

# Basic Impact Analysis

## Johnston Canyon Rock Scaling, Catwalk and Trail Repairs

Banff National Park  
July 2015

### 10. EFFECTS ANALYSIS

The Contractor selected to undertake this project will be required to submit an Environmental Protection Plan (EPP) to the Parks Canada Environmental Assessment Office for review prior to starting work that clearly demonstrates their plan to implement the mitigation measures outlined below in this report.

#### Soils and Landforms

##### *Potential Effects*

Potential effects to soils and landforms include the following:

- Soil compaction and rutting from equipment access on the Johnston Canyon trail, as well as on the old fire road access, which will be used for equipment access to the top end of the work area. Effects on the Johnston Canyon trail are expected to be minimal, as the equipment accessible portions of the trail are paved, although there is potential for soil disturbance if equipment goes off the paved portion of the trail. There is greater potential for effects on the old fire-road trail, which is not paved.
- Soil contamination from accidental spills or leaks of hydrocarbons from equipment, vehicles and/or during refueling.
- Increased use of the old fire-road trail by visitors over the long term if the equipment access results in the trail becoming more obvious, visible and accessible to visitors.
- Landform alteration (i.e., changes to the rock features that make up the canyon walls) due to rock scaling and trimming. No scaling or trimming is proposed in proximity to the travertine formations.

##### *Mitigation Measures*

- Minimize the number of vehicle/equipment trips on the fire-road trail, as much as possible;
- Avoid working during and directly after heavy rainfall events.
- Rehabilitate all areas where soil and/or vegetation damage has occurred as a result of project activities.
- Use appropriately placed downed wood, boulders and/or possibly signage where the fire-road trail connects to the Johnston Canyon trail above Catwalk #6 to deter public access following completion of the project.

- The contractor must have an appropriate spill management plan in place, including designated re-fuelling areas located at least 30 m from any water bodies, secondary containment for all equipment and re-fuelling area(s), and appropriate spill containment and clean-up materials for each piece of equipment, as well as appropriate training for all staff.
- Rock scaling and trimming will be undertaken carefully and diligently only to remove unstable rock and avoid causing any rock to become unstable. The Contractor will be directed on site by the Departmental Representative regarding the scope and intensity of the rock scaling required in order to minimize alteration to the appearance and configuration of the canyon walls.

## **Vegetation**

### *Potential Effects*

Potential effects to vegetation include the following:

- Loss of native vegetation due to removal of hazard trees that pose a potential safety hazard (i.e., they could fall on the trail), as well as incidental removal of other trees and vegetation, including shrubs, forbs, mosses and liverworts, as required in order to complete the rock scaling and trimming.
- Vegetation damage from worker access (foot traffic) between the old fire-road trail and the top of the canyon, as well as from air compressor lines for rock drills etc. that will need to be run from the access road to the canyon.
- Introduction of non-native invasive vegetation species as a result of import of weed seeds on equipment and/or increased weed establishment in areas of soil disturbance.

### *Mitigation Measures*

- All equipment must be clean and weed free (pressure washed) prior to starting work at the site.
- Keep equipment and vehicle use to existing trails and trail treads as much as possible.
- Ensure all workers take care to minimize vegetation damage due to foot access, equipment set-up and operation.
- Minimize vegetation removal as much as possible, removing only that which is required to ensure the safety of visitors. This includes removal of moss, forbs, shrubs and trees in order to complete the rock scaling and trimming and hazard tree removal. Moss covered areas that are included within the areas proposed for rock scaling (see photo summary in Attachment 2) will be checked over and, provided no instability is evident, will be left undisturbed (Hunt 2015). Generally moss grows over soil and more sporadically rock, the moss helps hold the soil mass together and prevent erosion and therefore is best left undisturbed. All vegetation planned for removal will be reviewed with the Parks Canada Environmental Surveillance Officer (ESO) prior to removal.
- Blasting mats and other appropriate measures will be used to control fly rock during the trim blast to prevent damage to vegetation.
- Areas of soil and/or vegetation damage will be restored in consultation with the Parks Canada ESO and Vegetation Specialists.

- Use appropriately placed downed wood, boulders and/or possibly signage where the fire-road trail connects to the Johnston Canyon trail above Catwalk #6 to deter public access following completion of the project.
- Monitor disturbed areas for weeds for three growing seasons following completion of the project and apply weed control measures and additional vegetation restoration measures as necessary, in consultation with Parks Canada vegetation specialists.

## **Wildlife**

### *Potential Effects*

Potential effects on wildlife include the following:

- Short-term effects to wildlife are expected during the construction period due to sensory disturbance from project activities. The Johnston Canyon trail is a high use facility therefore wildlife present in and around the canyon are likely habituated to human presence, however the type of noise from hazard tree removal, rock scaling and trimming is likely to have a more pronounced, albeit intermittent wildlife disturbance effect. Effects are also likely on the old fire-road trail, which is likely used by wildlife to travel up Johnston Creek and which normally sees relatively little human use. Increased human use on this trail, combined with equipment noise is likely to result in displacement of wary wildlife from this trail and its immediate vicinity during construction activities.
- Disturbance, injury and/or mortality of breeding birds as a result of vegetation removal (i.e., disturbance or destruction of occupied nests).
- Disturbance, injury and/or mortality of cliff nesting birds (black swifts, dippers and occasionally great horned owls) as a result of rock scaling and trimming activities.

### *Mitigation Measures*

- Work will occur during daylight hours only (approximately 0700 to 1900), avoiding the sensitive dawn and dusk times that are particularly important for wildlife.
- Minimize the number of vehicle/equipment trips on the fire-road trail, as much as possible;
- Materials that might attract wildlife (e.g. lunches and food scraps) must be kept secure at all times.
- The ESO will be notified immediately about any dens, litters or nests within or around the site. Any carcasses (road kills), bear activity, carnivore encounters or other aggressive wildlife or nuisance wildlife encounters on or around the site should be reported immediately to Banff Dispatch at (403) 762-1470.
- The project will occur from 08 September to 08 October 2015, which is outside of the breeding bird season. Black swifts have been known to stay on the nest until into mid-September, however surveys undertaken on 07 July and 22 July 2015 confirmed that there are no occupied black swift nests in Johnston Canyon this year.

## **Aquatic Resources**

### *Potential Effects*

No in-stream works are proposed as part of this project, however potential effects on aquatic resources include the following:

- Sedimentation of Johnston Creek from the deposit of organic and inorganic materials resulting from vegetation and soil removal and rock scaling and blasting activities over the creek. Sediment entering flowing watercourses could have direct and indirect impacts on aquatic resources, including the alteration of invertebrate habitat and production, the potential smothering of incubating fish eggs, and increased stress on fish which can impact their physiology (i.e., growth rates) and reduce their resistance to diseases.
- Contamination in Johnston Creek from accidental or incidental spills or leaks of hydrocarbons related to equipment operation, refuelling, leaks, exposed grease or accidental spills of concrete, asphalt or welding materials. The release of hydrocarbons or other contaminants can result in behavioural, physiological or lethal effects on aquatic resources. Physiological effects may be indicated by a reduction in growth, a decrease in overall condition of the fish, or a reduction in reproduction. If hydrocarbons or contaminants such as cement are released at a high concentrations, lethal effects might be observed in fish.
- Potential to permanently constrict Johnston Creek if the trim blast rock is allowed to fall into the creek and/or if the retaining wall replacement is constructed in a manner that increases its permanent footprint below the ordinary high water mark of the creek.
- Use of explosives in or near water produces shock waves that can damage a fish swim bladder and rupture internal organs. Blasting vibrations may also kill or damage fish eggs or larvae. Rock that falls into the creek can also cause direct physical harm or mortality to fish. The likelihood of fish presence in the direct vicinity of the trim blast is considered very low given its location between significant water falls. There is no known fish spawning habitat within the canyon.

### *Mitigation Measures*

- In addition to minimizing the amount of rock scaling and vegetation removal as much as possible, the amount of soil, organic materials and rock dust/debris that will fall into the creek will be kept to a minimum through containment, collection and appropriate disposal of debris wherever feasible. Material that has fallen on the trail or catwalks will not be pushed into the creek. The contained and collected debris will be removed and disposed of in a manner deemed appropriate by the ESO.
- The installation of two new culverts will be undertaken in dry conditions if possible with appropriate erosion and sediment control implemented as needed to minimize sediment inputs to the ephemeral drainage. The proposed erosion and sediment control measures will be reviewed with the ESO prior to this work starting.
- No asphalt will be permitted to fall into the creek and any old pieces that have slumped into the creek will be removed where it is safe to do so.
- All waste asphalt will be disposed of at an appropriate facility.

- Paving work in the rain should be avoided. If the work schedule requires work in the rain, the area of work must be isolated and appropriate sediment controls must be in place to prevent the release of sediment-laden water or any other deleterious substances into surface waters, particularly for surface repair works requiring the application of patching and sealing compounds, tar, asphalt and chemical surface sealants.
- In order to prevent concrete from going into the creek during construction of the retaining wall replacement, a wooden form will be custom made and secured to bedrock using dowels. Hessian sacking and caulking will be used to seal the form. Concrete will then be carefully placed behind the form. The concrete for this foundation work will be mixed as close as possible to the retaining wall, thereby reducing the likelihood of spillage during transit.
- At the location of the foundation repair at Catwalk #6, the area immediately beneath it is in the riparian zone, but only receives water in flood conditions. Concrete spills from this foundation repair work are highly unlikely to reach the creek, however care and attention is required by the Contractor. A wooden form made out of plywood will be secured with dowels driven into the soil mass around the area where concreting work is to occur. Hessian sacking and caulking will be used to ensure the form is adequately sealed against the soil. The concrete will be mixed at the end of Catwalk #6 in a more open area away from the creek (to prevent and reduce the likelihood of spills during transit).
- Fuel will be in a double lined container within a pickup truck which will be used to transport fuel and top up stationary equipment as required. Spill kits will be on hand and kept near this equipment as well as on the refueling truck.
- Cement will be transported in bags and only opened prior to mixing. To protect the cement, but also to contain potential spillage, the stockpile of cement will be covered and bags opened singularly when required.
- During removal and installation of railings, wooden plywood or other suitable materials will be used or hung below the work area to contain debris from cutting, welding, grinding, etc. Welding rods will also be collected and disposed of appropriately.
- The gabion basket retaining wall will be designed and constructed in a manner that will not result in any new footprint within the ordinary high water mark of the creek.
- A blasting plan will be prepared for the trim blast by an appropriately qualified blasting consultant. Specifically, the blasting consultant shall have 10 years of experience in the design of blasts for rock excavation and trim blasts on slopes for rock stabilization purposes. The blasting consultant shall not be a direct employee or affiliated with the Contractor and shall be registered with a professional body.
- The blasting plan will be reviewed by Parks Canada prior to the work and it must demonstrate that the potential for impacts to fish from the use of explosives near water will be minimized, including:
  - Designing the blast to minimize the amount of rockfall into the creek (i.e., the rock should slump down onto the trail as much as possible).
  - Advising on any additional measures that may be required to ensure that the rockfall does not impinge the creek flow.

- Minimizing the charge weights used and subdividing each charge into a series of charges in blast holes (i.e., decking) with a minimum 25 millisecond (1/1000 seconds) delay between charge detonations.
- Use blasting mats to minimize scattering of blast debris.
- Do not use ammonium nitrate based explosives in or near water due to the production of toxic by-products.

## **Aesthetics**

### *Potential Effects*

The canyon is renowned for its natural beauty and the relatively untouched appearance of the canyon walls, including lush growths of moss and other vegetation on rocky outcrops. The project has the potential to negatively affect the aesthetic values of the canyon if excessive vegetation removal and/or rock scaling occurs. Also, the addition of the expanded metal mesh on all of the railing sections will alter the appearance of the catwalks and railings, making them less visually permeable and therefore higher profile within the canyon viewscapes.

### *Mitigation Measures*

There are no mitigation measures to reduce the aesthetic effects of the addition of expanded metal mesh on the railings. This design was selected due to its overall effectiveness in improving safety for the public, its durability and its lower cost compared with adding more rails to the railings. The rock scaling, trimming and bolting will be undertaken in a manner that respects the relatively pristine aesthetics of the canyon (Hunt 2015), including:

- The rock scaling and trimming will be kept to the minimum required to ensure public safety while disturbing as little of the natural appearance of the canyon walls as necessary, as described above for soils and vegetation.
- All drill hole traces will be removed and rock bolts will be installed in a manner to hide their installation from view.
- Consideration could be given to cutting peep-holes in the expanded metal mesh at strategic locations and/or viewpoints in order to facilitate improved viewing for younger children.

## **Public Facilities and Services**

### *Potential Effects*

In order to complete the project safely, the Johnston Canyon trail must be closed to the public for the one-month duration of the work. The parking lot and washrooms will also be closed to the public.

### *Mitigation Measures*

- The project is being undertaken after the Labour Day weekend to avoid disrupting use of the trail during the peak summer season.