maintenance activities with the highest potential to cause adverse environmental effects. Salt, applied as a solid or brine, is quite mobile. Salt from road salting can have negative effects on the vegetation along the perimeter road and the deciduous forest and it could potentially have an adverse effect on emergent and submerged aquatic plants in the wetland area and River Styx. Road salt enters the surrounding environment by splash and spray from vehicles, snow melt into the soil and as runoff to surface water. Road salt causes osmotic stress and causes dehydration which leads to root and foliage damage. Salt can potentially lead to plant death, disrupt nutrient uptake and adversely impact seed germination, stems, leaves, and flowering. Chloride from road salting in surface waters can be toxic to fish, amphibians, reptiles, benthic invertebrates and has the potential to negatively impact food sources, survival, growth, and reproduction. Snow melt which wildlife species drink can potentially cause salt toxicity including dehydration, confusion and weakness, among other symptoms.

Sanding may result in transport of sand and sediment to nearby wetlands, surface water bodies, SAR habitat and fish habitat such as River Styx. Sedimentation could negatively affect water quality through contaminants, turbidity and changes in the water regime which affects wildlife such as turtles, amphibians and fish. Fish are susceptible to increases in suspended sediment as it

decreases the penetration of light into the water which affects fish feeding and schooling practices, irritates the gills of fish, can destroy the protective mucous covering the eyes and scales of fish, making them more susceptible to infection and disease and can lead to reduced survival. Turtles which are visual hunters experience delays in foraging success in high turbidity aquatic environments. Increased turbidity also decreases the ability of larval amphibians to find food. Settling sediments have the potential to fill in spaces between rocks which could have been used by benthic invertebrates.

There are some potential positive environmental effects associated with improved maintenance of culverts and drainage ditches. Clearing culverts and drainage ditches from garbage and debris reduces the likelihood of blockage and flooding and the transport of debris and sediment to nearby wetlands, surface water bodies and fish habitat (River Styx). This can be significant as flooding, debris and sedimentation could have potentially negative effects on soils, surface water, vegetation and wildlife habitat, including migratory birds which may use the deciduous forest for nesting and foraging. Prevention of flooding has a positive effect on transportation as the perimeter road would remain usable for patrol vehicles.

As with most construction projects of this nature, there is a potential for accidents and malfunctions to result in adverse environmental effects. As was noted before, accidents or malfunctions resulting in the spillage of especially fuel, oils, lubricants, and even asphalt, can potentially contaminate soil, surface water, groundwater, fish and fish habitat, and wildlife habitat. Also, responding to accidents and malfunctions may include the use of certain heavy equipment which could potentially result in temporary localized increases in noise/vibrations levels.

As there are no residences, other public, or private institutions, commercial or industrial establishments in close proximity to the proposed project site, we anticipate no adverse socioeconomic or cultural effects associated with the proposed project. The proposed project presents no land use conflicts since all construction effects are expected to be very localized, that is, contained within the security fence of the Joyceville Institution, and temporary in nature. Also, due to the limited size and scope of the project, we anticipate no significant effects on employment.

Being an existing road, and a previously disturbed area, there are no heritage or archaeological features within the proposed project footprint, and therefore no adverse effects.

As with every construction project, there are potential risks to human health associated with the conduct of the work; however, the location of the project, that is, within the security fence of the Joyceville Institution, virtually eliminates the potential for public health risks as the perimeter road is primarily only used by security patrol at the Institution. There are potential occupational health risks for the construction workers undertaking the project, but the mitigation of these risks is the responsibility of the construction company and it is assumed that the construction company would employ best construction practices in the conduct of this project. Refer to Chapter 5 of this report for mitigation measures.

Table 4.1 Project-Environment Interaction and Potential Effects Matrix

Natural Environment Component	Surface Water	Groundwater	Soils	Air Quality	Noise/ Vibration	Terrain and Topography	Vegetation	Fish and Fish Habitat	Wildlife/ Habitat	Migratory Birds	Species at Risk	Socio-Economic Conditions	Heritage/ Archaeology	Land Use	Land use by First Nations	Human Health	Transportation and Navigation
Construction																	
Contractor Equipment Mobilization	o	o	o	✓	✓	o	o	o	o	✓	✓	o	o	o	o	o	o
Establishment of Lay Down Area	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	o	o	o	o	o	o
Site Preparation	✓	✓	✓	✓	✓	o	✓	✓	✓	✓	✓	o	o	o	o	o	✓
Paving	✓	✓	✓	✓	✓	o	✓	✓	✓	✓	✓	o	o	o	o	o	✓
Contractor Equipment Demobilization	o	o	o	✓	✓	o	o	o	o	✓	✓	o	o	o	o	o	o
Operation and Maintenance																	
Regular maintenance checks and inspection by staff	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Repairs to cracks as needed	o	o	o	o	✓	o	o	o	o	o	o	o	o	o	o	o	o
Maintenance of drainage ditches and culverts	+	o	o	o	o	o	+	+	+	+	o	o	o	o	o	o	+
Sanding and salting during winter months	✓	✓	✓	o	o	o	✓	✓	✓	o	✓	o	o	o	o	o	+
Keeping road and areas adjacent to road garbage free	+	+	+	o	o	o	+	+	+	o	o	+	o	o	o	+	o
Accidents and Malfunctions																	
	✓	✓	✓	✓	✓	o	o	✓	✓	o	o	o	o	o	o	✓	o

Notes

✓ = potential negative effect which may require mitigation o = no interaction/effect + = positive effect

5.0 MITIGATION MEASURES

Mitigation measures are used to prevent potential impacts caused by projects to Natural Environment Components. Table 5.1 shows recommended measures during the construction, operation and maintenance phases of the proposed project to mitigate potentially negative effects.

Table 5.1 Effects of Project on Natural Environment Components and Recommended Mitigation

Effect	Affected Natural Environment Component	Recommended Mitigation	Likelihood of Residual Effect	Significance of Residual Effect
Construction				
Run off from soil/sand	Surface Water (River Styx and drainage from site to River Styx and southern wetland, Vegetation, Wildlife Habitat, SAR, Fish and Fish Habitat	<p>Maintenance of vehicles and equipment to be carried out on pre-designated location more than 30 m from any wetlands or water bodies.</p> <p>Ensure site drainage conditions are accounted for in site development plans.</p> <p>An erosion and sediment control plan should be developed by the contractor to mitigate potential effects on water quality, and appropriate measures should be adopted to minimize any impacts of accidental spills during construction. Plan shall be in place prior to commencement of work.</p>	Minimal potential due to the small magnitude, time period and limited geographical extent.	Not significant

Table 5.1 Effects of Project on Natural Environment Components and Recommended Mitigation (Cont'd)

Effect	Affected Natural Environment Component	Recommended Mitigation	Likelihood of Residual Effect	Significance of Residual Effect
		<p>Sediment and erosion control plan should consider the following:</p> <ul style="list-style-type: none"> • Implement temporary erosion and sediment control measures to prevent erosion/runoff from impacting nearby wetland area. Maintain these measures until the site has stabilized. • Inlet protection at all existing catch basins/storm drains/outfalls (that is, those which are not being immediately replaced) should be installed prior to the commencement of construction and will remain functional until construction completion. • Control measures should be inspected daily to ensure they are functioning and are maintained as required. If the control measures are not functioning properly, no further work will occur until the problem is resolved. • Restore disturbed areas as soon as possible to minimize the duration of soil exposure. Restoration should be to a pre-disturbed state or better. 		

Table 5.1 Effects of Project on Natural Environment Components and Recommended Mitigation (Cont'd)

Effect	Affected Natural Environment Component	Recommended Mitigation	Likelihood of Residual Effect	Significance of Residual Effect
Contamination From Spills/Leaks	Surface Water (River Styx and drainage from site to River Styx and southern wetland, Groundwater, Vegetation, Wildlife Habitat, SAR, Fish and Fish Habitat	<p>Installation of filter cloth under manhole lids.</p> <p>Implementation of erosion and sediment control plan.</p> <p>Avoid potential for large volume fuel spill by prohibiting the on-site temporary storage of fuel for construction.</p> <p>Construction machinery and equipment is to arrive on-site in a clean condition and be maintained free of fluid leaks.</p> <p>Maintenance of vehicles and equipment to be carried out on pre-designated location more than 30 m from any wetlands or water bodies.</p> <p>The contractor will be required to provide CSC with a Spills Management and Emergency Response Plan including aspects such as the provision of spill kits on-site, prior to the commencement of construction.</p> <p>All workers should be fully aware of the spill prevention and response procedures including notification of the CSC and MOE Spills Action Centre at 800-268-6060.</p> <p>Disposal of waste generated by a spill will be done in compliance with Ontario Waste</p>	Minimal potential with the stated controls in place.	Not significant

Table 5.1 Effects of Project on Natural Environment Components and Recommended Mitigation (Cont'd)

Effect	Affected Natural Environment Component	Recommended Mitigation	Likelihood of Residual Effect	Significance of Residual Effect
		<p>Regulations and at an MOE-approved disposal facility.</p> <p>These mitigation measures are to be covered in in the Mitigation Monitoring Report for this proposed project.</p>		
Decrease in Air Quality	Air Quality for wildlife and human health	<p>Use new or well-maintained heavy equipment and machinery, preferably fitted with muffler/exhaust system, baffles and engine covers.</p> <p>Comply with the equipment manufacturer/supplier operating specifications for heavy equipment and machinery.</p> <p>Minimize operation and idling of gas-powered equipment and vehicles.</p> <p>Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.</p> <p>Undertake misting, create localized wind barriers or implement other methods particularly during dry, dusty conditions to avoid generating airborne or surface dust and particulates.</p> <p>Stabilize areas of stockpiled or exposed soils.</p>	Minimal potential due to the small magnitude, time period and limited geographical extent.	Not significant

Table 5.1 Effects of Project on Natural Environment Components and Recommended Mitigation (Cont'd)

Effect	Affected Natural Environment Component	Recommended Mitigation	Likelihood of Residual Effect	Significance of Residual Effect
		<p>Keep the roadway clear of any mud or earth tracked from vehicles.</p> <p>Keep asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.</p> <p>The contractor should be required to provide Environmental Procedures which identifies requirement that controlling air pollution, including asphalt dust, both occupational and environmental. This should be also covered in the Mitigation Monitoring Report.</p>		
Decrease in Soil Quality	Potential contamination and disturbance of soil during construction through vehicle movement and leaks/spills.	<p>Avoid the movement of heavy machinery in areas of sensitive slopes, use wooden planks if necessary.</p> <p>Avoid using heavy machinery on land during wet weather, if possible.</p> <p>Reduce soil compaction by restricting large machinery to the designated staging area.</p> <p>To minimize land disturbance, the construction envelope will be clearly demarcated and kept as small as possible.</p> <p>Develop and implement an erosion control plan to re-vegetate or otherwise stabilize any</p>	Minimal potential due to the small magnitude, short duration and limited geographical extent.	Not significant

Table 5.1 Effects of Project on Natural Environment Components and Recommended Mitigation (Cont'd)

Effect	Affected Natural Environment Component	Recommended Mitigation	Likelihood of Residual Effect	Significance of Residual Effect
		loose soils after construction to prevent erosion and transport (e.g., erosion blanket seeded with native non-invasive species).		
Noise and Vibration	Noise/Vibration, SAR, Migratory Birds	Vehicles, machinery and equipment should be in good repair. All work shall be carried out in compliance with all applicable noise regulations and bylaws.	Minimal potential due to the small magnitude, time period and limited geographical extent.	Not significant
Contamination From Waste/unrecycled Asphalt	Soil, Groundwater, Surface Water,	All waste/unrecycled asphalt are to be disposed in accordance with Ontario's <i>Environmental Protection Act Regulation #347</i> and any relevant regulations from the federal Department of Fisheries and Oceans, Environment Canada and Health Canada. Mitigation measures are to be covered in in the Mitigation Monitoring Report for this proposed project.		
Removal and/or Compaction of Vegetation	Vegetation, Wildlife Habitat, SAR, Migratory Birds	Avoid vegetated areas during construction activities, establish lay down area for equipment and materials on a paved surface, if at all possible, such as the existing parking lot. All exposed soils shall be stabilized and re-vegetated as soon as possible (during the growing season) and in conjunction with planting works.	Minimal potential due to the small magnitude, time period and limited geographical extent.	Not significant

Table 5.1 Effects of Project on Natural Environment Components and Recommended Mitigation (Cont'd)

Effect	Affected Natural Environment Component	Recommended Mitigation	Likelihood of Residual Effect	Significance of Residual Effect
		<p>Vegetation will be restored upon completion of construction using native species, non-invasive species typical of the locality and soils to restore pre-construction conditions.</p> <p>Construction activities are to minimize disturbance to grassed areas. Any grassed areas to be used for construction activities are to be cleared and stripped and topsoil is to be stockpiled. Areas are to be stabilized after construction activities are complete.</p>		
Disturbance to breeding birds	Migratory Birds, SAR	<p>Work is planned for May/June 2016 during bird breeding season. Mitigation measures include nest surveys in trees within 10 m of the perimeter road before construction commences and avoidance of areas in which active nests were identified until fledglings have left the nest or schedule construction outside of breeding season. The breeding season covers the period approximately from end of March to the end of August.</p> <p>All work is to be undertaken in compliance with <i>Migratory Birds Convention Act</i> and with local noise bylaws.</p> <p>If a migratory bird is found to be using the construction area for breeding or nesting, the contractor will halt work. Environment Canada</p>	Minimal potential due to the small magnitude, unlikely need to clear vegetation, and limited geographical extent.	Not significant

Table 5.1 Effects of Project on Natural Environment Components and Recommended Mitigation (Cont'd)

Effect	Affected Natural Environment Component	Recommended Mitigation	Likelihood of Residual Effect	Significance of Residual Effect
		<p>must be contacted for further guidance prior to work commencing. Note that Appendix B, intended for the contractor, consists of photos of SAR in the project area.</p> <p>To the extent possible, vegetation clearing should occur before or after monarch migration to avoid impacts to this species. This species typically resides in Ontario between May and September and may be encountered in various life stages on host vegetation (milkweed).</p>		
Operation and Maintenance				
Increase in salt concentrations and sediment/turbidity from salting and sanding in winter months	Surface Water, Vegetation, Wildlife Habitat, SAR, Fish and Fish Habitat	Avoidance of excessive use of salt and sand during winter months, removal of excess sand once snow has melted.	Minimal potential due to the small magnitude, time period and limited geographical extent.	Not significant
Increase in numbers of disease carrying vermin such as rodents, raccoons, foxes, seagulls and pigeons as well bears and bacteria/viruses.	Surface Water, Vegetation, Wildlife Habitat, SAR, Fish and Fish Habitat	Avoid dumping of garbage and food scraps along the perimeter road, provide and regularly empty secure garbage receptacles. Train and make CSC staff aware of environmental implications of unorganized garbage disposal.	Minimal potential due to the small magnitude, time period and limited geographical extent.	Not significant

Table 5.1 Effects of Project on Natural Environment Components and Recommended Mitigation (Cont'd)

Effect	Affected Natural Environment Component	Recommended Mitigation	Likelihood of Residual Effect	Significance of Residual Effect
Accidents and Malfunctions				
Fuel and Oil spills negatively impacting the environment	Surface Water, Groundwater, Soil, Wildlife Habitat, SAR, Fish and Fish Habitat	<p>All equipment fueling and maintenance has to be carried out with due diligence in designated areas in order to ensure that no deleterious substances impact surface water, groundwater, soil, fish and fish habitat.</p> <p>Regular and documented equipment checks to quickly identify any leaks/spills especially given the proximity to the body of surface water.</p>	Minimal potential due to the small magnitude, limited geographical extent and duration of Project activities.	Not significant
Accidents	Human Health	Follow all applicable health and safety guidelines and proper use of personal protective equipment (PPE) (i.e., hard hats, steel toed boots, safety glasses, ear plugs etc.).	Minimal potential due to the small magnitude, limited geographical extent and duration of Project activities.	Not significant

No significant effects of the environment are expected on the project, as the project is not proposed for an area vulnerable to environmental risks such as flooding, land slides, etc., and since the proposed construction is expected to be completed during May/June when severe weather is not expected.

6.0 ENVIRONMENTAL EFFECTS CHECKLIST

A summary checklist of the potential environmental effects, potential mitigation and residual effects is shown in Table 6.1.

Table 6.1 Environmental Effects Checklist

Environmental Component	Potential Project Effects						Residual Effects	
	Potential Adverse Effect?			Can Be It Be Mitigated?			Significant?	
	Yes	No	Uncertain	Yes	No	Uncertain	Yes	No
Surface Water	✓			✓				✓
Groundwater	✓			✓				✓
Soils	✓			✓				✓
Air Quality	✓			✓				✓
Noise/Vibration	✓			✓				✓
Terrain and Topography		✓						
Vegetation	✓			✓				✓
Fish and Fish Habitat	✓			✓				✓
Wildlife/Habitat		✓						
Migratory Birds	✓			✓				✓
Species at Risk	✓			✓				✓
Socio-Economic Conditions		✓						
Heritage/Archaeology		✓						
Land Use		✓						
Land Use by First Nations		✓						
Human Health	✓			✓				✓
Transportation and Navigation		✓						
Accidents and Malfunctions	✓			✓				✓
Effects of Environment on the Project		✓						
Cumulative Effects		✓						

A summary of the recommended mitigation measures for the proposed project and who is responsible for their implementation is shown in Table 6.2. Should the mitigation measures be applied as recommended, there should be no residual environmental effects associated with the proposed project, and in turn no adverse effects.

Table 6.2 Mitigation Table Summary

Environmental Component Potentially Affected	Proposed Mitigation	Responsible to Ensure Implementation
Surface Water, Vegetation, Wildlife Habitat, Species at Risk, Fish and Fish Habitat	Construction activities: <ul style="list-style-type: none"> Install silt fencing and erosion control measures to avoid run off. 	Contractor
Surface Water, Groundwater, Soil, Wildlife Habitat, SAR, Fish and Fish Habitat	Construction activities: <ul style="list-style-type: none"> All equipment fueling, maintenance, liquid petroleum product transfer and handling has to be carried out with due diligence in designated areas; emergency clean-up protocols including a first response plan will be developed and implemented in the event of an accidental spill; fuels, oils and other hazardous substances have to be stored in designated, secure locations. 	Contractor
Air Quality	Construction activities: <ul style="list-style-type: none"> Use new or well-maintained heavy equipment and machinery, preferably fitted with muffler/ exhaust system baffles and engine covers. Comply with operating specifications for heavy equipment and machinery. Apply water spray to reduce dust and ensure that all trucks transporting waste soil, asphalt, loose aggregate material, etc. are appropriately covered. Minimize operation and idling of gas-powered equipment and vehicles. 	Contractor
Noise/Vibration	Construction activities: <ul style="list-style-type: none"> Vehicles, machinery and equipment should be in good repair. All work shall be carried out in compliance with all applicable noise regulations and bylaws. 	Contractor
Vegetation, Wildlife Habitat, Migratory Birds, Species at Risk	Construction activities: <ul style="list-style-type: none"> Avoid vegetated areas, wherever possible. 	Contractor
Migratory Birds, Species at Risk	Construction activities: <ul style="list-style-type: none"> Carry out breeding bird nest surveys in trees within 10 m of the perimeter road before construction commences and avoidance of areas in which active nests were identified until fledglings have left the nest or schedule construction outside of breeding bird season. 	Contractor
Human Health	Construction activities, Operation and Maintenance: <ul style="list-style-type: none"> Follow all applicable health and safety guidelines and proper use of PPE (i.e., hard hats, steel toed boots, safety glasses, ear plugs etc.). Avoid dumping of garbage and food scraps along the perimeter road, provide and regularly empty secure garbage receptacles. Train and make CSC staff aware of environmental implications of unorganized garbage disposal. 	Contractor, CSC staff
Surface Water, Vegetation, Wildlife Habitat, SAR, Fish and Fish Habitat	Operation and Maintenance: <ul style="list-style-type: none"> Avoid of excessive use of salt and sand during winter months, removal of excess sand once snow has melted. 	CSC staff

7.0 REFERENCES

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APPENDIX A: PHOTO DOCUMENTATION



Appendix A: Photo Documentation


PHOTO 1	
Date: December 23, 2015	
Direction: South	
<u>Location Identifier:</u> Perimeter road	
<u>Description:</u> East side of the perimeter fence, manicured landscape grass.	

PHOTO 2	
Date: December 23, 2015	
Direction: West	
<u>Location Identifier:</u> Perimeter road and watch tower	
<u>Description:</u> North side of the perimeter road.	

ENVIRONMENTAL EFFECTS EVALUATION, JOYCEVILLE INSTITUTION

PHOTO 3	
Date: December 23, 2015	
Direction: North	
Location Identifier: North of perimeter road. Description: Cultural meadow (CUM1-1) with River Styx in the background.	

PHOTO 4	
Date: December 23, 2015	
Direction: North	
Location Identifier: Top of slope, north side of perimeter road. Description: Rocky slope overlooking deciduous forest (FOD5-3) and River Styx.	

ENVIRONMENTAL EFFECTS EVALUATION, JOYCEVILLE INSTITUTION


PHOTO 5	
Date: December 23, 2015	
Direction:	
<p><u>Location Identifier:</u> Top of slope, north side of perimeter road.</p> <p><u>Description:</u> Culverts draining stormwater from Joyceville institution and gabion basket.</p>	

PHOTO 6	
Date: December 23, 2015	
Direction: West	
<p><u>Location Identifier:</u></p> <p><u>Description:</u> Construction debris on Cultural Meadow CUM1-1 on the west side of the perimeter road.</p>	

ENVIRONMENTAL EFFECTS EVALUATION, JOYCEVILLE INSTITUTION


PHOTO 7	
Date: December 23, 2015	
Direction: East	
Location Identifier: Perimeter road south of perimeter fence Description: Perimeter road, looking east to visitor parking lot.	

PHOTO 8	
Date: September 2, 2015	
Direction: East	
Location Identifier: Wetland south of perimeter road Description: Reed-canary Grass Mineral Meadow Marsh.	

APPENDIX B: SPECIES AT RISK PHOTOS FOR CONTRACTORS



Appendix B: Species at Risk Photos for Contractors

Species at Risk


PHOTO 1	
Species at Risk: Red-headed Woodpecker	
<u>Potential Habitat Location:</u> Wooded Areas	
<u>Photo Credit:</u> MNRF	


PHOTO 2	
Species at Risk: Cerulean Warbler	
<u>Potential Habitat Location:</u> Wooded Areas	
<u>Photo Credit:</u> MNRF	


PHOTO 3	
Species at Risk: Peregrine Falcon	
<u>Potential Habitat Location:</u> Wooded Areas, Rocky Slope	
<u>Photo Credit:</u> MNRF	


PHOTO 4	
Species at Risk: Bald Eagle	
<u>Potential Habitat Location:</u> Wooded Areas close to open water	
<u>Photo Credit:</u> MNRF	

PHOTO 5	
Species at Risk: Golden Eagle	
<u>Potential Habitat Location:</u> Wooded Areas close to open water <u>Photo Credit:</u> MNRF	



PHOTO 6	
Species at Risk: Milksnake	
<u>Potential Habitat Location:</u> Cultural Meadow <u>Photo Credit:</u> B. Hard	

PHOTO 7	
Species at Risk: Monarch	
<u>Potential Habitat Location:</u> Cultural Meadow where milkweed is present	
<u>Photo Credit:</u> MNRF	

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