

Attachment A – Determination of No Impairment

Nisqually to Paradise Road Repair and Improvements Environmental Assessment Mount Rainier National Park

While Congress has given the National Park Service (NPS) management discretion to allow impacts within the park, that discretion is limited by the statutory requirement (generally enforceable by the federal courts) that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. This cornerstone of the Organic Act establishes the primary responsibility of the NPS to ensure that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them. This Determination of No Impairment was prepared by the NPS based solely on the professional judgment of the park manager.

The impairment of park resources and values may not be allowed by the NPS unless directly and specifically provided for by the legislation or by the proclamation establishing the park. The relevant legislation or proclamation must provide explicitly (not by implication or inference) for the activity, in terms that keep the Service from having the authority to manage the activity so as to avoid the impairment.

The impairment that is prohibited by the Organic Act and the General Authorities Act is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of these resources or values.

An impact on any park resource or value may, but does not necessarily, constitute impairment. An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or identified in the park's general management plan or other relevant NPS planning documents as being of significance.

An impact will be less likely to constitute impairment if it is an unavoidable result of an action necessary to pursue or restore the integrity of park resources or values and it cannot be further mitigated. An impact that may, but would not necessarily lead to impairment may result from NPS activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park. Impairment may also result from sources or activities outside the park.

The National Park Service's Management Policies 2006 requires analysis of potential effects to determine whether or no actions would impair park resources. The park resources and values that are subject to the no-impairment standard include:

- the park’s scenery, natural and historic objects, and wildlife, and the processes and conditions that sustain them, including, to the extent present in the park: the ecological, biological, and physical processes that created the park and continue to act upon it; scenic features; natural visibility, both in daytime and at night; natural landscapes; natural soundscapes and smells; water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures, and objects; museum collections; and native plants and animals;
- appropriate opportunities to experience enjoyment of the above resources, to the extent that can be done without impairing them;
- the park’s role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the national park system, and the benefit and inspiration provided to the American people by the national park system; and
- any additional attributes encompassed by the specific values and purposes for which the park was established.

The purposes of Mount Rainier National Park are provided by the enabling legislation (March 2, 1899), the Organic Act of 1916 as amended by the Redwoods Act of 1978, and the Washington Parks Wilderness Act of 1988. Mount Rainier National Park is to be managed:

- to protect and preserve its natural and cultural resources, processes, and values, while recognizing their increasing importance in the region, the nation, and the world;
- to provide opportunities for visitors to experience and understand the park environment without impairing its resources to maintain wilderness values; and
- to provide for wilderness experiences.

Based on the 1916 Organic Act and the Mount Rainier National Park GMP, topics from the EA that were evaluated for potential impairment due to implementation of the Selected Alternative include: air quality and greenhouse gas, vegetation and special status plant species, wetlands, water resources (quality and quantity), floodplains, fish and wildlife and special status wildlife species, cultural landscapes, archaeological resources, and visual quality. Non-resource topics such as park operations, visitor use, or public health and safety are not subject to impairment determinations.

NATURAL AND CULTURAL RESOURCE TOPICS

Air Quality and Greenhouse Gas

The park is designated a Class I area under the Clean Air Act of 1977. This designation maintains the highest air quality and allows only small increments of pollutants above the existing park levels. In addition, the designation requires protection of air quality-related values important to the overall park visitor experience. The NPS is committed to controlling greenhouse gases (GHG) and has developed a Climate Change Response Strategy.

Ground-disturbing activities during construction from pulverizing or milling existing asphalt, excavation, shoulder work, and wall construction will temporarily generate dust and affect air quality.

Water will be used, as needed, as a dust suppressant to minimize the potential for construction impacts on air quality. Road rehabilitation will not increase vehicle capacity and, therefore, will not increase air emissions from existing levels of vehicle traffic. Compared to the baseline levels, the project will increase GHG levels by about 2.4%. Thus, the increase in GHG on an annual basis will generate local short-term negligible to minor adverse impacts. Air quality impacts from construction vehicles and equipment exhaust emissions, and generation of dust from ground disturbance will not result in an impairment of air quality or substantial contribution to greenhouse gas because construction-related adverse effects will be local, short-term, and minor.

Vegetation and Special Status Plant Species

The Nisqually – Paradise Road crosses several vegetation communities in the project area. The road begins in temperate forests in the Nisqually River Valley, passes through montane forests at middle elevations, and then passes through subalpine parkland in the area near Paradise. Three general forest community types are present within the project area—the western hemlock zone, pacific silver fir zone, and mountain hemlock zone.

Road rehabilitation will occur primarily within the existing disturbed road prism, but incidental effects on vegetation and special status plants adjacent to the road will occur from paving operations and structural repairs, embankment stabilization, drainage work, and other improvements. Deep patches and subexcavation will impact the roots of 17 trees larger than 18 inches diameter at breast height. The selected alternative will have local long-term minor adverse effects on vegetation from road rehabilitation disturbances that are estimated to temporarily affect about 0.02 of an acre and local long-term adverse impacts from placing riprap on about 0.72 of an acre of roadside vegetation at New Tahoma Creek and Kautz Creek. Replacement of about 100 culverts will have a local short-term minor adverse effect on vegetation. Weed establishment in areas of disturbed soil also is possible, but will be reduced with weed control practices. A few specimens of state rare plant species—gnome plant and lanceleaf grapefern—may be adversely affected by construction; although salvage and transplanting will be used to reduce impacts. One bryophyte species of interest is likely to be adversely impacted from ditch work adjacent to the road. Improvements to drainage and reductions in erosion will have a long-term beneficial effect on vegetation. The selected alternative will not result in an impairment of vegetation resources because construction-related adverse effects will be local, short- and long-term, and minor. In addition, a number of resource protection measures will be implemented to protect trees and vegetation, minimize the potential for weed establishment, and ensure restoration of disturbed areas.

Wetlands

Wetlands are present in several locations in and near the project area. Tahoma Creek, Kautz Creek, and the Nisqually River are perennial streams crossed by the existing road. Several other smaller streams cross the road from Nisqually to Paradise and down the Valley Road. Scrub-shrub and forested wetlands are scattered along Tahoma Creek and the Nisqually River. New Tahoma Creek is a small channel with gravel substrate and scrub-shrub and emergent wetlands in some locations. The recently developed new Kautz Creek channel has a cobble and stone substrate with no wetlands present where the road crosses. Wetlands are also present near multiple culvert inlets and outlets where perennial or intermittent flows are conveyed under the road.

Grading of roadside ditches that have filled with sediment to restore drainage away from the road will have a long-term adverse impact on about 1 acre of wet ditches that support wetland plant species. Replacement of about 100 culverts and culvert cleaning at some locations will result in small temporary wetland disturbances or sediment deposition in wetlands at culvert inlets and outlets. Several existing culverts will be replaced with larger culverts to support fish passage. Installation of the larger culverts will have less than 0.25 of an acre of temporary impacts on wetlands. The new culverts will have a beneficial effect on the adjacent wetland complex from improved hydrology and fish passage. Installation of the new culvert at New Tahoma Creek and placing riprap at the culvert outlet will result in incidental short-term impacts on less than 0.007 of an acre of wetlands and less than 0.10 of an acre of stream channel below the ordinary high water mark. No permanent loss of stream channel will occur at New Tahoma Creek. Placement of rock below the existing West Side Road culvert outlet to reduce scour and facilitate amphibian movement will affect a small area of waters, but no wetlands. The Kautz Creek drainage improvements will result in a permanent impact on less than 0.01 of an acre of wetlands from placement of riprap fill in the existing overflow ditch. Less than 0.01 of an acre of streambed will be permanently affected by riprap placed near inlets to the two 12-foot-diameter culverts on Kautz Creek.

The selected alternative will not result in an impairment of wetland resources because construction-related activities will result in local short-term minor adverse effects from temporary wetland disturbance and local long-term minor adverse effects on wetlands from ditch grading and placement of riprap in a roadside ditch. Road rehabilitation and drainage work that reduce erosion and promote soil stability will have long-term beneficial effects on wetlands. All construction activities near wetlands will be confined to the smallest area necessary to complete the work, and all temporarily disturbed wetland areas will be restored with native wetland vegetation following construction.

Water Resources-Quantity and Quality

The Nisqually River parallels much of the Nisqually – Paradise Road. Other principal drainages in the project area include Tahoma Creek and New Tahoma Creek, a channel that carries overflow from the Tahoma Creek via an existing box culvert. Kautz Creek is a large perennial stream with a bridge crossing and a second Kautz Creek channel, formed by a flood event in 2006, crosses under the road via two large culverts installed following the flood. Christine Falls is on Van Trump Creek and Narada Falls is on the Paradise River. The Nisqually – Paradise Road crosses a number of other smaller perennial and intermittent drainages throughout the project area. In addition, the roadside ditches intercept road drainage and sideslope discharges.

Road repairs involving excavation, grading, and exposure of soil material will increase the potential for erosion and stream sedimentation until vegetation is established, paving is completed, drainage work is installed, and other stabilization work is finished. Drainage improvements at New Tahoma Creek and Kautz Creek will provide long-term benefits to water resources from more controlled conveyance of flood flows and reduced potential for erosion during high flows. Other drainage improvements including culvert and ditch cleaning, installation of new culverts or culvert replacement, abutment protection of the Edith Creek Bridge, and drainage improvements at Narada Falls and elsewhere will temporarily introduce sediments into drainages, but will have a long-term benefit by restoring or improving drainage functions and protecting structural and natural features. Overall, the planned structural and drainage improvements will result in a local short-term minor adverse impact on water quality from ground disturbances that introduce sediment into drainages,

and a long-term beneficial effect from rehabilitation of deteriorating road conditions and improved drainage conveyance. Water extractions from local streams for construction use will result in a local short-term minor adverse effect on streamflow and water quality from periodic withdrawals. The selected alternative will not result in an impairment of water resources because any construction-related adverse effects will be local, short-term, minor, and mitigated with resource protection measures. Rehabilitation work will result in a long-term benefit on water resources by increasing the conveyance capacity of drainage structures, and improving or restoring hydrologic functions.

Floodplains

Floods in the park can occur throughout the year from precipitation events, glacial outburst, and rapid melting of snow and ice. Tahoma Creek has experienced glacial outbursts, and flood events in 2006 led to debris flows that closed the West Side Road and washed out portions of the Nisqually – Paradise Road. The 2006 flood redirected about 20% of the Tahoma Creek flow to the New Tahoma Creek channel. Kautz Creek also has experienced flood events, including the event in 2006 that resulted in stream avulsion that washed out a section of the Nisqually – Paradise Road and created a new Kautz Creek channel. The new channel and culvert crossings are still vulnerable to failure from future hydrologic events that exceed the existing structures' capacities. Increased aggradation of stream channels from flood events and debris flows is expected to remain a concern for protecting park roads and infrastructure. Continued changes in the Tahoma and Kautz creek channels and floodplains are likely in the future.

Replacement of the existing undersized box culvert at New Tahoma Creek with an 11-foot culvert will have a long-term beneficial effect on the ability of this channel to convey flows. Drainage improvements at Kautz Creek will improve the ability to convey flood flows and protect the road from damage. Filling in the overflow ditch allows the Kautz Creek flow to randomly access alluvial fan areas in a more natural, unrestrained manner. The grade control established by the riprap-filled ditch will reduce the potential for a new large primary active channel developing. The riprap armoring will protect the road from substantial damage during flood events while reducing resource impacts. These measures will improve floodplain function and will have a local long-term beneficial effect on the floodplain by increasing conveyance capacity and reducing the potential for damage to the road. The selected alternative will not result in an impairment of the floodplain because rehabilitation and drainage work is designed to improve conveyance of flood flows while protecting the road. See Floodplain Statement of Findings in Attachment C.

Fish, Wildlife, and Special Status Wildlife Species

Mount Rainier supports a wide diversity of fish and wildlife species. The project area contains habitat for many bird, mammal, reptile, amphibian, fish, and invertebrate species, and several special status species including the federally-listed northern spotted owl and marbled murrelet.

Noise and construction disturbance will temporarily impact fish, amphibians, mammals, birds, and some special status wildlife species. The selected alternative may affect, but is unlikely to adversely affect, the northern spotted owl. Mitigation measures will be implemented to restrict the timing of construction activities near northern spotted owl habitat until young owls have fledged. Because it is not feasible to limit construction to avoid the breeding season for marbled murrelets, construction activities may affect, and are likely to adversely affect, murrelets. Mitigation measures for northern

spotted owls also will reduce impacts on marbled murrelets. An Incidental Take Statement with associated Terms and Conditions from the draft Biological Opinion (BO) was prepared by the U.S. Fish and Wildlife Service (USFWS) and received on November 14, 2012. The USFWS indicated that the selected action will have no foreseeable adverse effects to northern spotted owls with implementation of conservation measures and the selected action will have foreseeable adverse effects to the marbled murrelet from construction related noise and visual disturbance. The USFWS reached a preliminary conclusion of “no jeopardy” for the marbled murrelet and provided draft reasonable and prudent measures and terms and conditions to minimize impact to these species and incidental take to the marbled murrelet. The NPS will implement these measures as part of the project. Impacts on other special status species that are not federally listed will be local, short- to long-term, minor to moderate, and adverse from temporary disturbances during construction. Installation of a fish-passable culvert at New Tahoma Creek and other culvert replacements will have a long-term benefit on cutthroat trout and other aquatic species. There will be no effect on essential fish habitat for Chinook salmon, coho salmon, or pink salmon. The selected alternative will not result in an impairment of fish, wildlife, and special status fish and wildlife species because most of the construction impacts will be short-term and minor to moderate and resource protection and conservation measures will be implemented to reduce impacts.

Cultural Landscape

The Mount Rainier National Historic Landmark District (NHLD) was designated in 1997 and encompasses most of the roads, historic developed areas, and historic backcountry structures in the park. The boundaries of the NHLD form a contiguous corridor that overlies the park’s road system, as well as some discontinuous backcountry features. The Nisqually – Paradise Road is an important contributing element to the NHLD.

Planned rehabilitation of the Nisqually – Paradise Road is intended to protect, restore, and repair the deteriorating structural components of the road. No alterations will be made to the historic width, alignment, guardwalls or bridges, or other historic features that convey the historic character of the road. All of the work will be conducted to preserve the integrity, design characteristics, and craftsmanship of structural features. Repair will meet the Secretary of the Interior’s Standards for Rehabilitation by reusing original material, repairing and replacing features in-kind, and using compatible designs when adding new features. Road stabilization and paving will maintain the structural integrity and visual appearance of the road. Local short-term negligible to minor adverse impacts on the cultural landscape setting will occur during project construction. However, the road rehabilitation will have a local long-term beneficial impact on the cultural landscape and associated historic structures from improvements designed to repair and replace deteriorating structural features that contribute to the integrity of the road. The project will not alter any of the character-defining features of the road. The selected alternative will not result in an impairment of the cultural landscape because the action will not adversely affect historic properties including the NHLD; improvements are designed to repair and replace deteriorating structural features that contribute to the integrity of the highway.

Archeological Resources

Surveys of the area of potential effect have located and recorded 34 historic sites, 21 isolates, and 1 nonhistoric ethnographic site. All of these sites, except the Government Road and two sites

documented prior to the Nisqually Road surveys – Longmire Historic District and Paradise Developed Area – fall outside of the designated area of potential effect.

All known archeological sites outside of the road prism will be avoided. Road rehabilitation within the road prism has the potential to impact areas deemed archeologically sensitive. The Government Road, Longmire Historic District, and Paradise Developed Area may be affected by rehabilitation work, including deep excavation, utility trenching, and other road stabilization measures. To reduce the potential for impacts, the park archeologist will develop an archeological monitoring plan that will determine sensitive areas requiring an archeological monitor during ground-disturbing activities. The work on the Paradise Valley Road will be limited to paving within the footprint of the existing road and repairs to the Edith Creek Bridge. The selected alternative will not impair archeological resources because the action will not adversely affect any known archeological resources. Limiting the majority of the rehabilitation to the existing road prism, and monitoring by a park archeologist during ground-disturbing activities in culturally sensitive areas will reduce the potential for adverse impacts.

Visual Quality

The Nisqually – Paradise Road provides a scenic winding road from the old growth forests at the southwest park entrance up to the alpine environment at Paradise. The road was designed to minimize the visual and environmental impacts of construction. This included preservation of roadside vegetation with large trees protected up to the paved surface of the road. The rustic nature of the road is accented by guardwalls, retaining walls, and many bridges constructed using native stone to match the color and texture of exposed road cuts. Scenic pullouts and overlooks were constructed to provide views of the spectacular scenery throughout the road corridor.

Visual impacts will occur during construction from construction equipment, materials, and ground disturbance. Potential loss of up to 17 trees larger than 18-inches in diameter from root damage will have a long-term minor adverse effect on visual quality along the road. Any disturbances to existing structural features or new structural features, such as culverts, guardwalls, retaining walls, and curbs, will be constructed with material that matches the color, texture, and character of existing facilities. Rehabilitation of damaged and deteriorating sections of the road will have a long-term beneficial effect on the visual quality of the road by protecting the scenic views for which the park is renowned. The selected alternative will not result in an impairment of visual quality because road rehabilitation will have a local short-term minor adverse impact and long-term beneficial effect by protecting and preserving the scenic and visual character of the road.

SUMMARY

As described above, adverse effects and environmental impacts anticipated as a result of implementing the selected alternative on a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or identified as significant in the park's general management plan or other relevant NPS planning documents, will not rise to levels that will constitute impairment of park values and resources.

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**Attachment B
Resource Protection Measures**

**Nisqually to Paradise Road Repair and Improvements
Environmental Assessment
Mount Rainier National Park**

The following provides the final resource protection measures that will be implemented for the selected action to minimize and reduce resource impacts.

General Measures	Responsible Party
<ul style="list-style-type: none"> • Construction limits will be clearly marked with stakes prior to the beginning of ground disturbing activities. No disturbance will occur beyond these limits other than protection measures for erosion/sediment control (these are typically placed just outside the clearing limit stakes). Temporary construction fencing will only be installed where determined necessary by FHWA/WFHL and NPS project coordinators. • All tools, equipment, barricades, signs, surplus materials, and rubbish will be removed from the project work limits upon project completion. Any asphalt surfaces damaged due to work on the project will be repaired to their original condition. All demolition debris will be removed from the project site, including all visible concrete and metal pieces. • Materials, including removed stumps, unusable stone masonry headwall material, unusable pipe, signs, guardrail, and weed-infested soil will be disposed of outside the park, according to local, county, state, and federal regulations. • Construction debris will be hauled from the park to an appropriate disposal location. • Debris will not be burned or buried in the park. • Delays for emergency response vehicles will be kept to a minimum by having emergency responders notify traffic monitors immediately via the park radio/frequency when the vehicle is dispatched, thus allowing approximately 10 minutes to clear the road before the arrival of the emergency vehicle. Emergency response providers and the contractor will need to coordinate on any road closures (for example, it may be necessary to temporarily stage emergency vehicles on both sides of a road closure). • The contractor will provide temporary portable toilets for use by employees. 	<p>NPS Project Manager and Park Safety Officer</p>
Air Quality	
<ul style="list-style-type: none"> • Dust control (i.e., use of water as a dust suppressant) will occur, as needed, on active work areas where dirt or fine particles are exposed. • Equipment will not be allowed to idle longer than 15 minutes when not in use. 	<p>NPS Project Manager</p>
Water Resources	

<ul style="list-style-type: none"> • Measures to protect water quality from sedimentation are described below in the Soils, Soil Erosion, and Sediment Control section. • The contractor will be required to meet minimum federal and WSDOT soil erosion and sediment control standards for stream crossings (intermittent and perennial). • Mechanized equipment will not be operated or material discharged or placed within the boundaries of any U.S. waters as identified by the ordinary high water mark or edge of a wetland. This includes wetlands, unless authorized by a permit issued by the U.S. Army Corps of Engineers (Corps) according to 33 USC § 1344, and if required by the state agency having jurisdiction over the discharge of material into the waters of the U.S. • In the event of an unauthorized discharge: <ul style="list-style-type: none"> o Further contamination will immediately be prevented. o Appropriate authorities and the Contracting Officer (CO) will be immediately notified. o Damages will be mitigated as required. • The FHWA/WFLHD will acquire a National Pollution Discharge Elimination System (NPDES) permit for the project. • Work areas, including material sources, will be separated by the use of a suitable barrier that will prevent sediment, petroleum products, chemicals, other liquids, or solid materials from entering the waters of the U.S. Barriers will be constructed and removed to avoid discharge of material into the waters of the U.S. Sediment or other material collected by the barrier will be removed and properly disposed of. • Establish staging areas (used for construction equipment storage, vehicle storage, fueling, servicing, and hazardous material storage), if possible, at least 150 feet away from streams in a location and manner that will preclude erosion into or contamination of streams or wetlands. For storage of equipment and materials at designated staging areas within 150 feet of streams and wetlands, appropriate erosion protection measures will be implemented to protect water resources. • Structurally adequate debris shields will be constructed to contain debris within the construction limits and prevent debris from entering waterways, travel lanes open to public traffic or areas designated not to be disturbed. • The contractor will only extract water from the Park approved site on the lower Nisqually River located at the pullout at the suspension bridge in Longmire. In order to reduce impacts to the riverbank, the park will designate where pumping equipment will be located on the slope 14 days before using this water source. The contractor will be allowed to extract up to 15 % of existing flow above park biologist designated minimum flow criteria, not to exceed 30,000 gallons per day. Water for use during night work will be pumped during the day and stored in tanker trucks. • In order to prevent the spread of disease and pathogens when pumping water from streams for construction needs or stream diversion, the contractor will be required to decontaminate equipment before placing anything in the river 	<p>Park Hydrologist, Park Biologist, Project Manager</p>
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and every time this equipment is moved and used in a separate surface water. The park will provide the contractor with decontamination procedures.

- The contractor will provide a screen (filtration size 0.08 inches maximum) on the end of the pump hose to filter out aquatic organisms. This screen should be cleaned of debris periodically. The contractor will provide a spill containment enclosure around the pump and or generator to contain gas, oil or other fluids. The contractor will provide a wattle or other filter barrier around the outside edge of the pullout to prevent siltation into the river. The CO will be notified 14 days prior to drawing water to determine the presence of threatened or endangered species. The streambed and streambank vegetation will not be disturbed when drawing water. All Federal, state, and local permits, if required, will be obtained before drawing water.
- A Hazardous Spill Plan or Spill Prevention, Control and Countermeasures Plan, whichever is determined appropriate, will be in place, stating what actions will be taken in the event of a spill, notification measures, and preventive measures to be implemented, such as the placement of refueling facilities, storage, and handling of hazardous materials. The plan will be submitted at least two days before beginning construction work. Other measures related to the spill plan include:
 - o All equipment on the project will be maintained in a clean and well-functioning state to avoid or minimize contamination from automotive fluids.
 - o All equipment will be checked daily and any leaks will be immediately repaired upon discovery.
 - o Vehicles or equipment leaking oil, gas, or antifreeze will not be stored in the park.
 - o Chemicals, fuels, and other toxic materials will be stored, used, and disposed of in a proper manner.
 - o Oil, hydraulic fluids, antifreeze or other chemicals will not be drained to the ground.
 - o If possible, equipment or vehicles will be refueled at least 150 feet away from streams or identified wetlands in a location and manner that will preclude erosion into or contamination of streams or wetlands. For refueling at designated refueling areas within 150 feet of streams and wetlands, appropriate spill containment measures will be implemented to protect water resources.
 - o A supply of acceptable absorbent materials will be kept at the job site in the event of spills. Acceptable absorbent materials are those that are manufactured specifically for the containment and cleanup of hazardous materials. Any spills will be cleaned up immediately.
 - o In the event of a spill, the CO will be notified immediately. BMPs for drainage and sediment control, as described in the FHWA and NPS Stormwater Pollution Prevention Plan, will be implemented to prevent or reduce nonpoint source pollution and minimize soil loss and sedimentation in drainage areas.
- Vegetable oil-based hydraulic fluids or alternative biodegradable oil will be used in all heavy equipment to minimize potential impacts to water quality

<p>from spills.</p> <ul style="list-style-type: none"> • Fresh concrete, concrete byproducts, or other chemical contaminants will not be allowed to enter water bodies. Structures containing concrete will be sufficiently cured to prevent leaching prior to contact with the water body. • Treated wood used for bridges or other structures will meet or exceed the standards established in the most current edition of “Best management Practices for the Use of Treated Wood in Aquatic Environments” developed by the Western Wood Preservers Institute. 	
Floodplains	
<p>Additional resource protection measures for drainage improvements are included under Fish, Wildlife, and Special Status Species.</p> <ul style="list-style-type: none"> • The following measures will be used for drainage improvements at New Tahoma Creek and Kautz Creek: <ul style="list-style-type: none"> o Minimal placement of fill on floodplains is anticipated; except as needed to protect culvert inlets and outlets at New Tahoma Creek and to armor the road side slopes at Kautz Creek. Free natural drainage and natural contours will be preserved to the extent practicable when designing and completing improvements. Previously vegetated areas that are disturbed will be revegetated when construction is complete. o Project operations must cease under high flow conditions that inundate the project area, except for efforts to avoid or minimize resource damage. o Flood hazard mitigation will be provided by incorporating improved flood conveyance capacity for protecting life and minimizing damage to the road and natural resources. o Mitigation of flood hazards to road users will be accomplished by improved drainage and closure of the road during periods of very high flows if flooding is anticipated. 	<p>Park Geologist and Park Hydrologist</p>
Soils, Soil Erosion and Sediment Control Measures	
<ul style="list-style-type: none"> • Excavated material that is suitable for growth of native vegetation as determined by the park will be salvaged and stockpiled according to park stipulations before any additional construction work takes place. • All conserved topsoil in the soil isolation zone from which it originated will be used before using excavated material. Topsoil refers to the uppermost soil horizon, usually 6 to 18 inches deep, which includes duff and other materials capable of supporting vegetation. • An aggregate-topsoil course will be placed on road shoulders to match pavement structure and promote the establishment of native plant vegetation. The mixture will consist of 50% aggregate and 50% local conserved topsoil. • Topsoil will not be mixed with subsoil. • All impacted areas will be hydroseeded and mulched to establish native plants, control erosion, and limit growth of invasive plant species. The hydroseeding method will be a two-step process that applies seed in a slurry of water, seed and tackifier on a prepared seedbed as the first step. The second step will apply wood fiber mulch and tackifier in a slurry of water over 	<p>Park Geologist and Park Hydrologist</p>

the first application. Tackifiers used in the process will be derived from plant materials to have no residual effects on the soil, seed or germinating plants. The mulch and tackifier will serve to hold sediment in place until growing plants are able to hold soils in place. Hydroseeding should be done at the end of the construction season under conditions specified in the contract documents.

- If erosion control on disturbed areas at the end of the first construction season is needed, a plant-based tackifier and light mulch will be applied. Hydroseeding, the process described above, will then be applied at the end of the project after final paving.
- Use of BMPs in the project area for drainage area protection will include all or some of the following actions, depending on site-specific requirements:
 - o Disturbed areas will be kept as small as practical to minimize exposed soil and the potential for erosion.
 - o Erosion- and sediment-control devices will be installed and vegetation cleared prior to salvaging topsoil for storage.
 - o Excavated material will be covered with water-repellent, breathable material during storage to prevent erosion/sedimentation.
 - o Waste and excess excavated materials will be located outside of the ordinary high water mark of streams to avoid sedimentation.
 - o Silt fences, sediment logs, temporary earthen berms, temporary water bars, sediment traps, stone check dams, or other equivalent measures will be installed. Erosion-control measures will be monitored to ensure they are properly installed and are functioning effectively.
 - o Sediment traps, erosion checks, and/or filters will be constructed above or below all culvert drains (if such drains will be required) and in all other ditches before the runoff leaves the project construction limits.
 - o Certified weed-free coir logs will be installed for filtering sediment from runoff and reducing the velocity of sheet flow. Logs will be installed according to plans and as directed by FHWA/WFLHD and the park to address erosion concerns. Logs will be placed in drainages that pass through work areas to limit erosion of exposed soils. Silt fencing will be installed around the perimeter of pullouts, which will be used for the storage of erodible materials. Silt fence will be installed according to plans; fencing will consist of one continuous piece of semipermeable fabric (or steps will be taken to join sections so there will be no gaps); fence will remain in an upright position after installation; materials and equipment will not be leaned against fencing to avoid fence collapse; and fencing will be repaired to ensure an effective barrier within 24 hours of deficiency notification.
 - o Sediment logs will be placed around the perimeter, if materials will be stored on the road.
 - o Straw or hay bales will not be used as filter barriers. When working in “wet” ditch lines, weed-free coir logs will be used at either end of the work area across the ditch line to filter siltation and will be staked firmly in place. If water is running in one direction, a barrier will be needed at the downhill end of the work area only.

Vegetation

- No vegetation will be disturbed outside of the construction limits unless prior approval is obtained from the park. Any unauthorized disturbance will result in the contractor paying for the restoration of that area using the methods set forth in the contract documents.
- Ditches that currently support wetland plant species will be revegetated with native wetland species following ditch cleaning. Parking of equipment and private vehicles will be restricted to hardened surfaces, such as pullouts, concrete ditch lines, and closed lanes of the road to limit disturbance of roadside vegetation. All pullouts to be used as parking will be fenced around the perimeter with temporary construction fencing. No parking in wet ditches or adjacent to streams will be allowed.
- The park will review and approve construction limits within which clearing and grubbing will occur as identified in the project plans and contract documents and as staked on-site prior to construction commencing.
- Vegetation and root zones designated to remain will be fenced off for protection.
- Vegetation will be removed in a manner that will not injure the vegetation around it or compact or gouge the topsoil.
- Whenever possible designated trees, stumps, and snags to be cleared will be salvaged to be used for erosion control or natural litter on finished slopes. All salvaged woody debris will be stockpiled at the closest storage site within the same soil isolation zone by July 1 or by a park-approved deadline to avoid contamination from windborne weed seed.
- The following measures will be implemented to protect trees:
 - o Any tree of concern to contractor will be inspected by park hazard tree expert and must be deemed likely to fail before tree is removed.
 - o Excavations in the road for deep patches and other structural work near large trees will be limited to a depth of less than 12 inches or the bottom of the existing asphalt, whichever is greater, within a 10-foot radius of the tree stem or the section of excavation will be shortened to avoid excavation within 10 feet of the tree stem unless shown otherwise on the plan or otherwise directed by the CO.
 - o Tree roots will be pruned with a saw making a clean vertical cut, removing the smallest portion of the root or root system possible that will still allow for excavation. Pruning equipment will be sterilized between each tree.
 - o Excavated tree roots will be kept moist until covering with conserved topsoil.
 - o Ropes, cables, or guy wires will not be fastened to trees.
 - o Construction materials or equipment will not be stacked against tree trunks.
 - o Protective measures will be installed around trees greater than 18 inches diameter at breast height in one of two ways depending on the proximity to road/staging areas:
 1. For trees immediately adjacent (2 feet or less) to pavement, staging

Park Botanist

<p>areas, or other work areas, the tree trunk will be wrapped with vertical lengths of nominal 2-inch-thick lumber of varying width and lengths (i.e., 2" x 6" x 8") and secured with banding. Only 2-inch thick lumber will be wrapped around the parts of the tree trunk that face construction activity and that are vulnerable to damage. If lumber is not wrapped around the entire tree, then protective material will be placed under the banding to prevent it from cutting into the bark. Additionally, lumber covered sections of trees will be wrapped with orange construction fencing to provide a visual cue to heavy equipment operators. When possible, fencing will be extended to the dripline of the tree to protect the entire root system.</p> <ol style="list-style-type: none"> 2. For trees not immediately adjacent (2 to 5 feet) to construction activities, orange construction fencing will be installed. Fencing will only be installed around parts of the tree trunk that face construction activities and are vulnerable to damage. Construction fencing will be placed at least 2 feet out from the tree trunk to provide a 2-foot buffer. When possible, the fencing will be extended to the dripline of the tree to protect the entire root system. <ul style="list-style-type: none"> o The park will provide a list of trees to be protected, with station numbers for each tree. This list will indicate which method will be used for each tree. FHWA/WFLHD will then identify all trees to be avoided in the field. o Scarred tree surfaces will not be treated with tree paint. Damaged limbs will not be pruned unless approved by the CO. o No tree roots will be cut or removed unless approved by the CO and park. o The contractor will immediately report any tree damage caused by construction to the CO. If protected trees are damaged, the contractor will pay damages as determined by the CO and park. o Clearing and grubbing will be done on an as needed basis and only with CO and park approval. o Trees within excavation areas will be preserved as determined by the CO and the park. o Vehicles/stage equipment will park only in pullouts or other approved areas to avoid damage to tree roots. No parking/staging will occur on road shoulders or other bare ground areas. o Trees will not be pushed over with heavy equipment unless approved by the CO. 	
Special Status Vegetation Species	
<ul style="list-style-type: none"> • If rare plant specimens (gnome plant, and lanceleaf grapefern) are encountered within the construction limits, they will be relocated in the spring prior to construction. They will be salvaged by the park prior to construction, stored outside the construction limits, and transplanted following construction. • For <i>Thamnobryum neckeroides</i>, a moss species of interest: <ul style="list-style-type: none"> o Care will be taken to not remove vegetation or trees in the vicinity of the boulder complex where it was discovered to prevent changes in light intensity. 	Park Botanist

<ul style="list-style-type: none"> o No slash from vegetation clearing will be disposed of around the boulder complex. • For <i>Anthoceros fusiformis</i>, a hornwort species of interest: <ul style="list-style-type: none"> o Spores from this species will be collected before construction begins. Spores mature in late spring and continue to be produced throughout the summer months, ending with the first frost. These spores then will be used to “reseed” the area after construction is completed. o At the beginning of the construction, potentially impacted species will be moved by the park to an upslope position or an area of similar habitat outside of the project area. Because bryophytes do not have roots, this may work and could allow the population to survive. 	
Weed Control	
<ul style="list-style-type: none"> • All imported rock and erosion-control materials that are capable of harboring plant seed will be certified weed-free according to North American Weed Management Association (NAWMA) standards to ensure that it is free of noxious weeds and accepted by FHWA/WFLHD and the park. Subsurface rock that has not been exposed to a weed source may be acceptable upon inspection by the park. The park will inspect all local material sources prior to use or transport of materials into the park. • For a material source provider to be considered certified weed-free, all staging areas, work areas, and facilities associated with producing the material will be inspected by a qualified government inspector, qualified park employee or other proper officials or authority: a representative of that State’s Department of Agriculture, a Weed Supervisor or Weed Superintendent, a University Extension Agent, or an individual designated by that State’s law or regulations and determined to be free of all noxious weed and invasive plant species. Due to the presence of noxious weeds and exotic species within the project limits, the contractor will comply with the following measures: <ul style="list-style-type: none"> o The CO will inspect all contractor vehicles and equipment prior to entering the park for mud, weeds, and other unwanted substances. All vehicles (includes hydroseeder truck and inside of tank), heavy equipment, hauling vehicles, and trailers will be pressure-washed before their first entry into the park. Hauling vehicles that have previously transported weed-contaminated material will be pressure-washed before transporting clean material. Subsequent entries of hauling vehicles into the park will not require pressure washing unless the vehicle shows signs of mud, plant material, or as requested by the FHWA/WFLHD or park. o Vehicle loads will be covered to reduce exposure to noxious weeds when transporting rock, soil or other material that could contain weed seed. Excavated material, conserved topsoil, conserved rock/soil, and subexcavation material stockpiles will be covered with a breathable water repellent fabric, which will be anchored around the perimeter to hold it in place. o The project will be divided into soil isolation zones to prevent the spread of noxious weeds by limiting the movement of weed-infested materials and equipment. The park will identify the starting and ending points for each 	Park Botanist

<p>zone to be included in the contract. The beginning and ending point of these zones will be clearly marked on the road, as directed by the FHWA/WFLHD and park. Rock, conserved topsoil, or stockpiled excavated material will not be transferred between the zones, unless approved by the park. Excavated materials must be retained in the zone where it originated at all times, unless approved by the park; or wasted at a disposal site outside the park with the park's approval. All vehicles and construction equipment showing signs of mud or plant material will be cleaned before moving them between different zones or leaving the project site to reduce the spread of noxious weeds. Equipment will be cleaned by brushing to remove material deposited on wheels, bumpers, and other exposed surfaces. Cleaning will not be required when moving vehicles and construction equipment between zones, provided they are clean and free of mud and/or plant material.</p> <ul style="list-style-type: none"> o Proposed locations for soil and rock stockpiles, and turnaround areas will be inspected and approved by the park resource advisor or plant ecologist before use. The park will treat a storage site before seed set if weeds are present to ensure the area is free of noxious weeds. The park will review proposed sites for acceptance. If the park does not approve the proposed site, an alternative site will be provided. 	
Wetlands	
<ul style="list-style-type: none"> • Impacts to wetlands will be avoided and minimized to the extent practicable. No wetland fill will occur without authorization from the Corps and appropriate permitting under the Clean Water Act. • Prior to construction work at New Tahoma Creek or other locations where wetlands may be present adjacent to the project area, certified weed-free coir logs or other erosion control measures will be installed to form a filter barrier to trap sediments from being deposited in wetlands. Construction fencing will be installed around wetlands to define construction limits. • Hydrologic connections to wetlands adjacent to the road will be maintained via culverts, ditches, or other measures. 	Park Biologist
Wildlife and Special Status Species	
<ul style="list-style-type: none"> • Park staff will inform construction personnel of the occurrence and status of special status species within the project area, the potential impacts construction activities may have to the species and the potential penalties for taking or harming a special status species. • Marbled Murrelet – Suitable marbled murrelet habitat occurs between milepost (MP) 0.0 and approximately MP 12.0. <ul style="list-style-type: none"> o Daytime construction work may begin two hours after sunrise and will cease two hours before sunset in suitable marbled murrelet habitat from April 1 to September 23. This restriction does not apply to daytime activities between September 23 and April 1. o Night work will not occur between April 1 and June 15 in marbled murrelet habitat. o Night construction work will be restricted from one hour after sunset to 	Park Biologist

<p>one hour prior to sunrise from June 16 to September 23. No restrictions related to marbled murrelet protections apply to nighttime activities between September 23 and April 1.</p> <ul style="list-style-type: none"> o Within marbled murrelet habitat (MP 0.0 to MP 12.0), no day work will be allowed in the same area where night work occurred. Night construction work zones will be restricted to those areas 100 meters from day construction zones. • Northern Spotted Owl – Suitable northern spotted owl habitat occurs from MP 0.0 to MP 15.5. <ul style="list-style-type: none"> o No project activities, other than hauling, may occur in protected activity centers from March 15 to July 31 unless the current year’s surveys conclude there is no conflict. o Current year surveys will be performed and preliminary results provided by June 1 of that year. If surveys reveal protected activity centers have shifted, then construction activities will be adjusted accordingly, with both daytime and nighttime construction being suspended immediately within newly identified protected activity centers and not permitted to begin at those locations until August 1. o Should annual northern spotted owl surveys be suspended, no construction may occur in unsurveyed habitat from MP 0.0 to MP 15.5 from March 15 to July 31. • The following measures will be taken to limit noise and disturbance from vehicles and construction equipment: <ul style="list-style-type: none"> o All motor vehicles and equipment will have mufflers conforming to original manufacturer specifications that are in good working order and are in constant operation to prevent excessive or unusual noise. o Sound attenuation devices (such as rubber strips or sheeting) will be installed and maintained on all equipment. This will include truck tail and other gate dampeners (both opening and closing) for all dump trucks on the project. o Use of unmuffled compression brakes will be prohibited within park boundaries. o The use of air horns within the park will not be allowed except for safety. o The contractor must use muffled pumping equipment for water withdrawals, water diversion, etc. (i.e., pump and generator to reduce noise to levels similar to that of the average ambient noise levels. No asphalt batch plants or rock crushing plants will be allowed within the park boundaries. • If tree and shrub removal is required, nesting bird surveys will be done. If there are nesting migratory birds, then tree removal will be conducted outside of the nesting season for migratory birds (September to February) to avoid disturbing or take of a migratory bird nest. • Any roadkill or wildlife collisions will be reported to the park immediately. • Construction vehicle speeds will not exceed construction zone posted speed limits to decrease wildlife/vehicular incidents. Speed limits outside the construction zone will default to the posted speed limit 	
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<ul style="list-style-type: none"> • Feeding or approaching wildlife will be prohibited. • The park wildlife ecologist will be notified if bear or fox loiter in the project area. • A litter control program will be implemented during construction to eliminate the accumulation of trash. All food items will be stored inside vehicles, trailers, or wildlife-resistant receptacles except during actual use to prevent attracting wildlife. • Visitors in traffic delays will be educated by NPS staff, when available, to not approach or feed wildlife. 	
Fish and Special Status Species (Culvert and Ditch Measures)	
<ul style="list-style-type: none"> • The appropriate Washington Department of Fish and Wildlife (WDFW) guidelines for the timing of in-water work will be followed. These guidelines are intended to avoid in-water work during periods when salmonid eggs and fry incubate within stream gravels. <ul style="list-style-type: none"> o In-water work is restricted to the period of July 15 to September 15 for all Nisqually River tributary streams (WAC-110-206). o No water rerouting or additional drainage will be added between MP 15 and MP 16 to protect wetland areas. o The culvert replacement at New Tahoma Creek will be limited to the period between August 1 and September 15 to minimize impacts to Fender’s soliperlan stonefly. o Upstream of the isolated construction area, flow will be diverted around the construction site with a cofferdam (built with non-erosive materials) and an associated pump or a by-pass culvert. o The culvert will be installed in the dry or in isolation from the stream flow by the installation of a bypass flume or culvert, or by pumping the stream flow around the work area. Exception may be granted if siltation or turbidity is reduced by installing the culvert in the flowing stream. The bypass reach will be limited to the minimum distance necessary to complete the project. The project will incorporate mitigation measures as necessary to achieve no-net-loss of productive capacity of fish habitat. The following technical provisions from Washington State Regulations will apply to temporary bypass culvert, or flume as applicable: <ol style="list-style-type: none"> 1. The temporary bypass culvert, flume, or channel will be in place prior to initiation of other work in the wetted perimeter. 2. A sandbag revetment or similar device will be installed at the inlet to divert the entire flow through the culvert, flume, or channel. 3. A sandbag revetment or similar device will be installed at the downstream end of the culvert, flume, or channel to prevent backwater from entering the work area. 4. The culvert, flume, or channel will be of sufficient size to pass flows and debris for the duration of the project. 5. For diversion of flow into a temporary channel the relevant provisions of the Washington State Regulations will apply. 6. Prior to releasing the water flow to the project area, all bank protection 	Park Biologist and Park Hydrologist

or armoring will be completed.

7. Upon completion of the project, all material used in the temporary bypass will be removed from the site and the site returned to pre-project conditions.
 8. If fish may be adversely impacted as a result of this project, the park biologist will be notified and arrangements will be made by the NPS to capture and safely move fish from the job site to the nearest free-flowing water.
- o Fish within construction sites that will be dewatered or isolated from the main water body will be captured and safely moved from the job site in accordance with the park Fish Removal and Dewatering Protocol. Fish capture and transportation equipment will be available on the job site during all in-water activities.
 - o Wastewater, from project activities and dewatering, will be routed to an area outside the ordinary high water line to allow removal of fine sediment and other contaminants prior to being discharged to state waters.
 - o Dewatering will not be required for culvert or ford removals on non-fish bearing streams unless substantial excavation of stream channel or culvert bedding materials will be required after the existing culvert or structure is removed.
 - o Any pump used for diverting water from a fish bearing water body will be equipped with a fish guard to prevent passage of fish into the pump. The pump intake will be screened with 3/32 inch or smaller mesh. Screen maintenance will be adequate to prevent injury or entrapment to juvenile fish and remain in place whenever water is withdrawn from the water body through the pump intake.
 - o Where fish passable culverts are installed, the culvert would be designed pursuant to state of Washington State water crossing structure regulations for culverts (WAC 222-110-070)..
 - o Grade control structures will be permitted to prevent head-cutting above or below the culvert or bridge. Grade control typically will consist of boulder structures that will be keyed into the banks, span the channel, and will be buried in the substrate. Grade-control structures will accommodate fish passage for all species and life stages of fish present if technically feasible.
 - o Woody debris will be placed downstream of the road crossing when removed from the road-crossing inlet.
 - o Culverts in fish-bearing streams will be designed, installed, and maintained to provide passage for all fish species and all life stages that are likely to be encountered at the site, if technically feasible.
 - o Existing roadways or travel paths will be used whenever reasonable. The number of new access paths to alleviate impacts to riparian vegetation and functions will be minimized.
 - o Disturbance of the bed and banks will be limited to that necessary to place the culvert and any required channel modification associated with it. Affected bed and bank areas outside the culvert and associated fill will be restored to pre-project configuration following installation of the culvert,

<p>and the banks will be revegetated within one year with native or other approved woody species. Vegetative cuttings will be planted at a maximum interval of three feet (on center), and maintained as necessary for three years to ensure 80% survival. Where proposed, planting densities and maintenance requirements for rooted stock will be determined on a site-specific basis. The requirement to plant woody vegetation may be waived for areas where the potential for natural revegetation is adequate, or where other engineering or safety factors preclude them.</p> <ul style="list-style-type: none"> o All fill material and man-made structures will be removed from stream channels. The natural stream channel profile will be restored. Bottom width opening of the fill removal at stream channel crossings will be equal to, or greater than, the natural bankfull channel width. o Streambanks will be shaped to blend in to the existing natural banks upstream and downstream from the crossing removal. o Streambed substrates will mimic the natural streambed characteristics upstream and downstream of the crossing replacement. Large woody material and/or large rocks may need to be placed within the crossing removal site to accomplish this objective. o The toe of the excavation will be stabilized with large wood, appropriately sized rock, and/or vegetation as necessary to prevent excessive erosion of the new streambanks. o Culverts will be designed and installed to avoid inlet scouring and will be designed in a manner to prevent erosion of streambanks downstream of the project. o Installation of culverts at any location that differs from the approved plan will require park and CO approval. <ul style="list-style-type: none"> • Where ditch or culvert inlet cleaning is performed, work will be conducted during dry conditions (generally July and August). Parking and storing equipment and materials in these areas also will be avoided. Disturbed areas will be documented and submitted to the park biologist for follow-up assessments. • The lane will not be extended into drainage ditches where wet ditch lines exist. Bridging of the ditch using a steel plate to provide minimum lane width may be allowed. All areas where extension of lane width is planned will subject to prior approval from the NPS Resource Advisor. • The NPS Resource Advisor assigned to the project will be informed as soon as possible and at least two weeks before culvert or ditch cleaning, or repair or replacement activities occur. Amphibian surveys will be conducted by park resource staff to determine if amphibian species of concern (SOC) are present in culverts, and along wet ditches. • Tadpoles will be removed prior to work. • To prevent amphibians from using plastic sheeting, under drain pipes, and other miscellaneous construction materials as refuge sites, all construction materials will be stored within the paved road edge. 	
Cultural Resources	
<ul style="list-style-type: none"> • In the event of the inadvertent discovery of historic properties such as 	Chief of

<p>archeological resources, suspected human remains, funerary objects, sacred sites, or objects of cultural patrimony, the park archeologist and Superintendent will immediately be notified. The park will follow their Archeological Inadvertent Discovery Plan approved by the SHPO. Work in the affected area(s) will stop immediately until the historic properties are reviewed by the park. As appropriate, consultation with the Washington Department of Archeology and Historic Preservation and any affected Native American tribes will also take place regarding disposition of affected artifacts and remains. During consultation, reasonable measures will be taken to protect the discovery site, including any appropriate stabilization or covering; to ensure the confidentiality of the discovery site; and to restrict access to the site of discovery.</p> <ul style="list-style-type: none"> • A monitoring plan will be developed by the park for project activities that have the potential to affect archeological resources recommended or determined eligible for inclusion on the National Register of Historic Places. This plan will require an archeological monitor to be present on-site during ground disturbing activities in or around culturally sensitive areas as determined by the park and consulting parties including the Washington Department of Archeology and Historic Preservation. Based on the monitoring plan, the contractor will notify the park two weeks in advance of conducting activities in culturally sensitive areas • The park Historical Landscape Architect and/or Historical Architect will be consulted as the design is finalized to ensure the design meets the <i>Secretary of the Interior's Standards for Rehabilitation</i> (i.e., that all historic features are preserved, repaired or replaced in-kind, and that any alterations are compatible with the historic character and cultural landscape of the road). SHPO consultation will continue as the design is finalized. • During construction, the Historical Landscape Architect (HLA) will provide technical assistance to the government inspector to ensure the design is implemented accurately and with a level of craftsmanship that meets the design specifications. A plan will be developed to identify key milestones for review by the HLA.” 	<p>Interpretation, Cultural Resource Specialist</p>
Visitor Use and Experience	
<ul style="list-style-type: none"> • Generally road travel delays will be kept to one stop for a maximum of 20 minutes with a 10-minute travel time, for a total maximum one-way delay of 30 minutes, except during temporary road closures. • The status of road construction and travel restrictions will be communicated via a number of outlets: the park website, regional newspapers, radio, entrance stations, visitor centers, news releases, local newspapers, media outlets, postings in local businesses, WSDOT 511 information cell line, and other locations. 	<p>Park Safety Officer</p>
Public Health, Safety, and Park Operations	
<ul style="list-style-type: none"> • During construction, signs will inform visitors of construction activities and closures along the Nisqually – Paradise Road. 	<p>Park Safety Officer</p>

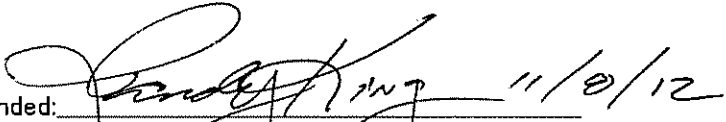
<ul style="list-style-type: none">• Appropriate barriers and barricades will be used to clearly delineate work areas and provide for safe vehicle travel through construction areas.• Trucks hauling debris and other loose materials will be covered to maintain adequate freeboard to prevent spillage to paved surfaces.• Construction workers will wear appropriate attire such as hard hats, gloves, and goggles to protect themselves from natural hazards such as falling rocks. Visitors will not be allowed outside their vehicles in a construction zone. Park staff will also be required to wear protective gear if they are working outside in the construction zone.• Any external lighting for night work will be shielded and down-casted as much as possible to minimize night sky pollution.	
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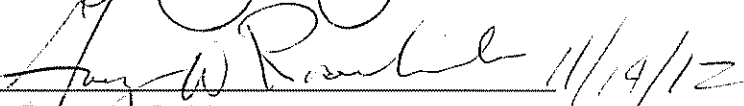
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Attachment C

FLOODPLAIN STATEMENT OF FINDINGS

Nisqually – Paradise Road Rehabilitation Environmental Assessment
Mount Rainier National Park
Washington

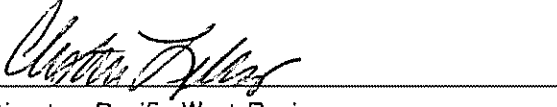
Recommended:  11/0/12
Superintendent, Mount Rainier National Park Date

Concurred:  11/19/12
Chief, Water Resources Division Date

Concurred:  11/20/12
Regional Safety Officer, Pacific West Region Date

ACTIVE

The above signatures certify that this document is technically adequate and consistent with NPS policy.

Approved:  10/03/2012
Regional Director, Pacific West Region Date

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INTRODUCTION

Executive Order (EO) 11988 (“Floodplain Management”) requires the National Park Service (NPS) and other agencies to evaluate the likely impacts of actions in floodplains. It is NPS policy to preserve floodplain values and minimize potentially hazardous conditions associated with flooding. If a proposed action is in an applicable regulatory floodplain, then flood conditions and associated hazards must be quantified, and a formal Statement of Findings (SOF) must be prepared. The NPS Procedural Manual #77-2, Floodplain Management provides direction for the preparation of a floodplain SOF. This SOF has been prepared for proposed work on the Nisqually to Paradise Road in Mount Rainier National Park in compliance with EO 11988 and with Procedural Manual #77-2.

PROPOSED ACTION

The NPS is proposing resurfacing, restoration, and repairing 17.6 miles of the Nisqually – Paradise Road (road) between the Nisqually Entrance and the developed area at Paradise. Rehabilitation of the road is needed because structural and design deficiencies in the road are accelerating deterioration. Deficiencies include inadequate drainage, surface slumps, soft spots, pavement warping and cracking, slope instability, and other structural problems that require attention. The proposed project also includes paving the 1.0-mile Ricksecker Point spur loop and the 2.2-mile Paradise Valley Road.

In addition, rehabilitation work includes replacement of an existing concrete culvert in New Tahoma Creek with a larger culvert and improving the ability to pass flood flows at Kautz Creek. Both of these activities would occur within the estimated floodplain of Tahoma Creek and Kautz Creek. The Federal Emergency Management Agency maintains Flood Insurance Rate Maps for floodplains, but no floodplain maps have been developed for the project area. The proposed work at these drainages is needed to better protect the road from future damage due to high streamflows by developing more sustainable protective measures. Following are descriptions of the locations, proposed work, and flood risk.

New Tahoma Creek

Existing Conditions

The New Tahoma Creek crossing of the Nisqually – Paradise Road is about 1 mile east of the Nisqually Entrance near the intersection with the West Side Road. Tahoma Creek crosses the road about 750 feet east of New Tahoma Creek. Under normal flow conditions, New Tahoma Creek carries flow from small steep hillside drainages, but following a flood event in 2006, it now carries a portion of the flow from Tahoma Creek at high flows.

The Tahoma Creek headwaters begin at Tahoma Glacier, located on the southwest flank of Mount Rainier. Tahoma Creek has experienced glacial outbursts and the recent flood event in 2006 that lead to a debris flows that closed the West Side Road and washed out portions of the Nisqually – Paradise Road. The 2006 flood reactivated a flood channel that had not had flow for hundreds of years and redirected about 20% of Tahoma Creek flow

to the New Tahoma channel (Kennard 2009). The flood significantly damaged the Nisqually – Paradise Road and overwhelmed the 170 cubic feet per second (cfs) capacity of the existing culvert on New Tahoma Creek. The road was repaired following the flood, but the culvert was not replaced. A small Veteran’s Day flood event in 2008 also directed flow into New Tahoma Creek, but did not result in damage to the road. Tahoma Creek and New Tahoma Creek are currently separated by a small deposit of unconsolidated alluvium, which is highly erodible during flood events. Further erosion of this material in the future would likely direct more flows to New Tahoma Creek.

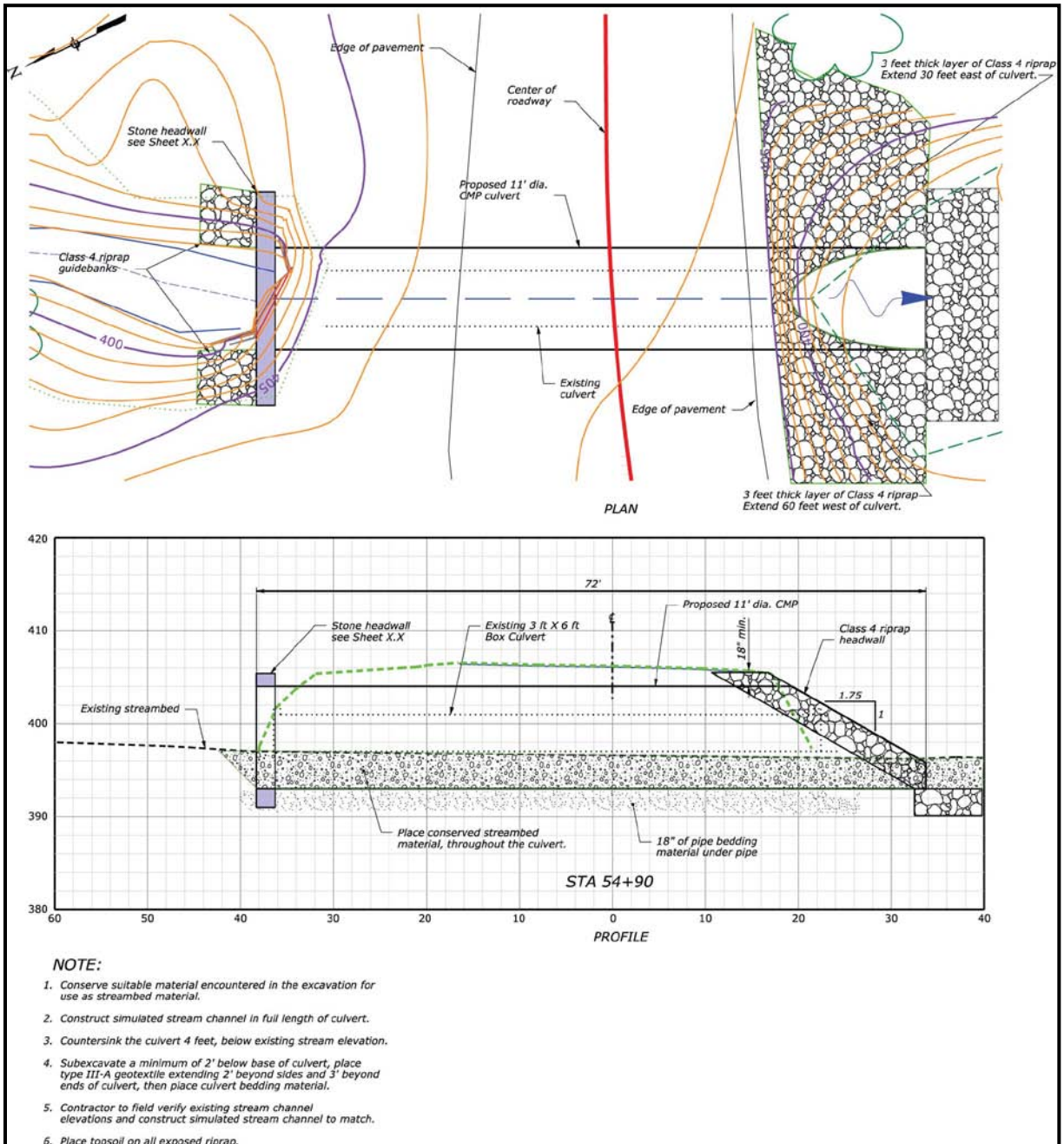
Preferred Alternative

The preferred alternative includes the replacement of the existing 3-foot-high by 6-foot-wide concrete box culvert that carries New Tahoma Creek flows under the road. A new 11-foot-diameter corrugated metal pipe (CMP), with a capacity of 700 cfs, would be constructed at this location to provide improved streamflow conveyance for flows from periodic flood events (Figure 10). About 3 feet of the culvert would be buried to provide a natural stream bottom. The culvert would be designed to provide for fish passage pursuant to state of Washington culvert regulations (WAC 222-110-070). The culvert inlet would be protected with a reinforced concrete headwall with a stone veneer using existing native material. The culvert outlet would be protected by placing large riprap rock from the pavement edge to the road embankment toe and extending the riprap along the embankment about 60 feet west of the new culvert to 30 feet east of the new culvert. The proposed culvert replacement is needed to protect the road from flood damage and maintain a primary access route into the park for visitors, staff, and emergency vehicles.

Flood Risk

Estimates indicate that it would take only 4% of the flow from Tahoma Creek to exceed the existing culvert capacity of 170 cfs at New Tahoma Creek. At projected 2050 flows, the proposed new culvert with a capacity of 700 cfs would be able to pass 63% of a two-year flood flow and 18% of a 100-year flood event (Kennard 2009). This estimate assumes a completely unobstructed culvert opening and no culvert filling during the storm. However, a more conservative estimate indicates the proposed new culvert would likely pass 13% of the 100-year flood flow, and flood flows for a 10- to 25-year flood event based on the following assumptions: (1) the existence of a debris flow surge (which raises stream level a few feet above flood levels associated with precipitation solely); (2) continuing aggradation of Tahoma Creek at the split between it and the New Tahoma Creek; (3) ongoing erosion of the “barrier” between the creeks; (4) underestimation of flood flows in the Tahoma Creek (the U.S. Geological Survey (USGS) methodology does not account for the glacier source); and (5) some level of culvert blockage by rafted wood, and deposition as the stream backs up.

FIGURE 1. NEW TAHOMA CREEK CULVERT REPLACEMENT



Kautz Creek

Existing Conditions

Kautz Creek drains the Kautz Glacier and surrounding lands in the watershed on the southwest side of Mount Rainier. Deposits from a debris flow during a November 2006 flood event resulted in the avulsion (the creation of a new channel) of Kautz Creek to a historic channel about 0.25 of a mile east of the existing Kautz Creek Bridge. The new channel now carries the majority of Kautz Creek flow. In 2007, two 12-foot-diameter CMP culverts were installed at the Kautz Creek road crossing to provide conveyance capacity for the streamflow from the shifted channel. In addition, a riprap-armored overflow ditch was constructed for conveying excess floodwater along the uphill side of the road east about 0.2 miles toward a sag in the road profile. Three 30-inch diameter CMP culverts were installed in the road sag to provide additional capacity for conveying flood flows. The uphill and downhill faces of the road embankment were armored for reducing erosion from floodwater overtopping the road. The new channel and culvert crossings are still vulnerable to failure from future hydrologic events that exceed the capacity of existing structures. Although damage was minimal, the road was inundated again by a relatively small flood in 2008. Failure of the existing culvert is possible from additional channel shifting even during small storms or from blockage of the culverts by rafted wood. Ongoing incision of the river channel also may contribute to failure of the existing system.

Preferred Alternative

Existing drainage structures (two 12-foot CMP's, three 30-inch CMP, and overflow ditch) have a combined maximum capacity to carry about 2,290 cfs (a 40-year storm event) before the road would be overtopped by flood water, possibly damaging the road pavement and eroding the road shoulder. There is a high potential for more and possibly all of the Kautz Creek flow to be conveyed across the alluvial fan surface to the overflow ditch. The ditch lacks the capacity needed for effectively capturing and redirecting the flow to the road profile sag. While the recently installed conveyance system has improved drainage, this area remains vulnerable to failure during high flow events because of a lack of hydraulic capacity. Thus, the park determined that additional improvements are needed to protect the road and better convey flows during flood events. Because of the high potential for the active channel flow to shift to another location on the alluvial fan, it is difficult to define flood flow volumes, locations of flows, and the best structures and drainages to protect the road. Overflow ditch capacity can be increased by raising the road and/or increasing the size of the ditch; however, environmental and funding limitations do not allow modifications that would be cost-effective.

The proposed improvements to the site include filling in the existing overflow ditch and armoring each side of the road embankment (Figure 11). The existing 12-foot and 30-inch-diameter culverts would be retained. Kautz Creek flood flows flow conveyed across the alluvial fan surface that exceed the capacity of the 12-foot diameter culverts would be conveyed as sheet flow across the filled-in overflow ditch and over the road. Filling in the overflow ditch allows the Kautz Creek flow to randomly access alluvial fan areas, in a more natural, unrestrained manner. The grade control established by the riprap-filled ditch reduces the potential for a new large primary active channel developing. The riprap

armoring protects the road from substantial damage during flood events, while minimizing resource impacts.

Proposed armoring of the north side of the road includes filling in the existing deep drainage ditch with riprap to form a shallow swale that would convey normal stormwater runoff from the road to the three existing 30-inch-diameter culverts. Riprap also would be placed along north and south side of the road west of Kautz Creek for about 300 feet. Existing 24-inch culverts would be left in place and filled over with riprap. Riprap also would be placed on the south side of the road about 700 feet east of the Kautz Creek channel. In total, about 0.62 of an acre of riprap would be placed on existing fill slopes and below the toe of the fill slope. Riprap on top of the road shoulder would be covered with aggregate/topsoil blended material and revegetated. Impact to trees would be minimized by selectively placing riprap to avoid tree at the toe of the fill slope embankment. Guardrail would be added on both sides of the road about 25 to 30 feet on either side of the Kautz Creek channel.

Total conveyance capacity from existing culverts would be about 2,200 cfs, or a 25-year flood event. Flood flows above this volume would begin to flow over the road, but with proposed armoring, structural impacts to the road are expected to be minor. The road would be closed to vehicle travel and public access when flows are anticipated to overtop the road.

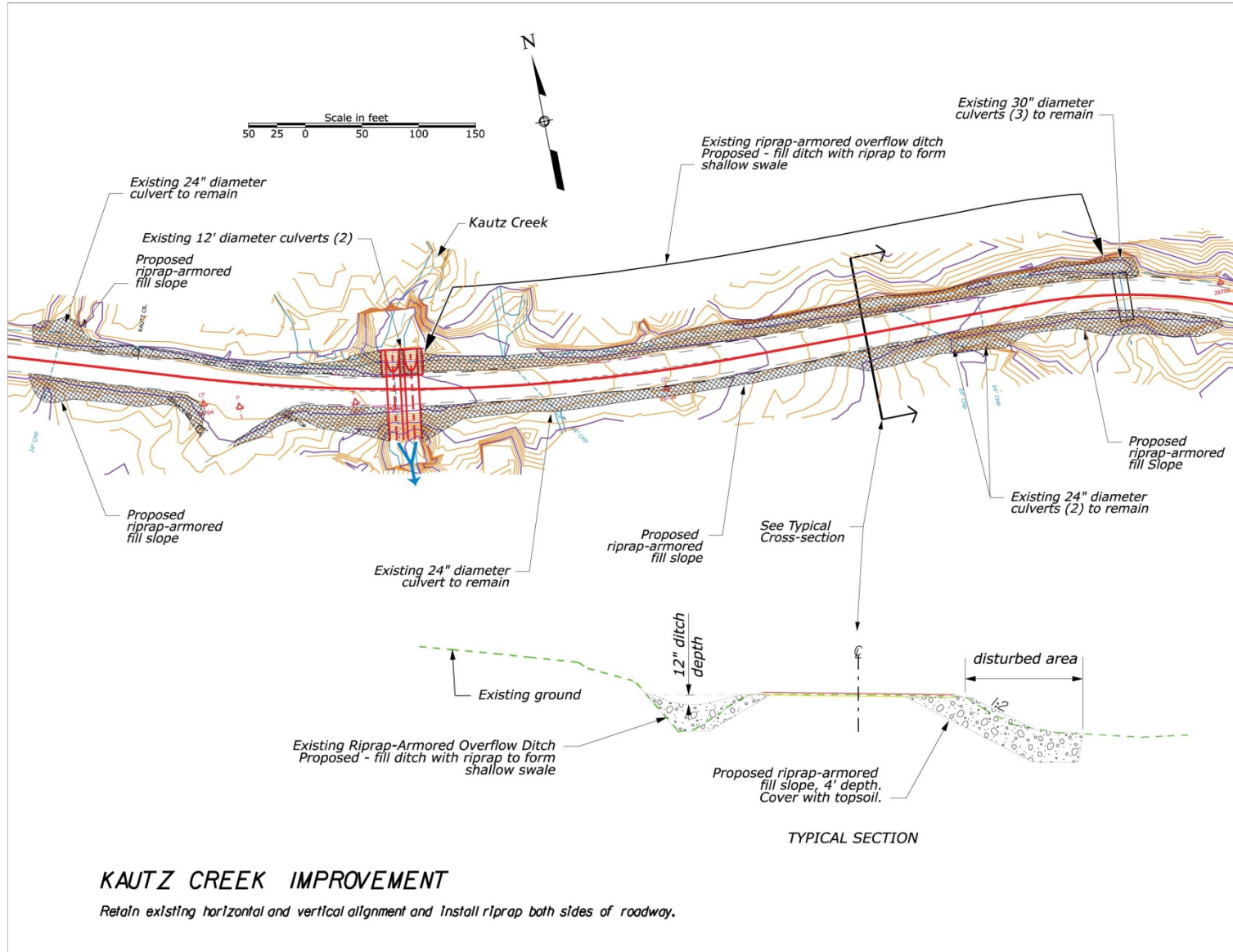
Flood Risk

Channel incision, bank erosion, and woody debris recruitment is occurring upstream and downstream of the culverts installed in 2007. The active channel upstream of the road appears to be migrating east. Woody debris placement and sediment deposition in the active channel could result in an increased frequency of overbank flow traveling down the alluvial fan surface toward the road. The risk of channel avulsion occurring between the culverts at the road and the sag in the road to the east is high. Blockage of the 12-foot culverts by rafted wood (especially since the stream is incising and the adjacent forest is immature) also increases the flood risk and potential failure of the existing drainage system. The risk of flood waters exceeding the capacity of the existing drainage structures and overtopping and damaging the road is high, without improvements to the drainage capacity.

JUSTIFICATION FOR USE OF THE FLOODPLAINS

The Nisqually – Paradise Road currently crosses New Tahoma Creek and Tahoma Creek about ½ mile upstream from the where Tahoma Creek enters the Nisqually River and Kautz Creek about 1 mile upstream from the confluence with the Nisqually River. There is no place to relocate the road that would not require crossing these streams and work in the floodplain.

FIGURE 2. KAUTZ CREEK DRAINAGE IMPROVEMENTS



RESOURCE PROTECTION MEASURES

The following mitigation measures would be implemented in accordance with the NPS floodplain guidelines and EO 11988 (“Floodplain Management”):

- Minimal placement of fill on floodplains is anticipated; except as needed to protect culvert inlets and outlets at New Tahoma Creek and to armor the road side slopes at Kautz Creek. Free natural drainage and natural contours would be preserved to the extent practicable when designing and completing improvements. Previously vegetated areas that are disturbed would be revegetated when construction is complete.
- The New Tahoma Creek culvert would be designed to provide fish passage.
- Natural and cultural resources in the construction area would be protected during construction using best management practices (Table 2 in Environmental Assessment).
- Instream work would be conducted from July 15 to September 15 and for culvert replacement on New Tahoma Creek work would be completed between August 1 and September 15 to protect aquatic resources and Fender’s soliperlan stonefly.
- Construction would be halted if high precipitation event resulting in at least a 2-yr stormwater runoff peak rate occurs
- Flood hazard mitigation would be provided by incorporating improved flood conveyance capacity for protecting life and minimizing damage to the road and natural resources.
- Mitigation of flood hazards to road users would be accomplished by improved drainage and closure of the road during periods of very high flows if flooding is anticipated.

COMPLIANCE

The proposed drainage improvements would accommodate natural streamflows, as well as improved capacity for carrying flood flows. Improvements would not restrict the ability of the floodplains to convey and store floodwaters, and would not contribute to flooding during or after construction.

Section 401 of the Clean Water Act requires a permit for any activity that may result in any discharge into the navigable waters of the United States. Pursuant to the U.S. Army Corps of Engineers, work on New Tahoma Creek would likely fall under Section 404 of the Clean Water Act Nationwide Permit 14 (Linear Transportation Projects). Therefore, Section 401 and 404 permits would be required. Less than about 0.01 acre of riprap placement on Kautz Creek near the existing culverts inlet/outlet would occur within the ordinary high water mark and may require Section 404 or 401 permitting.

Section 401 and 404 permits, plus the Environmental Assessment, this SOF for EO 11988 and Procedural Manual #77-2, Section 106 compliance, and the finding of no significant impact (FONSI), when signed, would complete the NEPA requirements for this project.

CONCLUSION

The protection of people and property is of high priority to the park. The NPS concludes that the preferred alternative would reduce the potential impact to the Nisqually – Paradise Road from flooding. In addition, the Park Service concludes that there is no other practicable alternative for the location of the proposed project. With the roads designed to reduce future flood damage, the risk to life and property would be minimized. There would be no significant adverse effects on natural or beneficial floodplain values.

Mitigation would include good design through sustainable design principles, appropriate siting, and best management practices during and after construction. The Park Service finds the proposal to be consistent with EO 11990.

REFERENCES

Kennard, P. 2009. Comments on MORA 14(6) 30% Western Federal Lands Highway Division Draft Review Notes. Memo from Regional Fluvial Geomorphologist, Mount Rainer National Park to Karen Vaage, Landscape Architect, Pacific West Regional Office. November 23.

Leon, S. 2009. Preliminary Hydraulic Design Report – Nisqually to Paradise Road. Federal Highway Administration, Western Federal Lands Highway Division. Vancouver, WA. October 29.

Attachment D: USFWS Biological Opinion – Draft Resource Protection Measures and Terms and Conditions

Nisqually to Paradise Road Repair and Improvements Environmental Assessment Mount Rainier National Park

The Service's draft Opinion includes the following resource protection measures, which are intended to minimize the impact of incidental take to the marbled murrelet.

- Monitor and report incidental take caused by exposure to temporary, construction-related sources of sound and visual disturbance.

The Opinion also includes the following draft Terms and Conditions:

- When developing final plans for construction, the Park shall include enforceable contract specifications to ensure full and successful implementation of the agreed-upon conservation measures.
- The Park shall prepare a schedule in advance of each year's construction activities. The schedule shall outline and communicate seasonal and day/night work timing restrictions, with reference to specific work locations, staging locations, and/or roadway sections. The Park shall provide the schedule to the selected Contractor(s) and work cooperatively to refine and adaptively manage implementation of the schedule, including contingencies. The Park shall provide a copy of each year's construction schedule to the Service at their earliest convenience, but no later than June 1.
- The Park shall conduct a field review of work and staging locations in advance of each year's construction activities. The Park shall assess the limits of construction, and identify and confirm unavoidable impacts to mature vegetation, with reference to specific locations and/or roadway sections. The Park shall plan, cooperatively refine with Contractor(s) input, and adaptively manage the implementation of BMPs designed to avoid and minimize impacts to mature trees and stands providing suitable habitat.
- If a field review of the limits of construction identifies trees providing suitable marbled murrelet nest platforms, the Park shall notify the Service at their earliest convenience and shall adaptively manage clearing and other work activities to avoid any possibility of nest destruction. The Park shall coordinate with the Service to positively confirm the absence of nesting marbled murrelets and/or postpone clearing until after the marbled murrelet nesting season.
- The Park shall prepare, and provide to the Service no later than December 15, a summary of each year's construction activities. The summary shall describe implementation of the seasonal and day/night work timing restrictions, schedule/ construction contingencies and adaptive management, current year survey findings, and the implementation of BMPs designed to avoid and minimize impacts to mature trees and stands providing suitable habitat.
- All materials for submittal to the Service shall be sent to the Washington Fish and Wildlife Office's Consultation and Technical Assistance Division (Attn: Manager, Forest Resources Branch).

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ERRATA
December 2012

**Nisqually to Paradise Road Repair and Improvements
Environmental Assessment
Mount Rainier National Park**

This errata sheet documents changes to the text of Nisqually to Paradise Road Repair and Improvements Environmental Assessment (EA) made following public release of the EA in August 2012. These changes correct, clarify or modify original text based on public comments and/or actions that have changed. There are no modifications that would result in substantial alteration of determination of effects, nor which substantively amend proposed actions.

This Errata must be attached to the original EA so as to comprise the full and complete record of the environmental impact analysis completed for this initiative.

1. The next to last sentence in the last paragraph on page 15 of the EA should be revised as follows:

“All of the night work construction and staging areas are more than 1 mile from Cougar Rock campground and 0.75 miles west of Longmire.”

2. The third sentence in the second paragraph under *Embankment Stabilization* on page 25 of the EA contains a typographical error and should be revised as follows:

“MSE wall construction would require removal of trees less than 18 inches diameter at breast height (DBH) and possible impacts to tree roots.”

3. Add a new sentence at the end of the first paragraph under the section titled *Culverts and Ditches* on page 31:

Roadside ditches will be cleaned of debris and excess sediment to ensure adequate drainage away from the road.

5. The following minor revisions were made to amphibian and fish resource protection measures in Table 2 of the EA. These changes do not alter the conclusions of the impact analysis.

Table 1. Amphibian and Fish Resource Protection Measures

MP	Construction Work	Night Work ¹	Resource Protection Measures ²
0.0 – 0.3	Subexcavation	No	Restrict work to dry soil conditions in adjacent ditches, work day only, no work in May and June, extension of lane width only after NPS Resource Advisor approval.
0.4 – 0.6	Subgrade reinforcement	No	Restrict work to daylight hours; coir logs with drift fencing on both sides of road (extend 6 feet beyond ends).
0.6 – 0.7	Potential culvert replacement	No	Avoid ditch work, work within fish window (beginning July 15 through and including September 15) or when conditions are dry if culvert is to be replaced or ditch work is necessary. If stream culvert is to be replaced, consult with NPS Resource Advisor.
0.8 – 0.85	Potential culvert replacement	No	Avoid ditch work, work within fish window (beginning July 15 through and including September 15) or when conditions are dry if culvert is to be replaced or ditch work is necessary. If stream culvert is to be replaced, consult with NPS Resource Advisor.
0.9 – 1.1	Subexcavation, culvert replacement	No	Restrict work to daylight hours, and no extension of lane width. Work when conditions are dry if culvert is to be replaced or ditch work is necessary. Consult NPS Resource Advisor.
1.1 – 1.2	New Tahoma Creek culvert replacement	Yes	Work within fish window (beginning July 15 through and including September 15), remove fish and tadpoles prior to work, install coir log with drift fence backing across channel on either end of work area and filter any sediment released.
1.6 – 1.7	Potential culvert replacement	No	Avoid ditch work, work within fish window (beginning July 15 through and including September 15) or when conditions are dry if culvert is to be replaced or ditch work is necessary. If stream culvert is to be replaced, consult with NPS Resource Advisor.
1.75 – 2.5	Subexcavation, subgrade reinforcement, deep patch, potential culvert replacement	Yes	No work in May and June, coir log with drift fencing along edge of pavement on both sides of road (extend 6 feet beyond ends), work within fish window (beginning July 15 through and including September 15) or when conditions are dry if culvert is to be replaced or ditch work is necessary. If stream culvert is to be replaced or lane width needs to be extended, consult with NPS Resource Advisor.

MP	Construction Work	Night Work ¹	Resource Protection Measures ²
2.0 – 2.1	Potential culvert replacement	No	Day work only, install coir log with drift fencing along edge of pavement on both sides of road (extend 6 feet beyond both ends), work within fish window (beginning July 15 through and including September 15) or when conditions are dry if culvert is to be replaced or ditch work is necessary. If stream culvert is to be replaced or lane width needs to be extended, consult with NPS Resource Advisor.
2.1 – 2.2	Potential culvert replacement, subexcavation nearby	No	Restrict work to daylight hours only, install coir log with drift fencing along edge of pavement on both sides of road (extend 6 feet beyond both ends), work within fish window (beginning July 15 through and including September 15) or when conditions are dry if culvert is to be replaced or ditch work is necessary. Limit ditch work. If stream culvert is to be replaced or lane width needs to be extended, consult with NPS Resource Advisor.
2.2 – 2.3	Potential culvert replacements, deep patches, and subgrade reinforcements nearby	Yes	Work within fish window (beginning July 15 through and including September 15) or when conditions are dry if culverts are to be replaced or ditch work is necessary. If stream culverts are to be replaced or lane width needs to be extended, consult with NPS Resource Advisor.
2.6 – 2.7	Subgrade reinforcement and potential culvert replacement	No	Work within fish window (beginning July 15 through and including September 15) or when conditions are dry if culvert is to be replaced. If culvert is to be replaced consult with NPS Resource Advisor.
2.8 – 3.2	Subgrade reinforcement, deep patches, potential culvert replacements	Yes	Work within fish window (beginning July 15 through and including September 15) or when conditions are dry if culvert is to be replaced. If culvert is to be replaced consult with NPS Resource Advisor.
3.4 – 3.6	Kautz Creek work	Yes	Work during dry period adjacent to stream, install sediment traps and erosion control.
4.3 – 4.4	Potential culvert replacements	No	Work within fish window (beginning July 15 through and including September 15) or when conditions are dry if culverts are to be replaced or ditch work is necessary. If stream culverts are to be replaced or lane width needs to be extended, consult with NPS Resource Advisor. No equipment storage, fueling or stockpiling at turnout, which is located over culvert. Protect stream with sediment/silt barrier.

MP	Construction Work	Night Work ¹	Resource Protection Measures ²
4.9 – 6.0	Deep patches, subgrade reinforcement, potential culvert replacement	Yes	Work within fish window (beginning July 15 through and including September 15) or when conditions are dry if culverts are to be replaced or ditch work is necessary. If stream culverts are to be replaced or lane width needs to be extended, consult with NPS Resource Advisor.
6.1 – 6.2	Deep patch and potential culvert replacement	Yes	Work within fish window (beginning July 15 through and including September 15) or when conditions are dry if culverts are to be replaced or ditch work is necessary. If stream culverts are to be replaced or lane width needs to be extended, consult with NPS Resource Advisor.
6.3 – 6.4	Potential culvert replacement	No	Work within fish window (beginning July 15 through and including September 15) or when conditions are dry if culverts are to be replaced or ditch work is necessary. If stream culverts are to be replaced or lane width needs to be extended, consult with NPS Resource Advisor.
6.4 – 6.5	Potential culvert replacement	No	Work within fish window (beginning July 15 to September 15) or when conditions are dry if culvert is to be replaced. If culvert is to be replaced consult with NPS Resource Advisor.
6.5 – 6.6	Potential culvert replacement	No	Work within fish window (beginning July 15 through and including September 15) or when conditions are dry if culvert is to be replaced. If culvert is to be replaced consult with NPS Resource Advisor.
7.5 – 7.6	Potential culvert replacement	No	Work within fish window (beginning July 15 through and including September 15) or when conditions are dry if culvert is to be replaced. If culvert is to be replaced consult with NPS Resource Advisor.
7.8 – 8.1	Standard road rehabilitation activities	No	Restrict work to dry soil conditions in adjacent ditches, no work in May and June. If lane width needs to be extended, consult with NPS Resource Advisor. Provide sediment barriers. No driving on uphill shoulder.
10.6 – 10.9	MSE wall, deep patch, potential culvert replacement	Yes	Restrict work to dry soil conditions in adjacent ditches. Avoid extension of lane width. If lane width needs to be extended, consult with NPS Resource Advisor. Install silt fence along edge of pavement on upslope side to protect water quality of adjacent seeps and wet ditch.
11.3 – 11.6	Standard road rehabilitation activities	No	Restrict work to day only, no extension of lane width. Install construction fencing on upslope side of road. Install sediment barriers.
11.7 – 12.0	Deep patch	Yes	Restrict any necessary ditch work to dry soil conditions. If ditch cleaning is absolutely necessary, it will be done in consultation with the NPS Resource Advisor.

MP	Construction Work	Night Work ¹	Resource Protection Measures ²
14.8 – 15.8	Deep patch, drainage improvement	Yes	Restrict work to dry soil conditions in adjacent ditches. No extension of lane width or ditch cleaning. If ditch cleaning absolutely necessary, consult with NPS Resource Advisor. Use sediment barriers along both sides of the road.
18.4 – 21.0	Standard road rehabilitation activities	No	Restrict work to day only, no work until snow-bank on east side is completely melted and ditches are dry. Contingent on approval by NPS Resource Advisor who will visit site prior to construction to check conditions. Upslope habitat beyond paved road edge will be left undisturbed, no removal of substrate, including gravel, cobble, boulders or downed wood. No extension of lane width.

¹ Locations where night work is planned. Areas of night work have greater potential for amphibian impacts and additional resource protection measures may be used.

² All instream work where native fish may be impacted will be conducted during the fish window beginning July 15 through and including September 15 or when conditions are dry. Some locations may be conducted in the dry, or do not require culvert replacement or instream work, in which case implementation during fish window is not required.