9. MITIGATION MEASURES

To mitigate for the potential harmful effects of the project, the following measures shall be implemented:

9.1. General:

9.1.1. Inform the Departmental Representative and PCA's Environmental Authority (EA) (Environmental Officer, Smiths Falls) regarding any changes to project plans and/or scheduling. Any changes not assessed under this Basic Impact Assessment (BIA) will require approval from PCA and may require further mitigation measures.

9.1.2. Contractor is required to submit an Environmental Management Plan (EMP) to the Department Representative and Parks Canada Agency's Environmental Authority that outlines all the measures to be implemented by the contractor on the project site to eliminate or reduce environmental effects and address mitigation measures outlined in this BIA. In order to allow for the timely commencement of project activities, the EMP can be submitted as separate components as project details become available. The EMP, or its components, will be submitted in writing prior to implementation of project activities and must be accepted by Parks Canada.

9.1.2.1. The EMP and its component plans, must be prepared in accordance with Parks Canada Agency's Environmental Standards and Guidelines Document (ESG) - Ontario Waterways, July 2017, this BIA, and applicable PCA Best Management Plans (BMPs).

9.1.2.2. PCA will not issue permit to authorize start of Work, under *Historic Canal Regulations*, prior to the review and acceptance of EMP.

9.1.2.3. A copy of the EMP shall be kept on site for the duration of the project and all works, as applicable, shall be completed in compliance with the EMP.

9.1.3. It is recommended that an environmental professional(s) (EP) prepare the EMP or its component plans incorporating guidance found in PCA's Environmental Standards and Guidelines - Ontario Waterways (2017). The EMP will detail frequency of monitoring and list high-risk construction activities where an environmental professional must be onsite. Monitoring and testing should be adaptable to changing site conditions and will capture any event/incident for the length and scope of that event.

9.1.4. The contractor is to ensure that all on-site personnel are aware of, and comply with the prescribed mitigation measures within this BIA and any measures outlined within subsequent amendments to this BIA.

9.1.4.1. A copy of this BIA and any subsequent amendments shall be kept on site for the duration of the project.

9.1.5. The Contractor shall adhere to all federal, provincial, and municipal legislation, by-laws, regulations, guidelines, safety standards, and codes governing construction activities. In cases of overlap, the most stringent will apply.

9.1.6. Should conditions at the work site indicate that there are negative impacts to fish, fish habitat, wildlife, cultural or visitor experience resources, all associated works shall cease until the problem has been corrected and PCA's EA staff have been consulted/notified. PCA has the right to require that work be altered or ceased immediately.

9.1.7. As per the *Historic Canal Regulations (HCR)* applicable to lands administered by the Rideau Canal National Historic Site of Canada, a permit signed by PCA's Ontario Waterways Director will be required to authorize the project work prior to commencement of the project.

9.2. Equipment and Site Condition:

9.2.1. Maintain equipment and machinery to avoid leakage of fuels and liquids. Ensure measures are in place to minimize impacts of accidental spills.

9.2.2. All materials and equipment used for the purpose of site preparation and project completion shall be operated and stored in a manner that prevents any deleterious substance (e.g. petroleum productions, debris etc.) from entering the water.

9.2.3. Any stockpiled materials, or concrete debris shall be stored and stabilized a safe distance away from any watercourse, drainage course or swales to prevent erosion and subsequent entry into the canal or removed from the site, in accordance with all federal, municipal and provincial regulations.

9.2.4. Store all oils, lubricants, fuels and chemicals within sealed, impermeable containers, within secure areas and upon impermeable-lined drip/spill trays.

9.2.5. Vehicle and equipment re-fueling and/or maintenance shall be conducted over an impermeable-lined drip/spill tray to allow full containment of spill, off of slopes and away from the water at a recommended distance of 30 m if possible. If not possible, fueling sites shall be as per the EMP and mitigations to prevent substances from entering the watercourse applied.

9.2.6. A designated re-fueling depot will minimize the potential for extensive impacts at the site due to accidental releases of substances; proper spill management equipment shall be in place for fueling.

9.2.7. Drip/spill trays shall be placed under all fuel-powered equipment. Drip trays shall be sized appropriately to encompass the outer perimeter of the equipment/machinery, providing adequate spacing for refueling activities.

9.2.8. All compressed air/fuel tanks shall be stored off to the side, away from on-going activity, and be adequately protected with an impact-protection barrier.

9.2.9. Any Above-ground Storage Tanks (ASTs) or other fuel storage tanks on site, are to be stored in compliance with Federal and Provincial storage tank requirements. Specifically, ASTs are to be placed within a secondary containment system of adequate holding capacity, based on the volume of the AST. See: https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/publications/code-practice-storage-tank-systems/part-3.html .

9.2.10. Self-contained fuel tanks, or fuel tanks so large where sizing a drip/spill tray to be placed underneath said tank would be impractical, at minimum, a spill tray is to be placed at the nozzle/hose end and utilized for all refueling activities.

9.2.11. There shall be no discharge of chemicals and cleaning agents in or near aquatic habitats; all such substances shall be disposed of at a facility licensed to receive them

9.2.12. Spill control and emergency plans will be in place prior to initiation of construction; an emergency spill kit shall be kept on-site and employed immediately should a spill occur. The contractor shall ensure that adequate additional spill clean-up resources are available.

9.2.13. In the event of a spill, PCA and the Ontario Spill Action Centre (1-800-268-6060) shall be notified immediately. Remediation will be conducted immediately to contain and clean up in accordance with federal and provincial regulatory requirements **AND to the satisfaction of PCA.** Documentation of remediation, testing and results will be provided to PCA. Spills should be reported directly to the PCA Environmental Officer on file (613-485-0452).

9.2.14. Spill-related environmental incidents or emergencies include (but is not limited to):

- **9.2.14.1.** Chemical spill or petroleum spill;
- **9.2.14.2.** Poisonous or caustic gas emission;
- **9.2.14.3.** Biological or chemical explosion;
- **9.2.14.4.** Hazardous material spill;
- **9.2.14.5.** Sewage spill;
- **9.2.14.6.** Contaminated water into waterways;
- **9.2.14.7.** Release of turbidity into the waterway; and
- **9.2.14.8.** Release of water with pH <6 or >9 into the waterway.

9.2.15. Operate machinery from stable location.

9.2.16. Only the working end of machinery shall directly enter the water. Any part of a machine or equipment entering the water shall be free of fluid leaks and externally degreased to prevent any deleterious material from entering the water. Complete the in-water activity as quickly as possible to minimize the time equipment is in the water. Do not leave equipment in water during breaks in work activity.

9.2.17. The use of biodegradable hydraulic fluids for machinery that will be working in or around the water is preferred.

9.2.18. The Material Safety Data Sheet (MSDS) of any unapproved substances to be utilized onsite (particularly that of substances to be in use in/adjacent to water) shall be provided to PCA EA for review and acceptance. MSDS information of known products to be utilized in/adjacent to water throughout the duration of the project should be incorporated as part of the EMP.

9.2.19. An adequate containment system shall be placed below the swing bridge and inspected daily to effectively confine and capture any debris that could potentially become detached during the removal and replacement of the swing bridge superstructure, or any of its component parts, including the asphalt wearing surface and nail laminated timber deck.

9.2.20. All debris collected within the containment system shall be carefully emptied into an enclosed container daily, or more frequently if required, to ensure that no paint chips or debris escape into the surrounding environment, or remain at the site. All paint chips and debris shall be recovered, collected, and taken to a landfill site licensed to receive it for disposal in accordance with all applicable federal, provincial, and municipal laws, regulations, and guidelines.

9.3. Water Quality:

9.3.1. Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Aquatic Life will form the baseline for water and streambed quality (see http://ceqg-rcqe.ccme.ca/en/index.html#void).

9.3.2. Activities causing turbidity or release of sediment will comply with the CCME Guidelines on Total Particulate Matter (see http://ceqg-rcqe.ccme.ca/download/en/217).

9.3.3. Ontario Drinking Water Quality Guidelines cannot be exceeded (beyond parameters that currently exist) due to project activities.

9.3.4. Ensure that any sediment settling basins are of adequate size to compensate for excess sediment run-off and erosion (i.e. storm water run-off, misdirected drainage).

9.3.5. Only washed and clean material free of fine particulate matter shall be placed in or near water where it has been previously planned and authorized.

9.3.6. Salt and other road chemicals should be properly stored in designated areas only, preferably in dry sheds to prevent infiltration of leachate to the water table and surface runoff.

9.3.7. Accumulated snow that may be contaminated with salt should be disposed of only at approved dumpsites or designated areas.

9.3.8. Snow containing salt or sand should never be dumped in, or allowed to melt and run off into watercourses.

9.4. Fish and Fish Habitat:

9.4.1. Should unanticipated dewatering/in water work be required, fish shall be removed from the work area prior to complete dewatering and released alive downstream into the river.

9.4.1.1. Fish salvages shall be conducted by a qualified professional in areas isolated from flows prior to construction, under applicable permit(s).

9.4.1.2. PCA's EA shall be advised 24 hours prior to fish rescue.

9.4.1.3. Minimize the length of time fish are out of the water.

9.4.1.4. Use appropriate equipment to remove any stranded fish in the dewatered area. As water levels drop in the work area monitor the deeper pool areas where fish are congregating. If safe to do so, seine nets or dip nets can be operated by field staff to remove the fish.

9.4.1.5. Contact PCA EA staff should there be any issues with fish removal.

9.4.1.6. Any fish found within the dewatered cofferdam areas will be documented by species, counted and removed and placed downstream if found in the downstream cofferdam and upstream if found upstream.

9.4.1.7. Round Gobies (*Neogobius melanostomus*) or other invasive species found during dewatering activities shall be euthanized humanely and not returned to the water system; this shall be reported to PCA.

9.4.1.8. Sediment/turbidity curtains shall be deployed in a manner – e.g. moved in a direction from close to shore/structures outward – which prevents the entrapment of fish inside the curtain.

9.4.1.9. Should flooding occur on the site, fish salvages will once again be conducted by a qualified professional, as necessary.

9.4.1.10. All in-water work should be initiated after July 1st and completed before March 15th to protect fish populations during their spawning and nursery periods. Should work be required beyond this date, additional mitigation measures may be required based on site specific characteristics. Work beyond March 15th must be approved by PCA prior to work occurring, and may not be granted if site conditions do not allow it.

9.4.2. The proponent is advised to abide by those mitigation measures and best management practices outlined within Fisheries and Oceans Canada's (DFO's) online guidance materials: Measures to Avoid Causing Harm to Fish and Fish Habitat (http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html).

9.4.3. If water pumping is required, ensure that there is a fish screen that complies with DFO *Freshwater Intake End-of-Pipe Fish Screen* Guideline when pumping in fish-bearing water to prevent impingement or entrainment of fish.

9.5. Erosion and Sediment Control:

9.5.1. Mandatory submission – **and acceptance by PCA** – of an Erosion and Sediment Control Plan, as stand-alone or part of the EMP, demonstrating:

9.5.1.1. A focus on erosion control primarily and sediment control secondary;

9.5.1.2. Erosion and sediment controls will be tailored to the type of sediment found onsite (e.g. if clay is present, additional controls are necessary).

9.5.1.3. The area to be controlled. In addition to the construction site, it is necessary to identify adjacent areas that could be negatively impacted by construction activities;

9.5.1.4. Drainage areas and patterns based on pre-construction topography and construction design;

9.5.1.5. The EMP will have, as a principal to reduce the amount of sediment laden water produced, a focus on separating offsite and infiltrating water into the construction site from construction activities and sediment sources.

9.5.1.6. How clean storm run-on will be diverted around the site and away from exposed areas;

9.5.1.7. How sediment-laden run-off will be directed to detention or retention facilities on-site. Large drainage areas can produce a significant amount of run-off, resulting in a need for large detention or retention structures;

9.5.1.8. Channels that are designed and constructed to the necessary design discharge;

9.5.1.9. Temporary and permanent erosion control needs for all drainage channels;

9.5.1.10. Consideration of project schedule in selecting, designing and laying out environmental controls; and

9.5.1.11. Consideration of seasonal requirements (for longer-term projects); select and design controls and practices for controlling erosion and sedimentation including shutdown periods.

9.5.1.12. The EMP shall include a Traffic Control Plan which shall include measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. This shall also include measures to minimize the amount of mud transported onto paved public roads by vehicles and/or runoff.

9.5.1.13. The EMP shall include a Waste Water Management Plan, identifying methods and procedures for management, treatment and discharge of waste waters.

9.5.2. Erosion and sediment control measures shall be implemented prior to work and maintained during the work phase, to prevent entry of sediment into the water where site access or other activities cause exposed soil. The following principles should be considered:

9.5.2.1. Diversions to limit run-on water;

9.5.2.2. Reduction of erosional forces by surface water velocity reduction;

9.5.2.3. Reduction of sediment development through sediment collection or anchoring;

9.5.2.4. Sedimentation of mobilized sediments;

9.5.2.5. Filtration of sediment-carrying flows;

9.5.2.6. Collection of captured or contained sediments;

9.5.2.7. Treatment of pH (hydronium and hydroxide).

9.5.3. The size of particles present in the sediment is a key consideration for selecting the appropriate sediment treatment option(s):

9.5.3.1. If the sediment consists primarily of gravel or sand, which are relatively large particles, a single treatment using a more basic technology, such as a sediment trap or sediment bag, may be adequate.

9.5.3.2. If the sediment consists of silt and/or clay, which are relatively small particles, the effluent will most likely need a more advanced technology, such as a filter press or chemical treatment with anionic flocculent and a filtration method.

9.5.3.3. If the sediment consists of a large spectrum of particle sizes, the water may need primary treatment to remove larger particles, followed by secondary treatment to remove finer particles.

9.5.4. Sediment control measures shall be implemented during any in-water work to control turbidity levels. Sediment/turbidity curtains, or other appropriate measures, shall be implemented prior to any in-water work that may result in sedimentation. These shall remain in place until all suspended sediments have settled.

9.5.5. Monitor water quality for unacceptable suspended sediment levels during in and near-water activities. Monitoring shall include the full scope and breadth of any incident.

9.5.6. All erosion and sediment control measures shall be inspected daily to ensure they are functioning properly and are maintained and/or upgraded as required to prevent entry of sediment into the water.

9.5.7. Environmental protection measures shall be checked after each extreme weather event.

9.5.8. If sediment and erosion control measures are not functioning properly, no further work shall occur until the sediment and/or erosion problem is addressed.

9.5.9. All disturbed areas of the work site shall be stabilized immediately and re-vegetated as soon as conditions allow. All exposed areas should be covered with erosion control blankets or other measures to keep the soil in place and prevent erosion until vegetated in the spring.

9.5.10. Soils shall be protected by laying geotextile and covering with a suitable depth of gravel, >100mm to prevent crushing/compaction of existing soils; alternative methodology for soil-compaction prevention may be utilized (ex. blast mats), as reviewed and approved by PCA.

9.5.11. Sediment and erosion control measures shall be left in place until all areas of the work site have been stabilized.

9.5.12. Upon completion of the work all debris shall be completely removed and the area restored to its original state or better. Repair all damages to property due to project activities.

9.5.13. Sediment control measures and exclusion fencing must be removed in a way that prevents the escape or re-suspension of sediments.

9.5.14. Erosion and Sediment controls shall not be removed without acceptance from PCA.

9.5.15. A US Dot II Marine Grade turbidity curtain will be maintained in the water around all working areas where sediments can enter the watercourse. If necessary or appropriate, a turbidity curtain shall be used during installation and removal of the cofferdams and/or dewatering process. It will be maintained in the water around all working areas during construction to contain and control the suspension of fines. If water levels/conditions do not permit the flotation of a turbidity curtain, other measures as approved will be implemented.

9.5.16. Turbidity curtains should be placed in accordance with US DOT II Marine Grade Specifications. Turbidity curtains are to be anchored or weighted down across its length to form a continuous seal on the substrate bed, with adequate floatation at the water's surface to prevent over spills of water.

9.5.17. With respect to turbidity curtain installation:

9.5.17.1. Perform an initial sweep of the work area to drive fish out prior to completely closing off turbidity curtains surrounding the work area.

9.5.17.2. Deployed turbidity curtains in a manner – e.g. moved in a direction from close to shore/structures outward – that prevent entrapment of fish inside the curtain.

9.5.17.3. Turbidity curtains shall not be deployed fully across the watercourse to serve as a barrier to fish migration.

9.5.18. Turbidity curtains should not be used as a primary or secondary settling area for dewatering activities. Supplementary sediment and erosion control measures should be installed prior to construction activities and should be added upon/reinforced as necessary.

9.5.19. No acid-generating rock (containing sulphides) will be used.

9.5.20. In the event of a significant sedimentation or debris caused by construction activities, the contractor will take appropriate measures to contain and mitigate the problem including the installation of additional downstream turbidity curtains.

9.5.21. The contractor will maintain a standby supply of pre-fabricated sediment fence barriers, or an equivalent ready-to install sediment control devices.

9.5.22. Avoid activities that could lead to erosion during excessively wet weather conditions; monitor forecasts for heavy rainfall watches & warnings.

9.6. <u>Concrete:</u>

9.6.1. Concrete leachate is alkaline and highly toxic to fish and aquatic life. Measures must be taken to prevent the incidence of concrete or concrete leachate from entering the watercourse. Maintain complete isolation of all cast-in-place concrete and grouting from fish-bearing waters for a minimum of 48 hours if ambient air temperature is above 0°C and for a minimum of 72 hours if ambient air temperature is below 0°C or until significantly cured to allow the pH to reach neutral levels. Avoid project activity during wet weather conditions

9.6.2. All concrete, sealants, or other compounds used for this project shall be utilized according to the appropriate Product Technical Data Sheet, stating guidelines and methods for proper use, and provided by the manufacturer of the product.

9.6.3. Ensure that all works involving the use of concrete, cement, mortars, and other Portland cement or lime-containing construction materials (concrete) will not deposit, directly or indirectly, sediments, debris, concrete, concrete fines, wash or contact water into or about any watercourse.

9.6.4. All concrete debris and dust generated as a result of various concrete work shall be removed in a way that will ensure material does not enter the waterway. All debris including unused aggregate or concrete rubble shall be completely removed and area restored to original state upon completion of work.

9.6.5. All concrete debris and slurry shall be placed into an enclosed container daily, or more frequently if required, in order to ensure that no debris escape or remain at the site.

9.6.6. All concrete waste/wash water shall be directed to an isolated/impermeable containment unit and removed from site.

9.6.7. At the discharge point into the watercourse, pH will be maintained between 6.5 and 9.0. Water with pH > 9 cannot be released directly back into the watercourse, but must be treated prior to release. Water with a pH ≥ 12.5 is considered toxic and treated as a hazardous waste under Ontario Regulation 347 of the *Environmental Protection Act* and wastewater in this condition must be removed from the site.

9.6.8. In the event of sedimentation or turbidity caused by construction activity, contractor shall stop all work and install additional sediment barriers as necessary to ensure watercourse is protected.

9.6.9. Mitigation Measures for Placement of Tremie Concrete, if applicable:

9.6.9.1. Ensure concrete forms are tight and no flow is occurring.

9.6.9.2. Isolate area with curtains or impermeable material specified for concrete particulates.

9.6.9.3. Ensure that fish exclusion procedures are followed and fish are not trapped within the turbidity curtain during placement;

9.6.9.4. Isolated area should be the minimum size required to complete task.

9.6.9.5. For tremie pours, CO_2 system must be installed and operating along the entire length of the isolated area. The tank shall be used to release carbon dioxide gas into an affected area to neutralize pH levels. Ensure sufficiently sized tanks for the concrete volumes used.

9.6.9.6. Workers shall be trained in the use of the system.

9.6.9.7. Use of neutralizing acids is not permitted.

9.6.9.8. pH monitoring conducted inside and outside the containment area, and downstream while the activity is taking place. Monitoring locations and frequency shall be outlined within the EMP.

9.6.9.9. Turbidity curtains shall be left in place until the pH is less than or equal to baseline conditions.

9.6.9.10. Use Anti-washout Admixture to decrease the percentage of concrete fines released to the water column Use grout bags where possible to further contain the concrete; and

9.6.9.11. Stop placement of concrete if fish kill is observed and contact PCA EA Officer.

9.6.10. In the event of a release of concrete or grout, PCA and the Ontario Spill Action Centre (1-800-268-6060) shall be notified; remediation will be conducted immediately contain and clean up in accordance with federal and provincial regulatory requirements **AND to the satisfaction of PCA**. Documentation of remediation, testing and results will be provided to Parks Canada.

9.6.11. Wash equipment away from water and provide containment facilities for the wash-down water from concrete delivery trucks, concrete pumping equipment, and other tools and equipment. Wash-out locations will be identified within the EMP.

9.7. Dewatering and Pumping Activities (If required):

9.7.1. If required, a de-watering Plan shall be submitted, as part of an EMP, to PCA for review and acceptance prior to any dewatering.

9.7.2. Submersible pumps or pump intakes used for dewatering and should be placed in the low point of the work site. If there is high turbidity, consider pre-filtering water that goes to the pump by placing it in a perforated drum with clear stone around the outside or other similarly designed approach.

9.7.3. Discharged water should be filtered by means of an appropriately designed sediment basin, anionic flocculation or by physical means such as a filter press.

9.7.4. Discharge of pumped water must be a manner that does not cause additional erosion.

9.7.5. Dewatering, demolition and construction is staged such that clean is pumped back to the system and turbid water is managed through a waste water system.

9.8. <u>Vegetation:</u>

9.8.1. Site clearing/commencement of construction should be planned to occur outside of sensitive nesting times (April 1 to August 31). If this is not feasible, then the site must be inspected by a certified biologist prior to clearing, to check for the presence of nests and other wildlife (particularly snakes and turtles).

9.8.2. Phase any vegetation removal to reflect construction activity; grubbing should not be conducted unnecessarily early in the schedule, and/or over an area that is larger than realistically required, to be properly mitigated with Erosion and Sediment controls

9.8.3. If large tree roots are extracted, they should be retained for post-construction restoration.

9.8.4. Where it is necessary to remove mature vegetation at any time of year, an inventory of species to be removed, coupled with a replanting plan using native species shall be submitted to PCA staff for approval.

9.8.5. Trees (and associated root systems), shrubs and vegetation which are to remain throughout construction should be properly identified and delineated with flagging tape or temporary fences.

9.8.6. Where practical, the branches of the large trees should be trimmed back as the first option rather than cutting the entire tree.

9.8.7. Should any woody vegetation require chipping/mulching, the after product will be stored onsite for the duration of the project to supplement erosion and sediment control methods where required.

9.8.8. Minimize clearing as much as possible to maintain riparian vegetative cover and windbreaks, where possible maintain vegetated buffer at shoreline and minimize clearing near water bodies. If buffers cannot be maintained, avoid grubbing of vegetation root mass in proximity to shorelines and stream banks.

9.8.9. Clear vegetation from unstable or erodible banks by hand, and where possible, avoid the use of heavy machinery. If machinery must be used, operate machinery on land and in a manner that minimizes disturbance to the banks of the water body.

9.8.10. Only cut trees using tools designed for tree cutting activities (e.g. chainsaw, brush saw).

9.8.11. Whenever possible, vegetation should be trimmed in early spring, late fall or winter. Trimming when the plant is actively growing (i.e. late spring summer and early fall) can further stimulate growth, weakening the plant and making it susceptible to disease.

9.8.12. Prune limbs close to the tree trunk. For a clean cut, make a shallow undercut first, then follow with the top cut. This prevents the limb from peeling bark off the tree as it falls. Do not use an axe for pruning.

9.8.13. If over half of a tree needs pruning, in most circumstances it will be best to cut it down instead of pruning. Cut trees off at ground level and do not leave pointed stumps.

9.8.14. In larger areas to be cleared attempts should be made to keep trees >15 cm DBH intact and instead remove lower limbs (< 2.5 m high).

9.8.15. Delineate areas to be avoided with flagging tape or temporary fences.

9.8.16. Ensure appropriate handling procedures are followed for noxious weeds such as Giant Hogweed (*Heracleum mantegazzianum*), Poison Ivy (*Toxicodendron radicans*) or Wild Parsnip (*Pastinaca sativa*).

9.8.17. In disturbed areas not designated for sodding, native species are to be used for tree planting and/or ground cover with mulch to prevent erosion and to help seeds germinate.

9.8.18. If there is insufficient time (at least four weeks) in the growing season remaining for the seeds to germinate, or at risk of germinating and being damaged by frost, the site shall be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring. Frost can occur as early as August 31st and late as June 25th.

9.8.19. Root systems of trees identified to remain should be properly delineated and fenced off, so as to protect the root systems from being crushed and impacted by machinery.

9.8.20. In the event that the installation of root-protectant fencing is not possible and/or ideal, alternative measures, as approved by PCA, must then be implemented. Such measures must provide a sufficient amount of soil compaction prevention with regards to the highest level of activity to occur within the immediate area of protection.

9.8.21. The success of all vegetative plantings shall be assessed through visual site inspections conducted at least once each spring and each fall for the first two growing seasons following planting. If at any time during the monitoring period any plantings are found dead or failing, mitigation measures shall be implemented to reduce the risk of future failure and the plants shall be replaced and monitored accordingly.

9.8.22. Burning of cleared vegetation is not be permitted.

9.8.23. Transplanting of trees or vegetation on site it not permitted without approval from PCA.

9.8.24. If required, apply the minimum amount of granular over the roots of the Eastern White Cedar that is required to support the grade raise of the western approach.

9.9. Wildlife:

9.9.1. If an animal is found within the limits of the fencing, it should be left alone to leave the area if possible. If found in the project area, turtles may need to be relocated prior to commencing work Contact PCA for guidance

9.9.2. The EMP must detail procedures (e.g. exclusion fencing) for preventing turtle entry/nesting within disturbed project gravels/soils during all stages of project activity.

9.9.2.1. As due diligence, isolation barriers (i.e. turbidity curtains, sediment fences, etc.) should be installed as early on in the fall season as possible, in order to prevent individuals from entering the work area and establishing over-wintering sites.

9.9.3. Once cleared and before staging set-up, temporary reptile fencing, such as polythene/ woven geotextile secured with timber stakes, or material of a similar nature/function, should be installed completely around gravel stockpiles to prevent turtle nesting in the project area. Exclusion fencing should also be installed completely around stockpiled material (wood chips, gravel, earth, etc.) to prevent turtle nesting in the project area. Fencing shall not have mesh or netted backing. For guidance on how to plan and install exclusion fencing, refer to the document titled Species at Risk Branch, Best Practices Technical Note, Reptile and Amphibian Fencing, Ver. 1.1, developed by the Ontario Ministry of Natural Resources and Forestry: http://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_tx_rptl_amp_fnc_en.pdf

9.9.4. The EMP must demonstrate procedures for avoiding disturbance/harm to wildlife and nesting birds.

9.9.5. Synthetic plastic Erosion Control Blankets/Mats should not be utilized, particularly during nesting season, as they pose as an entrapment hazard to turtles. Fibre-based bio-degradable Erosion Control Blankets/Mats are only to be utilized.

9.9.6. If recommended by an environmental professional and approved by PCA, exclusion zones or "no go" areas will be established to protect areas with known residences (e.g., hibernacula, dens, nests).

9.9.7. If recommended by an environmental professional and approved by PCA, conduct "Pre-stressing" activities within a few days prior to the onset of site preparation (vegetation clearing and grubbing) to encourage wildlife to move away from a site.

9.9.8. Field information regarding incidental encounters with wildlife (non-SAR wildlife) shall be compiled and reported on a daily basis.

9.9.9. For incidental encounters, the following information should be recorded in the field:

9.9.9.1. Locations, dates and time of day where the species were encountered;
9.9.9.2. Names of species encountered;
9.9.9.3. Photographs of the species, if taken;
9.9.9.4. Condition of animal.

9.9.10. If injured/dead wildlife are encountered report to PCA immediately. PCA may require retrieval and storage on ice of carcass for laboratory testing

9.9.11. The contractor shall ensure that all vehicles and equipment used by project personnel will follow any construction zone speed limits to reduce the risk of hitting wildlife, as enforced by the site supervisor.

9.9.12. Work areas will be kept clean and free of potential hazards to wildlife such as wire, cable, tubing, plastic, antifreeze or other materials that wildlife may eat or become entangled in.

9.9.13. Waste will be stored, handled, and transported in accordance with the Waste Management Plan, including storage of all solid waste in sealed, bear-proof containers.

9.9.14. Feeding of wildlife is prohibited.

9.9.15. Attractants (i.e. waste) shall be regularly removed from site to further deter the presence of wildlife in the work area.

9.10. Species At Risk:

9.10.1. The contractor is to ensure that species at risk training is provided to all employees before they begin work on site (materials can be part of the Environmental Protection Plan). Employees must be able to identify potential species at risk and know the proper procedures to follow when they encounter a species at risk.

9.10.2. If a Species at Risk is observed or suspected on or near the worksite (this includes snakes, turtles and/or eggs), the species must not be harmed or harassed. If the species does not leave or cannot leave the site, the contractor must immediately stop the works and contact PCA's EA staff on how to proceed. Additional measures to avoid impacts may be required before work can restart. Stand back and allow the animal to leave the site.

9.10.3. Should empty nest structures be observed on the underside of the bridge, they should be reported to PCA. If nests were to be found the contractor should discuss with PCA possible deterrent mitigations to discourage nesting in spring 2021.

9.10.4. Minimize the disturbed area; clearly mark the work space.

9.10.5. Park on roads or disturbed area only.

9.10.6. Rehabilitation and replantation efforts should include the planation of milkweed and butterfly-friendly flowers.

9.11. Invasive Species:

9.11.1. To reduce the risk of introducing invasive species, all equipment, clothing and footwear must be thoroughly cleaned prior to coming to the site. Any machinery that appears to have not been cleaned will not be permitted on site. For additional information or guidance on how to properly clean equipment, see the Clean Equipment Protocol for Industry developed by the Ontario Invasive Plant Council and found here:
http://www.ontarioinvasiveplants.ca/wp-content/uploads/2016/07/Clean- Equipment-Protocol_June2016_D3_WEB-1.pdf

9.11.2. Any equipment or vehicles which are to be used in water, should be thoroughly cleaned before and after use of any visible mud, vegetation, mussels, etc.

9.11.2.1. Vessels/equipment should be drained of standing water.

9.11.2.2. Vessels/equipment should ideally be cleaned with high pressure water (> 250 psi).

9.11.2.3. Vessels/equipment should be dried for 2 – 7 days in sunlight before transported between waterbodies.

9.11.2.4. Cleaning of vessels/equipment should be conducted away from waterbodies at a recommended distance of at least 30 m from the shoreline.

9.11.3. Mud, dirt and vegetation should be cleaned from clothing and footwear prior to entering the work site, and prior to leaving the work site.

9.11.4. Should an invasive species be encountered (or at least suspected), a photo and report of the specimen should be sent to PCA's EA staff and the Invading Species Hotline at 1-800-563-7711 or online at EDDMapS Ontario: https://www.eddmaps.org/ontario/.

9.11.5. Conduct a site assessment for invasive plant infestations prior to carrying out field activities.

9.11.6. Use weed-free material (i.e. sand, gravel, etc.) for erosion control and stabilization and weed-free seed and confirm that seed mix to be used for revegetation purposes does not (potentially) contain invasive plants.

9.11.7. Seed purchased commercially should have a label that states the following:

9.11.7.1. Species;

9.11.7.2. Purity: Most seed should be no less than 75 % pure and preferably over 85 % pure. The rest is inert matter or other seed;

9.11.7.3. Weed seed content: The tag should state NO invasive plants are present. Only certified weed-free seed should be used; and

9.11.7.4. Germination of desired seed: Germination generally should not be less than 50 % for most species, although some shrubs and forbs will have lower percentages.

9.11.8. Move only weed/contaminate-free materials into non-infested areas. Moving materials from one infested location to another within a particular zone may not cause contamination, but moving materials from infested to non-infested areas could lead to the introduction and spread of invasive plants.

9.11.9. If removal of invasive species occurs, individuals will be disposed of appropriately, offsite to ensure no further propagation.

9.12. Use of Treated Wood

9.12.1. Wood must not be treated with preservative onsite with the exception of small spot treatments. If spot treatments are required they are to be conducted on an impermeable surface and to be completely dry before installation.

9.12.2. Ensure that any Treated Wood purchased is marked with an End Tag to certify that it has been treated to the applicable CSA treatment standard. The end tag should show the preservative used, the use category, the product group and a plant identification number.

9.12.3. Use of Treated Wood must be in accordance to the CSA O80 Standard Product Group and Use Category system that corresponds to the planned context-specific use.

9.12.4. To mitigate risk of leaching, a sealer or coating may be used. Penetrating sealers are recommended due in addition to waterproofing the wood, the application of such sealers reduces the release of chemicals contained in CCA-Treated Wood by 80% to 95%.

9.12.5. To reduce leaching, wood treated with borate preservatives should not be used in locations where it will be subject to heavy rains or ground contact.

9.12.6. The use of cleaning and bleaching products containing sodium hypochlorite, sodium hydroxide, sodium percarbonate, citric or oxalic acid on Treated Wood should be avoided as these products can cause the wood to release toxic chemicals.

9.12.7. To minimize the need for in-field treatment it is recommended that framing, sawing, cutting and drilling be done before treatment to the maximum degree possible, preferably in a contained area to collect and remove sawdust and a minimum of 30 m from water.

9.12.8. Treated wood must be visually inspected before use to ensure that it appears clean and its surface is free of preservative residues. Otherwise, the lumber should not be used and should be disposed of in accordance with the manufacturer's guidelines and with local and provincial regulations.

9.12.9. Exposed cut ends and drill holes should be field-treated1 with a preservative (along with a sealer) in accordance with the manufacturer's and the Pesticide Label instructions, preferably a minimum of 30 m from water and in a protected cutting area prior to the assembly of the wooden structure.

9.12.10. Workers must always cut and work with Treated Wood outdoors or in an adequately ventilated area and ensure that cut ends and sawdust from Treated Wood are collected and disposed appropriately as specified in the Treated Wood Pesticide Label.

9.12.11. If Treated Wood is to be stored on site, the following table provides recommended instructions (modified from Environment Canada, 2004):

Time Period	**Volume of Storage**	**Factors**
90 Days or Less	55 m^3 or less	- Store on flat ground (slope less than 10%) and a minimum of 10 m from environmentally sensitive area - Elevate to avoid contact with water runoff - Provide absorbent (ex. wood chips) or limited permeability (ex. Concrete) base - Minimize on site storage time - Inspect wood upon delivery to ensure it meets ordering specifications - Place tarpaulin or weather resistant material over wood - Inspect storage area for evidence of leaching treatment chemicals

	More than 55 m^3 ***(Additional factors)***	- Store a minimum of 30 m from environmentally sensitive area
More than 90 days	55 m^3 or less ***(Additional factors)***	- Store a minimum of 3 m from drainage ditches - Provide emergency response information and fire protection equipment - Limit access to the storage area
	More than 55 m^3 ***(Additional factors)***	- Store a minimum of 30 m from environmentally sensitive area and a minimum of 3 m from drainage ditches - Store at least 30 m from potable water supply and outside of 100-year flood plain where possible - Store at least 30 m from forested area and clear storage area of combustible ground vegetation. - Choose a storage area where runoff can be captured/managed - Provide fencing and/or signage around area

9.12.12. If the chemical solution is accidentally spilled while ends are being field-treated, the spill should be managed in accordance with site-specific spill control and response plan or other prescriptive mitigation measures. Alternatively, the spill should be contained with a disposable absorbent substance (soil, sawdust, forest litter or rags), cleaned up immediately and disposed of safely as per the Pesticide Label directions.

9.12.13. Due to the toxic chemicals that may be produced in the smoke and ashes, Treated Wood should never be burned.

9.12.14. Collect all remaining scraps, cuttings, wood chips and sawdust in a timely manner and dispose of them appropriately at an appropriate disposal facility and as specified in the Pesticide Label. Do not compost waste material.

9.13. <u>Cultural Resources and Archaeology:</u>

9.13.1. Vehicular access routes and staging areas will be restricted to present-day roadways, parking lots, exposed bedrock areas and significantly disturbed areas. If this is not possible, the PCA Project Manager should contact the Parks Canada subject experts for input.

9.13.2. Parks Canada requires, when temporary structures are installed on a site, that the contractor safeguards the character-defining elements of the sites on the Rideau Canal National Historic Site World Heritage Site. The contractor should bear in mind that at national historic sites, the recommended practice is what is called a minimal intervention approach, as defined in the Standards and Guidelines for the Conservation of Historic Places in Canada.

9.13.3. All work must occur within the area as originally designed and that was reviewed for the Archaeological Overview Assessment. Should the location of the staging areas be modified and/or additional staging areas or access routes be required, forward additional information to the Terrestrial Archaeology section for review. Additional archaeological mitigation may be required.

9.13.4. Notify Parks Canada staff upon discovery of any archaeological resources. If features are encountered, leave in place, mark the location and contact Parks Canada staff to take photographs and, if possible, depth measurements. The Parks Canada representative must

provide the information immediately to Archaeology team for advice and assessment of significance, which will in turn determine what will be required to mitigate the find. Work in the area can resume when the Archaeology section has provided clearance.

9.13.5. If significant features (i.e., structural remains and/or high artifact concentrations) are encountered during construction activities, excavation should cease in the immediate area, and the Parks Canada Project Manager be informed. The Project Manager should then contact Parks Canada's Terrestrial Archaeology section for advice and assessment of significance, which will in turn determine the requirements to mitigate the find.

9.14. Air Quality and Noise:

9.14.1. All on-site vehicles are expected to have a Drive Clean Emissions Report in compliance with O. Reg. 361/98: Motor Vehicles under the Environmental Protection Act, R.S.O. 1990, c. E.19. EA Officers may stop a vehicle if they believe the vehicle is emitting excessive exhaust smoke or suspect that emission control equipment has been tampered with or removed.

9.14.2. Use well-maintained heavy equipment and machinery, preferably fitted with fully functional emission control systems/muffler/exhaust baffles, engine covers, etc. In addition, employ timing and location of construction activities to reduce or minimize the effect of noise on nearby residents, recreational users, and wildlife.

9.14.3. Machines shall not be left to unnecessarily idle in order to avoid emissions.

9.14.4. Adhere to local and municipal noise by-laws.

9.14.5. Notify residents of planned activities that may cause disturbance and schedule them to avoid sensitive time periods.

9.14.6. Due to the proximity of the work site to water, calcium chloride shall not be used to suppress concrete dust.

9.15. Waste Management:

9.15.1. Littering is prohibited. Garbage and waste material onsite is to be collected daily and stored in appropriate containers/bins.

9.15.2. Burning or burying of waste is prohibited.

9.15.3. Recyclable material and waste shall be removed from the site, in accordance with all federal, provincial and municipal regulations, to disposal facilities licensed to receive them.

9.15.4. Waste containers should be sealed or lined to prevent leakage of liquid wastes.

9.15.5. Waste generated will be disposed according to regulations (i.e., O. Reg. 102/94 and O. Reg. 558/00, R.R.O. 1990, 347).

9.16. Work Area Commissioning and Site Restoration:

9.16.1. Sediment and Erosion control measures are to only be removed with approval from PCA.

9.16.2. Upon completion of work there shall be a final clean-up of the site. No tools, temporary structures, or parts thereof, used or maintained for the purpose of this project shall be permitted to remain at the site or enter the water after completion of the project.

9.16.3. If applicable, ensure that all construction debris is removed from the work area prior to rewatering. This may involve sweeping and hosing down the bottom of work area. All wash water is to be collected and treated.

9.17. Floods, Extreme or Inclement Weather, and Ice Formation:

9.17.1. Undertake construction under normal weather conditions, to the extent possible, and design the project worksite to withstand variable weather conditions.

9.17.2. When there is a high probability of a rainfall event, apply wet weather restrictions on construction activities to reduce surface run-off from exposed work areas and to minimize the risk of inundation.

9.17.3. The work area shall be stabilized against the impacts of high flow/heavy rainfall events at the end of each workday.

9.18. Environmental Monitoring and Reporting:

9.18.1. Environmental mitigation measures shall be inspected daily and a daily checklist/log shall be maintained over the duration of the project.

9.18.1.1. Any deficiencies should be addressed immediately.

9.18.2. Daily Water Quality (NTU, pH, etc.) records shall be maintained by the contractor and shall be provided to the Departmental Representative on a weekly basis.

9.18.2.1. Water Quality sampling shall be collected at a minimum frequency of once per day. Testing locations should be specified within the EMP and may be modified (with PCA acceptance) dependent of site activity and/or downstream effects (i.e. in the event of a plume release into the watercourse [turbidity, concrete fines, etc.] additional testing should be conducted further downstream to track the movement and dissipation of the plume through the watercourse).

9.18.2.2. Water Quality parameters in exceedance of accepted water quality ranges, should be reported immediately to PCA (i.e. Water quality <6 or >9, and/or NTU <8 above baseline).

9.18.3. SAR, Invasive species, and wildlife sightings, or lack thereof, should be reported on the daily inspection checklist.

9.18.3.1. SAR-related incidences should be reported immediately to PCA.

9.18.4. Environmental summary reports shall be completed monthly and provide details of monitoring work completed, the findings of all monitoring, and details of how and when issues were resolved.

9.18.5. Following completion of the project, weekly ESC monitoring or ESC monitoring following precipitation / snowmelt events, shall be completed until vegetation has become establish on all disturbed areas and ESC measures are removed.

9.18.6. Any damages should be repaired immediately and any accumulation of sediment should be removed and disposed of as required by all applicable federal, provincial, and municipal laws, regulations, and guidelines.

9.18.7. The Contractor shall provide a written checklist of for inspection for vehicle/machinery leaks and overall condition, and, for the purpose of invasive species a written record of measures taken to clean vehicles/machinery/equipment.