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**DRAFT**  
**ENVIRONMENTAL ASSESSMENT**  
**MOREY CREEK DAM**  
**BYPASS CHANNEL**



**McCHORD AIR FORCE BASE**  
**WASHINGTON**

**62 CES/CEV**

**62D AIRLIFT WING**

**McCHORD AIR FORCE BASE FEBRUARY 2009**

**McChord Air Force Base  
Environmental Document  
Available for Public Review**

**Proposal:  
Construct Bypass Channel  
Morey Dam on Morey Creek  
McChord Air Force Base, Washington**

A Draft Environmental Assessment (DEA) has been prepared for the proposed construction of a bypass channel around Morey Dam, McChord Air Force Base, Washington. This proposed project will be completed in a partnership with Pierce County Public Works and Utilities, Surface Water Management. Morey Dam was constructed in 1979 and the 12-foot spillway is a vertical barrier that prevents fish migration. Construction of the bypass channel will allow salmon migration from Clover Creek around the dam and into Morey Pond and upstream reaches of Morey Creek. The bypass channel will allow the dam to remain in place and retain Morey Pond as fish habitat and a wildlife viewing resource.

Public comments are welcome on this document through April 3, 2009. The document may be reviewed online at [www.mcchord.af.mil](http://www.mcchord.af.mil) or at two branch locations of the Pierce County Library: Lakewood Branch at 6300 Wildaire Rd SW, and Parkland/Spanaway Branch at 13718 Pacific Avenue South.

Written comments on the DEA may be submitted to:

**Public Affairs Office  
62 AW/PA,  
100 Col Joe Jackson Blvd  
McChord AFB, WA 98438**

# **ENVIRONMENTAL ASSESSMENT**

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# **1.0 PURPOSE AND NEED FOR ACTION**

## **1.1 INTRODUCTION**

The National Environmental Policy Act (NEPA) of 1969 is the nation's charter for protecting the environment and establishes the nation's environmental goals and policies. It requires federal agencies consider the environmental consequences of proposed actions in the decision-making process. The President's Council on Environmental Quality (CEQ) Regulations implement NEPA (40 Code of Federal Regulations (CFR) 1500-1508, 1978). CEQ Regulations require that an environmental assessment (EA):

- (1) Briefly provide evidence and analysis to determine whether the proposed action might have significant effects requiring preparation of an environmental impact statement (EIS). The Air Force will prepare a Finding of No Significant Impact (FONSI) if the analysis determines that the environmental effects will not be significant.
- (2) Facilitate the preparation of an EIS when required.

This EA is part of the environmental impact analysis process for the proposed action as set forth in Air Force Instruction (AFI) 32-7061, *The Environmental Impact Analysis Process*, (as a formal rulemaking at 32 CFR part 989). This AFI implements NEPA, CEQ Regulations, and Department of Defense Instruction (DoDI) 4715.9, *Environmental Planning and Analysis*.

## **1.2 LOCATION HISTORY AND BACKGROUND**

McChord Air Force Base (AFB) is located in central Pierce County, Washington (Figure 1-1). The host unit at McChord AFB is the 62d Airlift Wing (AW), whose primary mission is to build, maintain and protect a combat-ready force to rapidly deploy and employ combat airlift for America. The 62 AW is composed of the Operations Group, Logistics Group, Mission Support Group and Medical Group. These group's capabilities encompass the entire spectrum of airlift activities including preparation and loading of passengers and cargo, detailed planning for worldwide combat operations, operation and maintenance of the aircraft, and operation of the airfield. The 62d AW operates C-17 Globemaster III cargo aircraft to accomplish its mission.

Morey Creek enters McChord AFB on the eastern boundary of the installation and flows westward through a 5-foot diameter concrete culvert under Perimeter Drive. It then enters Morey Pond, an approximately 2.5-acre surface water body created by Morey Dam. After flowing over the dam the creek waters join Clover Creek and flow through two 12-foot diameter steel culverts beneath the north-south runway, exiting the installation near the 1100 dormitory area (Figure 1-2). The western segment of the pond, the dam and the confluence of Morey Creek downstream of the dam and Clover Creek are all within the

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1000-foot distance line from the runway centerline. Only flightline-authorized vehicles are approved within this 1000-foot line.

Morey Dam was installed in 1979 to create Morey Pond as a fishing location for base personnel, their families and military retirees. The pond is stocked annually with hatchery rainbow trout. The 12-foot high dam is a vertical barrier that prevents migratory fish passage. The dam has been ranked by Pierce County as a high priority to remove in the WRIA 12 Lead Entity Strategy. This project has potential to allow anadromous salmonid to migrate from Clover Creek through the Morey Pond segment of Morey Creek. Upstream of Morey Creek is the outlet of Spanaway Lake that is protected from development in a park and provides a constant/spring-like flow with excellent spawning gravel. Upstream of Spanaway Lake is a 3.5 mile long marsh/stream complex on Fort Lewis that is protected from development and potentially good habitat for anadromous salmonids.

Figure 1-3 shows Morey Pond, Morey Dam and the confluence with Clover Creek. Figures 1-4 and 1-5 show Morey Pond from the north and south banks. Figure 1-6 shows the spillway at the dam and Figure 1-7 shows the inflow point into Morey Pond.

### **1.3 PURPOSE AND NEED FOR ACTION**

McChord AFB has a requirement to ensure successful completion of its airlift mission while promoting and supporting preservation and enhancement of our natural resources. In a partnership with Pierce County to support salmon recovery efforts in western Washington, this EA evaluates alternatives that would increase salmonid spawning capabilities currently affected by the Morey Creek dam.

### **1.4 SELECTION STANDARDS**

Mission requirements for this project are:

- Ensure continued security and access restrictions to the runway and prevent runway incursions
- Result in no increase in installation requirements for maintenance or personnel
- Produce no increase in the potential for bird/aircraft strike hazards (BASH) incidents that may damage aircraft and endanger flight personnel.

Natural Resource requirements for this project are:

- Provide for migratory fish passage past the current blockage at Morey Pond
- Protect water quality and flow rates in downstream Clover Creek
- Allow continued use of Morey Pond for wildlife viewing and other recreational purposes.

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Regulatory requirements for the project are:

- US Army Corps of Engineers Clean Water Act Section 404 Permit
- Washington Department of Ecology Clean Water Act Section 401 Permit
- Washington Department of Fish and Wildlife Hydraulic Project Approval
- National Marine Fisheries Service, Essential Fish Habitat Consultation
- US Fish and Wildlife Endangered Species Act Consultation
- Coastal Zone Management Act
- Section 106 Consultation with Washington State Department of Archaeology and Historical Preservation

### **1.5 SCOPE OF THE ANALYSIS**

The purpose of this EA is to identify and evaluate the environmental effects involved in providing for migratory fish passage past the current blockage at Morey Dam. The decision to be made is whether to remove the dam entirely, install a concrete fish-way (fish ladder), construct a bypass channel, or to take no action in light of the environmental impacts that would occur as a result of the action.

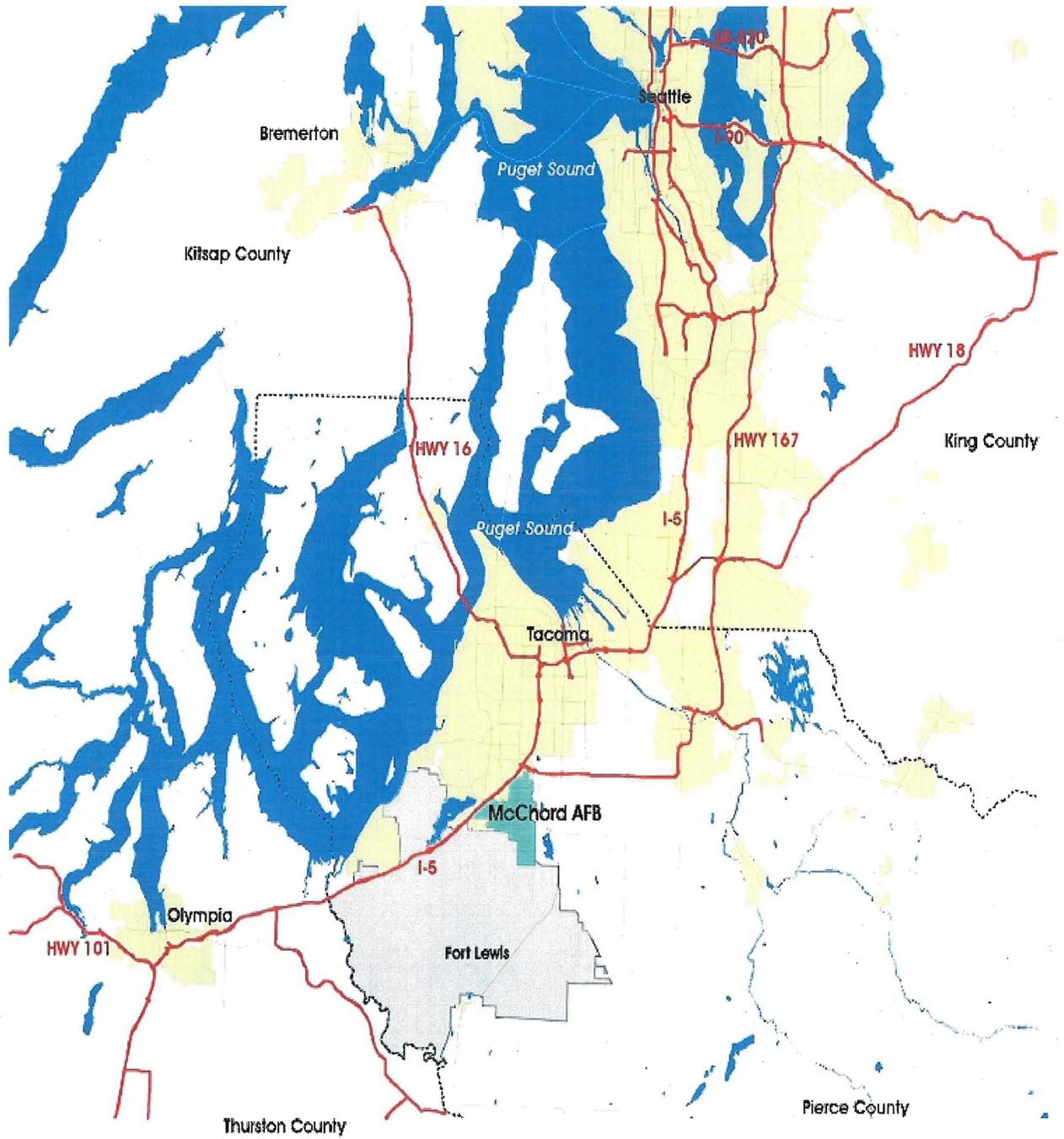


Figure 1-1. Location of McChord AFB and the Surrounding Regional Area.

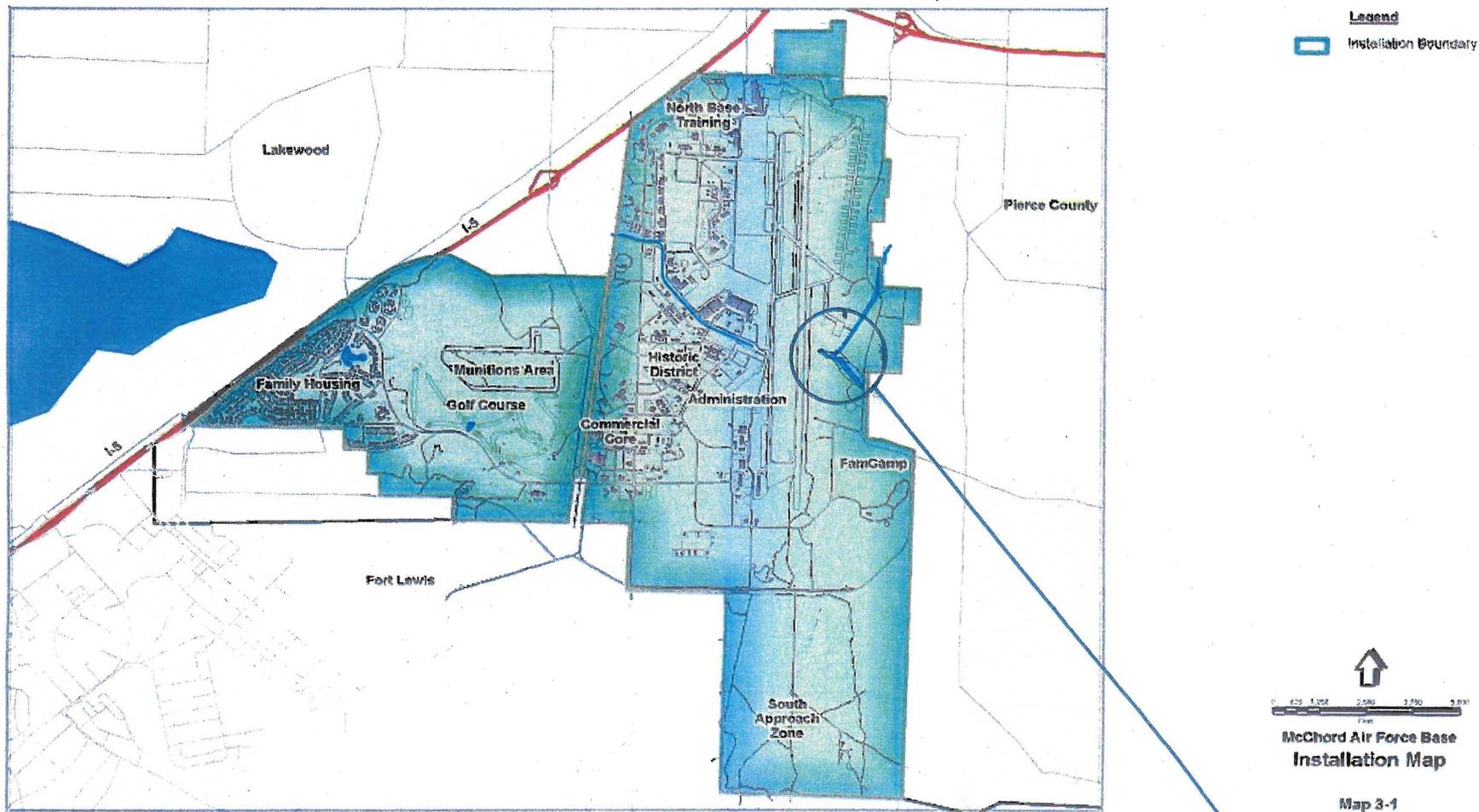


Figure 1-2. McChord AFB and the Clover and Morey Creek Reaches on the Installation.

Project Location

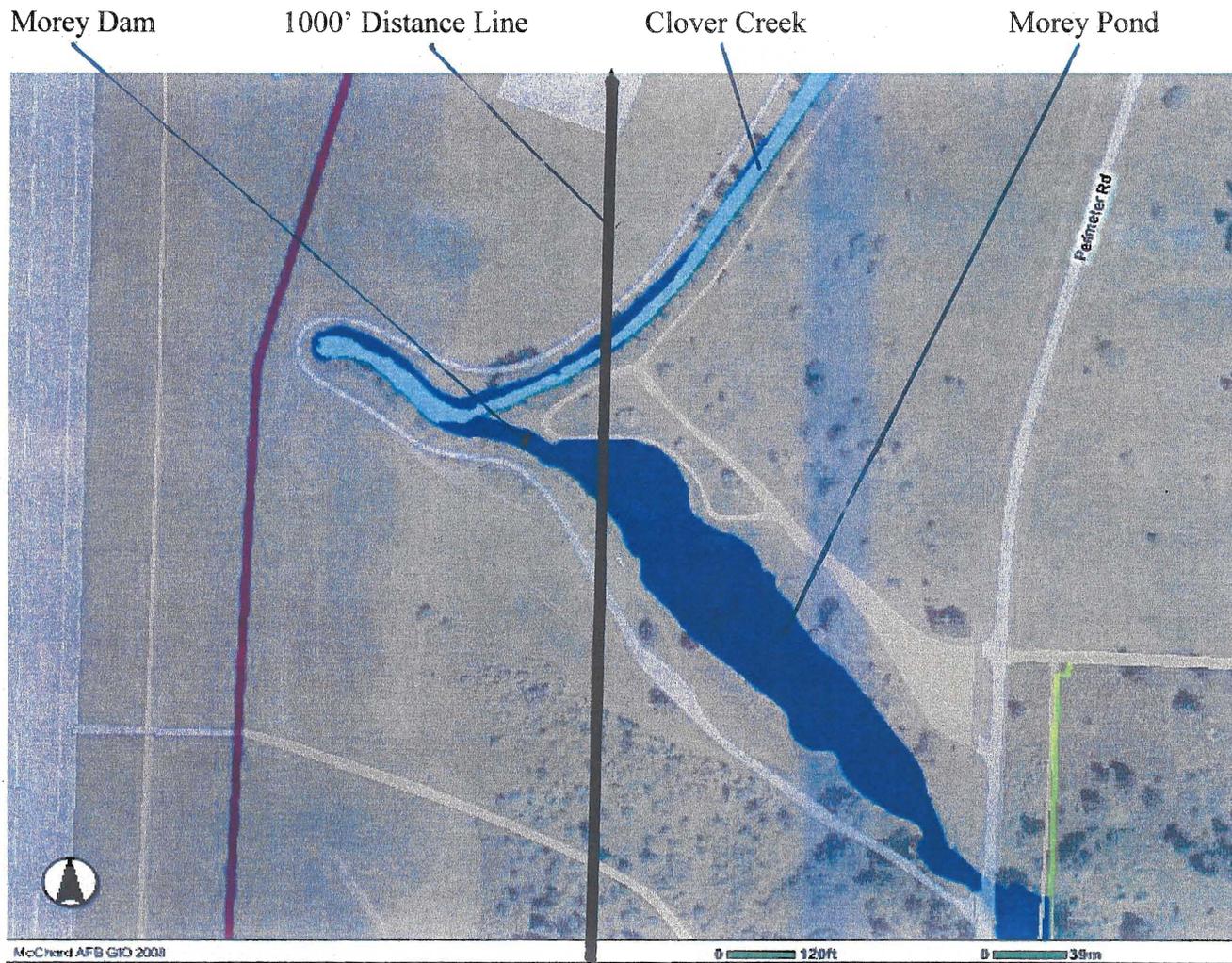


Figure 1-3. Morey Pond, Morey Dam and the confluence with Clover Creek.



Figure 1-4. View of Morey Pond from the north bank looking west towards dam.



Figure 1-5. View of Morey Pond from the south bank near the dam looking east.



Figure 1-6. Morey Dam spillway.



Figure 1-7. Morey Creek where it enters McChord (note concrete culvert in foreground).

## **2.0 EVALUATION OF ALTERNATIVES**

The alternatives evaluated as part of this EA are:

- 1) No Action;
- 2) Removal of Morey Dam and Morey Pond;
- 3) Construction of a concrete fish-way (fish ladder);
- 4) Construction of a bypass channel.

### **2.1 ALTERNATIVE 1: NO ACTION**

The no action alternative would continue to block migratory salmonid access to the upper reaches of Morey Creek and Spanaway Lake. The dam is not a complete blockage to downstream migration as salmonid smolts may reach Clover Creek by going over the dam in high flow conditions.

The no action alternative would meet all of the mission and regulatory requirements of the project. It also meets the natural resource requirements of protecting water quality and flow rates downstream in Clover Creek. However, it would not meet the primary natural resource requirement of allowing migratory fish passage past the current blockage at Morey Dam. Accordingly, this alternative would not meet the purpose and need of the proposed action.

### **2.2 ALTERNATIVE 2: REMOVAL OF MOREY DAM AND POND**

Alternative 2 would remove Morey Dam completely, drain Morey Pond and restore Morey Creek channel through the current pond area to a natural condition. This would remove the pond as it now exists and replace it with approximately 600 feet of new creek channel and 3.25 acres of restored streamside riparian area.

To accomplish this, the pond would be dewatered and a temporary bypass channel would be created for the creek. The concrete dam would be demolished and removed, along with about 1,700 cubic yards of sediment, followed by establishment of a new channel and restoration activities.

The alternative meets the mission requirements of maintaining existing runway security, not increasing maintenance or personnel requirements and not increasing BASH hazards. If Morey Pond was dewatered the area would see fewer visitors and vehicle traffic, thus reducing the potential for runway incursions. Also, the current bird attraction of the pond would be removed, thus reducing the existing BASH hazard.

The alternative meets the primary natural resource requirement of allowing for migratory fish passage upstream through Morey Creek. However, removal of the dam, excavation of the sediment and restoration of the creek channel present major potential detrimental

impacts to downstream water quality due to release of sedimentation during these activities. The restoration of the channel and re-vegetation of the stream bank also present significant risk of erosion and downstream sedimentation during the 1 to 2 year period required for stabilization. This alternative also does not meet the natural resource requirement allowing for continued recreational use of the pond.

It is anticipated that this alternative would be able to meet the regulatory requirements. However, given the scope of the project, the time frame required to accomplish the project and the potential for significant impact to downstream water quality the effort required to obtain regulatory approval would be immense.

### **2.3 ALTERNATIVE 3: CONSTRUCTION OF CONCRETE FISHWAY**

Alternative 3 would consist of construction of a concrete fishway (more commonly known as a fish ladder) that would consist of a concrete pool-and-weir or a pool-and-chute style structure for fish passage. For the pool-and-weir option, the existing dam would be modified to function as an overflow spillway and the pond would remain. A series of 10 to 15 pools would be constructed adjacent to the dam for the fish to pass through. For the pool-and-chute option, the dam would be removed and the pond would be replaced by a series of pools constructed within the alignment of the stream channel. Construction of either design would require dewatering the area using cofferdams, excavation for the fish-way, construction of the concrete fishway, and site restoration.

This alternative meets the runway security and BASH mission requirements, but does not meet the maintenance and personnel requirement. Fishways require regular monitoring and adjustment, maintenance, and eventual replacement in order to reliably operate as designed. Typical fishway maintenance includes sediment removal, removing debris, and repair/replacement of stop-logs, fencing and railings.

The primary natural resource requirement of allowing migratory fish passage is met with this alternative, although fishways are not considered effective means of fish passage. The maintenance requirements, if not met, can greatly reduce the capacity of the fishway to allow migratory fish movement. This alternative does meet the other two natural resource requirements of protecting downstream water quality and continued use of Morey Pond.

The effort required to obtain regulatory approval for a construction fishway would be significant.

### **2.4 ALTERNATIVE 4: CONSTRUCT BYPASS CHANNEL**

Alternative 4 would construct a bypass channel from the south bank of the main stem of Clover Creek around the existing dam to the south shoreline of the pond. The bypass would provide a passage for migratory salmonidids around the dam and into Morey Pond and ultimately Morey Creek and Spanaway Lake. The dam and Morey Pond would

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remain in place, with the pond acting as a refuge habitat for juvenile salmonid on their way downstream through the channel.

The channel will be approximately 590 feet long with an average slope of 2.2 % and incorporates the “riffle pool” approach. The base channel will range in width from 6 to approximately 30 feet with additional 10 foot benches in the curves. The design also provides a shallow water habitat component at the connection to Morey Pond. This habitat is design to provide refuge for juvenile salmonid from predators.

A 7.5-inch weir plate will be re-installed at the dam and the new outlet channel will match the invert elevation of the existing overflow elevation of the dam. This will maintain the current size of the pond and allow the pond to continue to be utilized for recreational purposes. Under normal conditions, the bypass channel will be the outlet for stream flow from Morey Pond. Flow over the spillway of the dam will only occur as a result of large precipitation events.

Approximately 200 linear feet of pond shoreline on each side of the bypass channel connection to the pond will be enhanced under this alternative. This habitat bench creation will include placement of habitat logs and keyed boulders to provide shelter for juvenile salmonid to hide from predators on their way downstream. The entire pond will also act as habitat for juvenile salmonid.

Alternative 4 would increase runway security by situating the bypass channel in an area currently accessible by vehicles. Once the channel is in place no vehicles will be able to access the runway through the area occupied by the channel. It also does not result in increased maintenance or personnel requirements. Care must be taken during the design to ensure that the channel does not result in a bird-attractant during the fish migratory time frames. However, since the pond is already a bird-attractant, it is not anticipated that the channel will increase the existing BASH threat.

The alternative meets the primary natural resource requirement of allowing fish passage past the current blockage and also the requirement to protect downstream water quality. Alternative 4 will increase the recreational use of the pond by providing a view area for observing migratory fish passage. Construction of the habitat bench along the south shoreline will also increase the natural resource value of the pond by providing habitat for juvenile salmonid.

All of the regulatory requirements are met by this alternative.

## **2.5 IDENTIFICATION OF THE PREFERRED ALTERNATIVE**

Table 2-1 summarizes the mission, natural resource and regulatory requirements and the anticipated ability for each alternative to meet these requirements. Information for each alternative shown in bold indicates that the alternative does not meet the requirement.

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Alternative 4 is the only alternative that meets all mission, natural resource and regulatory requirements.

Based on the information provided in Section 2.3 and the capability of meeting the project mission, natural resource and regulatory requirements, the preferred alternative is Alternative 4: Construct Bypass Channel, as described in Section 2.4 above. Alternatives 2 (remove dam) and 3 (fishway) will not be considered further in this analysis and have been eliminated from further review.

Design drawings for the bypass channel are included in Appendix A. Prior to any site work a construction waiver will be obtained from Air Field Management to allow vehicles and construction within the 1000-foot distance line from the runway centerline. A new gravel access road will be constructed south of the channel footprint to provide access for vehicles and equipment during the construction phase. Once the construction is complete the road will be removed and the seeded with either Roemer's or Idaho fescue grasses. Signs will be placed at the 1000-foot distance line noting that only authorized flightline vehicle traffic is allowed beyond these signs.

This project would require the removal of seven deciduous trees and one evergreen tree. The timber will be utilized for the project as bed control logs in the bypass channel and habitat logs in the juvenile habitat bench areas. Approximately 200 square feet of existing wetlands would be lost due to the channel excavation. An existing metal staircase leading from the top of the stream bank down to Morey Creek below the dam will be removed and stored for replacement at another location on Clover Creek by Air Force Personnel. The existing fishing platform on the south bank of the pond will be retained and will act as a viewing platform at the confluence of the bypass channel and pond and juvenile habitat area.

The channel will connect the south edge of Morey Pond (Elevation 289.5 feet) with the south bank of Clover Creek (elevation 278.3). This will require the excavation of approximately 1200 cubic yards (CY) of material. Subsurface in this area is the Steilacoom Gravel, consisting of silty, sandy, cobbly gravel. Some of the material may be re-used in segments of the channel requiring fill, with the remainder of the excavated material graded throughout the project area at the end of the construction.

By definition, any proposed project at McChord AFB must meet the applicable regulatory requirements before implementation. Once an engineering design has been finalized, the following applicable environmental permits and approvals:

- US Army Corps of Engineers Clean Water Act Section 404 Permit
- Washington Department of Ecology Clean Water Act Section 401 Permit
- Washington Department of Fish and Wildlife Hydraulic Project Approval

The proposed work would be accomplished during historic low stream flow period (July – October timeframe) to minimize any effects to fish, aquatic life, and water quality.

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<b>Mission Requirements</b>	<b>Alternative 1 No Action</b>	<b>Alternative 2 Dam Removal</b>	<b>Alternative 3 Concrete Fishway</b>	<b>Alternative 4 Bypass Channel</b>
Runway Security	No Change	Potential Increase in Security	No Change	Increased Runway Security
Maintenance and Personnel Requirements	No Change	No Change	<b>Yes Maintenance Required</b>	No Change
BASH Potential	No Change	Reduced BASH Potential	No Change	No change
<b>Natural Resource Requirements</b>				
Provide fish passage	<b>No</b>	Yes	Yes	Yes
Protect downstream water quality and flow	No Change	<b>No Potential major impacts</b>	Yes	Yes
Continued recreational use of Morey Pond	Yes	<b>No Pond will no longer exist</b>	Yes	Yes
<b>Regulatory Requirements*</b>	Yes	<b>Significant Effort Required</b>	<b>Significant Effort Required</b>	Yes

\*Preferred alternative must by definition meet all regulatory requirements before project can proceed.

**Table 2-1. Summary of Project Requirements and Evaluation of Alternatives**

## **3.0 AFFECTED ENVIRONMENT**

### **3.1 INTRODUCTION**

This chapter describes the general environment at McChord AFB and in the vicinity of the proposed project location.

### **3.2 PHYSICAL ELEMENTS**

#### **3.2.1 LOCATION**

McChord AFB includes 4,639 acres of land within Pierce County in western Washington about 6 miles east of Puget Sound. Land uses, their acreages, and percent of the base are as follows: Semi-improved—1,505 acres (32%), Unimproved/Multiple Use (forest and natural areas)—1,325 acres (29%), Improved—907 acres (20%), and Facilities—902 acres (19%).

With a total population of 14,773, approximately 27% are active duty military personnel. There are an additional 2,245 Traditional Guardsmen and Reserves. An Economic Influence Statement was completed in 2003 and identifies the economic impact of McChord AFB on the surrounding communities. The Economic Influence Statement accounts for off-base local area expenditures within a 50-mile radius of the base. For fiscal year 2003, the total payroll of McChord AFB was \$282,106,173 and had total annual expenditure of \$92,112,724. McChord AFB also created an estimated 3,170 jobs within the local area, having an estimated dollar value of \$113,042,200. There are currently over 11,500 persons employed at or indirectly by McChord AFB.

#### **3.2.2 CLIMATE**

The climate at McChord AFB is tempered by the Pacific Ocean breezes and characterized by mild temperatures, a pronounced rainy season, and considerable cloudiness. The Cascade Mountain range shields the area from the cold, dry continental air masses in the winter months, and the hot, dry continental air masses in the summer months. The annual mean temperature is 51.6 degrees Fahrenheit, with an average daily maximum temperature of 59.4 degrees and an average daily minimum temperature of 44.6 degrees. Throughout the year, extreme temperatures are rare and usually of short duration. Wind speeds are consistent throughout the year at an annual average speed of nine miles per hour with the wind direction predominantly from the southwest. Humidity remains fairly constant at about 73% during the summer and winter. Average annual rainfall in the area is 40.7 inches, with approximately 81% of the annual rainfall occurring from October through April.

### **3.2.3 AIR RESOURCES**

McChord AFB is within the jurisdiction of the Puget Sound Clean Air Agency (PSCAA) and the installation is designated along with the rest of Pierce County as a maintenance area for ozone, carbon monoxide and particulate matter (PM10) (McChord AFB, 2005). Vehicles are a major source of air pollutants in the Puget Sound Clean Air Agency (PSCAA) area contributing 66 percent of the total carbon monoxide emissions (McChord AFB, 2005).

### **3.2.4 GEOLOGY AND SOILS**

Highly pervious soils on McChord AFB are limiting factors for natural vegetation and landscape plantings. Upper soil levels become very dry during the summer months, which are low in rainfall, and require irrigation of planted areas. Historically, the moisture content of the soils combined with natural fires maintained the McChord AFB area as a prairie ecosystem.

Elevation at McChord AFB is generally between 280 feet and 320 feet above mean sea level (MSL). Highest elevations are hills reaching 360 feet (Wescott and Porter Hills) while depressions (glacial kettles) are as low as 263 feet.

The surficial geology of McChord AFB is primarily the result of the Vashon glaciation that ended about 12,000 years ago. Glacial deposits consist of surface alluvium, outwash gravel, cemented glacial till, and two underlying sand units separated by an impermeable blue clay lens. The typical ground surface on the base consists of Spanaway gravelly sandy loam, which is very permeable. Steilacoom outwash gravel is generally found beneath the surface alluvium and this gravel commonly contains "kettles" or depressions left where large blocks of glacial ice melted. Vashon till, characterized by a mixture of silt, sand, gravel, cobbles, and boulders, commonly underlies the Steilacoom gravel. A layer of Colvos Sand, up to 150 feet thick, lies below the Vashon gravel and is the principle aquifer for the base and surrounding areas. A 2- to 4-foot thick layer of blue clay underlies the Colvos Sand and separates the Colvos Sand aquifer from other deeper layers (Parsons, 2003).

### **3.2.5 SURFACE WATER**

Morey Creek enters McChord AFB on the eastern edge of the installation and flows through a 5-foot diameter concrete culvert beneath Perimeter Road. Morey Creek flows through Morey Pond, over Morey Dam and then merges with Clover Creek east of the runways. Morey Pond is approximately 2.5 acres in size and has a maximum depth of 7 feet.

Clover Creek then flows westward through the twin 12-foot culverts under the runways and emerges west of the runways near the industrial portion of the base. The creek exits the base at its western boundary and flows into Lake Steilacoom. Lake Steilacoom

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empties into Chambers Creek, which discharges to Chambers Bay at Puget Sound. A spillway and substation are located on Chambers Creek at its entrance to Chambers Bay. A fish hatchery is located downstream of Steilacoom Lake.

At the time of the base's inception in the late 1930's, Clover Creek flowed directly westward from the location where it enters the base and Morey Creek flowed northward from the current confluence with Clover Creek to intersect with Clover Creek. In order to construct the main north-south runway, Clover Creek was rerouted via an excavated channel southward to its' current confluence with Morey Creek. From that point the newly excavated Clover Creek channel flowed westward past the runway and then northward to re-intercept the original Clover Creek channel. The confluence of the 1930's excavated channel and the original channel can be observed at the existing B Street Bridge on McChord.

In the early 1950's the runway was extended southward and the two culverts channeling Clover Creek under the existing runway were installed (USACE, 1954). The final major restructuring of the Morey and Clover Creek channels at McChord occurred in 1979 with the construction of Morey Dam just upstream of the Morey/Clover confluence that created Morey Pond.

### **3.2.5.1 MOREY CREEK STREAMFLOW**

The U.S. Geological Survey (USGS) maintained a flow monitoring station (12090480) above McChord AFB near parkland from February 1991 to September 1992. This station recorded streamflows between 1 and 8.3 cubic feet per second (cfs) over this time period.

On September 12, 2007, flow measurements were taken as closely in time as possible of both the inflow and outflow from the pond. Inflow to the pond was measured at 1.6 cubic feet per second (cfs) and outflow at the spillway measured at 3.0 cfs, suggesting groundwater inflow to the pond, as discussed further in Section 3.2.6.

### **3.2.5.2 CLOVER CREEK STREAMFLOW**

The USGS has had three streamflow gauging stations on Clover Creek, two upstream of the base and one downstream of the base. The downstream station (#12090500, Clover Creek near Tillicum, Washington) was monitored for 10 partial years and 17 full years between 1950 and 2003, and has a drainage area of 73.8 square miles at the Pacific Highway bridge crossing, which is about 4,000 ft downstream of the base. Although the watershed is slightly bigger at the USGS station than at the study reach, there are no significant tributaries (except for storm water runoff from the intervening neighborhood). Thus, the flow characteristics at Station 12090500 are probably similar and thus representative of the McChord AFB reach of Clover Creek.

Mean values of monthly streamflows at the USGS station (for a discontinuous 17-yr period of record) were highest in February (110 cfs) and lowest in September (3.4 cfs).

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However, monthly mean streamflow varied widely for every month. For example, the mean flow for February has ranged from a low of 14.8 in 2001 to a high of 279 in 1951. Similarly, the mean flow for September has ranged from a low of 0.0 in 2003 to a high of 11.5 in 1997 (Table 3-1). Although recent streamflow measurements of 34 and 41 cfs made in April 2005 are significantly lower than the April mean flows of 69.3 cfs, they are within the range of previous April data. The March 2005 streamflow measurement of 9 cfs, however, was lower than the previously recorded USGS minimum March flow of 12 cfs on March 7, 2000.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>1949</b>							8.45	3.05	1.07	0.23	4.03	27.4
<b>1950</b>	124	128	192	121	65.7	37.5	19.9	11.5	6.37	10.4	25.0	119
<b>1951</b>	158	279	173	88.0	46.9	26.2	12.5	3.79	1.40	3.99	6.27	19.4
<b>1952</b>	25.2	47.1	40.6	29.8	20.7	12.1	4.47	0.56	0.08	0.00	0.00	0.00
<b>1953</b>	30.1	103	47.8	40.7	31.5	21.4	10.6	3.65	2.40	4.00	14.5	88.1
<b>1954</b>	155	138	103	73.5	44.2	29.5	18.1	8.44	9.32			
<b>1990</b>										6.87	37.0	80.6
<b>1991</b>	65.8	84.2	92.9	133	61.8	34.8	18.1	10.8	6.33	3.68	8.66	18.6
<b>1992</b>	27.1	64.8	38.0	38.2	20.8	9.93	6.48	2.88	0.78			
<b>1994</b>										0.51	2.64	35.1
<b>1995</b>	54.3	81.5	82.8	57.4	35.5	16.8	13.5	5.88	1.95	4.19	15.6	72.6
<b>1996</b>	95.8	192	105	108	78.5	42.1	26.9	12.5	7.25	12.2	21.6	101
<b>1997</b>	232	183	196	96.1	57.4	40.4	25.9	10.3	11.5	13.8	24.1	34.6
<b>1998</b>	103	81.8	92.2	49.7	25.8	15.8	6.24	2.55	1.70	2.23	17.8	107
<b>1999</b>	141	167	159	79.7	47.2	24.5	13.2	6.00	2.14	1.64	20.5	58.5
<b>2000</b>	56.6	68.7	87.1	55.4	42.9	25.9	14.5	5.03	2.95	3.40	4.69	7.36
<b>2001</b>	13.4	14.8	15.3	22.8	17.8	11.8	3.55	1.54	0.63	0.42	20.1	73.3
<b>2002</b>	71.5	75.8	77.6	70.5	44.3	23.9	12.9	4.33	1.41	0.38	0.80	5.51
<b>2003</b>	25.2	46.9	46.5	44.9	29.2	12.3	4.14	0.58	0.00			
<b>Mean of Monthly</b>	<b>86.1</b>	<b>110</b>	<b>96.8</b>	<b>69.3</b>	<b>41.9</b>	<b>24.1</b>	<b>12.9</b>	<b>5.49</b>	<b>3.37</b>	<b>4.25</b>	<b>14.0</b>	<b>53.0</b>

Source: USGS website data for station 12090500 CLOVER CREEK NEAR TILICUM, WA

**Table 3-1. Clover Creek Monthly Mean Streamflows (cfs)**

The USGS recorded annual peak flows that ranged from 56 to 568 cfs in 27 out of 54 years between 1950 and 2003. The three highest peaks of 387, 418 and 568 cfs occurred on January 2, 1997, February 9, 1996 and February 12, 1951, respectively. Anecdotal observations indicated that these flows resulted in overbank flooding and inundation of the area downstream and west of Barnes Road. This flooding may be partially attributed to the channel constriction caused by the closely-spaced concrete trestle abutments of railroad track located just west of the installation boundary and the abundant overgrowth of vegetation at the railroad crossing.

### 3.2.5.3 CLOVER CREEK FLOODPLAINS

Drinking water supply, recreation, and fish and wildlife populations compete for available surface and groundwater in the area. The Washington Department of Ecology has closed key tributaries and lakes, including Clover Creek and the shallow aquifer in the area, to further water rights. Clover Creek suffers from both severe flooding problems and from low (often non-existent) summer flows. This creek has a long history of alterations to its flow patterns.

Flooding occurs when the natural capacity of the ecosystem is exceeded, destroying habitat and flushing pollutants into the system. Installation of the 12-foot diameter culverts occurred in 1952 by the US Army Corps of Engineers (USACE) (USACE, 1954). The USACE adopted a discharge of 500 cfs as the maximum flood with a 50-year frequency on Clover Creek in order to determine the culvert size. Based on the USACE calculations, the 500 cfs flow rate would correspond to a water depth in the culverts of 9.25 feet (assuming 2.75 feet of the culvert bottom were covered with channel material). However, the actual depth of channel material is approximately 1.6 feet so the 500 cfs flow rate would correspond to a water depth in the culvert of 8.1 feet.

The USACE completed a Clover Creek Flood Study for McChord AFB in 2000 (USACE, 2000). Major floods on Clover Creek generally occur during the winter months from October through March. Two large floods occurred in December 1933 and February 1951. Since then the largest floods were in March 1972, February 1996 and January 1997. During the February 1996 flood, Clover Creek remained in its channel on the base except between Barnes Boulevard and the railroad trestle at the western base boundary. In this area, the creek overtopped the banks and flooded part of the parking lot north of the creek. It was noted that this portion of the creek was choked with weeds at the time of the flood.

A Flood Insurance Mapping Study was conducted for the Federal Emergency Management Agency (FEMA) in 2003 (FEMA, 2003). The report used an estimated 100-year recurrence flood of 577 cfs and a 500-year event at 924 cfs for the Clover Creek reach in the vicinity of McChord AFB.

The National Flood Insurance Program (NFIP) and Executive Order (E.O.) 11988 encourages governmental agencies to adopt sound floodplain management programs. Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. For purposes of the NFIP and E.O. 11988, a floodway is used as a tool to assist communities in floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to one foot, provided that

hazardous velocities are not produced. Results of the Corps of Engineers floodway analysis indicated the Clover Creek floodway is confined to the stream channel.

**3.2.5.4 WATER QUALITY**

Within Washington State, water quality standards are published pursuant to Chapter 90.48 of the Revised Code of Washington. Authority to adopt rules, regulations, and standards necessary to protect the environment is vested with the Washington Department of Ecology. Under the federal Clean Water Act, the EPA Regional Administrator must approve water quality standards adopted by the state. Through adoption of these water quality standards, Washington has designated certain characteristic uses to be protected. Criteria necessary to protect those uses are published in Washington Administrative Code (WAC) Chapter 173-201A. These water quality standards are periodically reviewed and modified. Washington Water Quality Standards for Class A (excellent) streams such as Clover Creek are presented in Table 3-2.

Fecal Coliform	<100 colonies/100 milliliters
Dissolved Oxygen	>8.0 milligrams/liter
Total Dissolved Gas	<110 percent of saturation
Temperature	< 18 degrees Celsius
pH	6.5 to 8.5
Turbidity	< 5 NTU* over background

\*Nephelometric Turbidity Unit

**Table 3-2. Water Quality Standards for Clover Creek**

In addition to the numeric standards, toxic, radioactive, or deleterious material concentrations must be kept below those levels that have the potential to singularly or cumulatively adversely affect characteristic water uses; cause acute or chronic conditions to the most sensitive biota dependent on those waters; or adversely affect public health, as determined by the Washington Department of Ecology. Aesthetic values cannot be impaired by the presence of materials or their effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste. (WAC 173-201A-040 and -050)

The Washington State Anti-Degradation Policy for water is published at WAC 172-201A-070. This policy states that:

1. Existing beneficial uses shall be maintained and protected and no further degradation that would interfere with or become injurious to existing beneficial uses shall be allowed.
2. Whenever the natural conditions of said waters are of a lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria.

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3. Whenever waters are of a higher quality than the criteria assigned for said waters, the existing water quality shall be protected and pollution of said waters which will reduce the existing quality shall not be allowed, except in those instances where the overriding considerations of public interest shall be served; all wastes and other materials and substances discharged into said waters shall be provided with all known, available, and reasonable methods of prevention, control, and treatment by new and existing point sources before discharge; all activities which result in the pollution of waters from non-point sources shall be provided with all known, available, and reasonable best management practices; and the lower water quality shall still be of high enough quality to fully support all existing beneficial uses.

Washington Department of Ecology (DOE) and the USGS routinely sample streams throughout the state for the criteria listed above. Every two years DOE assesses whether a stream is impaired or degraded and lists impaired and degraded stream segments per Clean Water Act Section 303(d). Currently the full length of Clover Creek, from its inception east of McChord AFB to its termination at Lake Steilacoom, is considered in a state of degradation due to elevated fecal coliform levels, reduced dissolved oxygen concentrations and elevated summer temperature levels. Morey Creek is not included on the 303(d) list.

There has been no long-term, continuous water quality monitoring program implemented at Morey Pond. Data were collected monthly at the inflow culvert beneath Perimeter Road from January 2002 to February 2003. Dissolved oxygen concentrations at the inflow to the pond ranged from 4.7 to 12.5 mg/L over this time frame, while water temperature ranged from 7.0 to 21.5° C. Summertime (June – September) monitoring was completed at the Morey Pond inflow culvert in the years 2003 to 2007. Dissolved oxygen concentrations were similar to the 2002/2003 data while the temperatures ranged from 14.5 to 22.6° C.

Diurnal temperature studies were conducted in May, June and July 2007 at the Morey Pond spillway (May 21-22), main pond (Jun 3-4 at 2' and 5' depths concurrently) main pond (July 2-3 at 3' depth). Temperature fluctuations were lowest at the spillway, ranging from 13.9 to 14.7° C, most likely due to the cooler temperatures typical in May. The June main pond measurements at the 2 and 5-foot depths both showed a similar fluctuation between day and night temperatures. Temperature measurements at the 2-foot depth ranged from 21.8° C at the start (10am) to a peak of 22.5° C at 7:30pm back to 21.2° C at cessation of the test. The temperature pattern was similar for the 5-foot depth, although the peak temperature reached 22.2° C. Temperature fluctuations in the July test at 3-foot depth were minor, with a 24-hour temperature range of only 0.6° C.

In August 2007 water temperatures were taken at the surface, at a depth of 1.5 feet and at approximately 6 feet (pond bottom). These data ranged from 18.4° C at the surface, to 17.7° C at 1.5 feet and 17.4° C near the bottom. Dissolved oxygen concentrations at these same depths and times ranged from 9.7 to 7.7 to 6.8 mg/L.

### 3.2.6 GROUNDWATER

The USEPA has designated all of the Chambers-Clover Creek watershed area as part of a sole source aquifer system to protect the area's groundwater-based drinking water supply (Chambers-Clover Creek Watershed Management Committee, 1997). The Clover Creek/Steilacoom Sub-Watershed is the largest sub-basin of the Chambers-Clover Creek Watershed.

Groundwater data is available for the Installation Restoration Program site FT-32 located approximately 500 feet south of Morey Pond. Six monitoring wells were installed in the water table aquifer and water level data were collected in March 1997 and March 1998. Water level elevations in the March 1997 dataset ranged from 290.45 to 294.00 feet. Shallow groundwater elevations in March 1998 ranged from 291.15 to 291.78 feet. The spillway elevation of Morey Dam is 291.4 feet (McChord, 1998a).

On September 12, 2007, flow measurements were taken as closely in time as possible of both the inflow and outflow from the pond in an effort to determine if the pond was gaining or losing water to groundwater. Inflow to the pond was measured at 1.6 cfs and outflow at the spillway measured at 3.0 cfs, suggesting groundwater inflow to the pond.

Groundwater data have been collected near Clover Creek during two investigations: the 1990-1991 *Washrack/Treatment Area Remedial Investigation/Feasibility Study (RI/FS)* conducted downstream of the exit from the runway culverts and the 2001-2003 *McChord AFB, Site SS-34N RI/FS* conducted near the western edge of the installation. The data indicate that groundwater is unconfined and that during the monitoring periods groundwater elevations fluctuated from 1.0 to at least 7.0 feet at the downstream stations, and from 2.3 to 15.1 feet at the upstream stations. At the time of these measurements, the bottom of the Clover Creek channel was about 7.0 feet above the groundwater table during the summer observations and about 2.0 feet above the groundwater table during the winter observations. The data indicate that Clover Creek was a losing stream in both study areas.

## 3.3. NATURAL RESOURCE ELEMENTS

### 3.3.1 FLORA

Much of stream bank along Clover Creek and Morey Creek on McChord AFB are heavily overgrown with invasive vegetation. Plants in and along the creeks include: common cattail (*Typha angustifolia*), bur-reed (*Sparganium* ssp.), yellow iris (*Iris pseudacorus*), reed canarygrass (*Phalaris arundinacea*), bittersweet nightshade (*Solanum dulcamara*), Scot's broom (*Cytisus scoparius*), and Himalayan blackberry (*Rubus discolor*). Trees found adjacent to the Clover Creek streambank are black cottonwood (*Populus trichocarpa*), Douglas fir (*Pseudotsuga menziesii*), Pacific willow (*Salix lasiandra*), and big leaf maple (*Acer macrophyllum*) (McChord AFB, 2005).

### 3.3.2 FAUNA

Clover and Morey Creek are inhabited by nine observed fish species (Entrix, 2006). Reticulate sculpins (*Cottus perplexus*) and threespine sticklebacks (*Gasterosteus aculeatus*) were the two most commonly observed species during field surveys in March and June 2005. Other observed species were: coho salmonid (*Oncorhynchus kisutch*), cutthroat trout (*Oncorhynchus clarki clarki*), pinkinseed (*Lepomis gibbosus*), rainbow trout (*Oncorhynchus mykiss*), redbelt shiner (*Richardsonius balteatus*), rock bass (*Ambloplites rupestris*) and yellow perch (*Perca flavescens*).

#### 3.3.2.1 ANADROMOUS FISH

The specific genetic makeup of each salmon and steelhead species allows it to adapt to its own waterway. The Washington State Salmon and Steelhead Stock Inventory (SASSI) developed stock origins based on genetic background. SASSI recognizes four definitions of stock origin: Native, Non-Native, Mixed (hybridization or a stock whose individuals originated from mating between native and non-native fish), and unknown (Chambers-Clover Creek Watershed Management Committee (CCWMC), Watershed Characterization, June 1997).

To understand the requirements of a stock, it is necessary to describe the type of spawning and rearing practices that produced the fish. SASSI defines three production types:

- Wild Stock: Wild stock refers to spawning and rearing in a natural habitat, regardless of parentage. Wild stock environment can support all four stock origins.
- Cultured Stock: Cultured stock depends on spawning, incubation, hatching, or rearing in a hatchery or pen.
- Composite Stock: Composite stock is sustained by both wild and artificial production.

Clover Creek is a small tributary of Chambers Creek, which has a Chinook salmon (*Oncorhynchus tshawytscha*) hatchery. It has little to no flow in the summer and fall and Chinook salmon have not been observed in the creek since the 1940s and are unlikely to occur in Clover Creek due to the lack of suitable habitat.

The primary anadromous species present in Clover Creek are coho salmon (*Oncorhynchus kisutch*) and sea-run cutthroat trout (*Oncorhynchus clarki*). Clover Creek on McChord AFB is Essential Fish Habitat, under the Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996, (Public Law 104-267), for coho salmon. Winter steelhead are also found in Clover Creek. Observations show that coho salmon utilize habitat upstream and downstream of the project area. The summer chum salmon run in Clover Creek has been extinct since the 1980s. Spanaway Lake may have had a sockeye salmon run, but currently this run no longer exists.

**3.3.2.2 FRESHWATER FISH**

The Chambers-Clover Creek Watershed Characterization lists the following fish present in Clover Creek: cutthroat trout (*Oncorhynchus clarki*), three-spine stickleback (*Gasterosteus aculeatus*), suckers (*Castostomus sp.*), sculpin (*Cottus sp.*), western brook lamprey (*Lampetra richardsoni*), and redbreast shiner (*Richardsonius balteatus*) (CCWMC, 1997)

**3.3.3 THREATENED AND ENDANGERED SPECIES**

The following table lists the most current U.S. Fish and Wildlife Service (FWS) Endangered Species Act listings for Pierce County, Washington. This list was revised November 1, 2007.

Common Name	Scientific Name	Status	Project site-specific notes
Marbled murrelet and its critical habitat	<i>Brachyramphus marmoratus</i>	Threatened	No nesting. Not found on MAFB.
Canada lynx	<i>Lynx Canadensis</i>	Threatened	Not found on MAFB
Gray wolf	<i>Canis lupus</i>	Threatened	Not found on MAFB.
Grizzly bears	<i>Ursus arctos</i>	Threatened	Not found on MAFB.
Northern spotted owl and its critical habitat	<i>Strix occidentalis caurina</i>	Threatened	No nesting. Not found on MAFB.
Bull trout and its critical habitat	<i>Salvelinus confluentus</i>	Threatened	No habitat on MAFB. Not found on MAFB.
Marsh sandwort	<i>Arenaria paludicola</i>	Endangered	Presumed extirpated in Washington. Not found on MAFB.
Golden paintbrush	<i>Castilleja levisecta</i>	Threatened	Not found on MAFB.
Water howellia	<i>Howellia aquatilis</i>	Threatened	Located on MAFB, but several miles from project area in unconnected wetland area.

**Table 3.3: FWS Pierce County ESA Species List (from FWS website)**

### **3.3.4 WETLANDS**

Wetlands are defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. (33 CFR 323)

The total area of wetlands on McChord AFB is 138.34 acres, with the majority of wetlands classified as "classic kettle hole" wetlands that are groundwater-influenced systems. Wetlands depending primarily upon surface water hydrology include those associated with Clover Creek, Morey Creek and Morey Pond. Wetland types represented on base include emergent marsh, coniferous forest wetland, deciduous forest wetland, scrub-shrub wetland, and open water wetland. Sedge meadows, spiraea and willow swamps, and ash forests are characteristic of historic, native wetland communities in the Puget Trough Ecoregion (Rolph and Houck, 1996). Clover Creek flows in a defined, altered channel and culverts across McChord AFB. The lower banks of the entire reach of Clover Creek across the installation (except in the culverts) are classified as jurisdictional emergent wetlands. There are approximately 1.5 acres (65,000 square feet) of wetlands present in the project area on the banks of Morey Pond and Morey Creek and on Clover Creek.

### **3.4 CULTURAL RESOURCE ELEMENTS**

Historic resources and archaeological resources have been inventoried at McChord AFB. No historic buildings, structures or districts exist in or adjacent to the project site.

The McChord AFB property possesses a history of Euro-American settlement dating back years before statehood. Two archaeological sites are located at and/or near the project site on the south side of Morey Pond. These sites, a farmstead (Rigney) and the Sastuc Outstation (Sheep Station), were located in the area on the south side of Morey Pond.

The first documented use of the property was as a sheep station and farm named "Sastuk," operated by the Puget's Sound Agricultural Company (PSAC). The PSAC was an outgrowth of Hudson's Bay Company agricultural interests. This is the earliest group of historic sites related to the PSAC. Sites of this category are rare, and represent the initial development of agriculture in the region.

The Morey Pond area is the historic location of the Sastuk Sheep Station, according to the 1847 PSAC map. The site consisted of a shepherd's hut, three gardens, a bridge, and a barn. If this was the location of Sastuk and the barn at the Rigney farmstead (see discussion below) was a PSAC structure associated with the Sastuk, it is likely that the site was heavily disturbed during the initial development of McChord Field and construction of the runway. If Sastuk was located further east and at least one building

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from this station was incorporated into the Rigney farmstead, some potential for subsurface remains exists. Shovel testing revealed the area to be generally disturbed.

The historic farmstead location formerly contained at least nine structures. The land historically is associated with the Rigney family. A Puget Sound Agricultural Company (PSAC) shepherd's hut, or perhaps a house and barn built in 1858 or 1859 for farm manager Thomas Cooper, could have been incorporated into the Rigney farmstead. The site was likely affected and/or destroyed by construction of the runway or covered with fill dredged from Morey Pond in the 1970s. Testing revealed a shallow, though not uniform, A horizon and evidence of debris throughout the area (asphalt, cement and electrical cable casing fragments). Testing indicated that the area had been heavily disturbed.

### **3.5 SOCIOECONOMIC ELEMENTS**

McChord AFB is located in Pierce County, Washington. The estimated population of Pierce County in 2004 was 744,000 (State of Washington Office of Financial Management, 1997). The installation bounded by US Army Fort Lewis to the south, the City of Lakewood to the north, south and west and the unincorporated Town of Parkland to the east. Lakewood had an estimated population of 59,010 in 2004. This entire region has experienced growth in the past decades and projections reveal a continuation of this trend. Pierce County, including incorporated and unincorporated areas, is projected to have a population exceeding 900,000 by 2015 (State of Washington Office of Financial Management, 1997).

An Economic Influence Statement was completed in 2003 and identifies the economic impact of McChord AFB on the surrounding communities. The Economic Influence Statement accounts for off-base local area expenditures within a 50-mile radius of the base. For fiscal year 2003, the total payroll of McChord AFB was \$282,106,173 and had total annual expenditure of \$92,112,724. McChord AFB also created an estimated 3,170 jobs within the local area, having an estimated dollar value of \$113,042,200. There are currently over 11,500 persons employed at or indirectly by McChord AFB.

## **4.0 ENVIRONMENTAL CONSEQUENCES**

The purpose of this chapter is to describe the effects of all alternatives on the affected environment.

### **4.1 PHYSICAL ELEMENTS**

#### **4.1.1 AIR RESOURCES**

##### **4.1.1.1 CONFORMITY ANALYSIS REQUIREMENTS**

This analysis summarizes applicable information relevant to attainment of air quality goals. Section 176(c) of the Clean Air Act (CAA), as amended, states that Federal agencies must not engage in, approve, or support in any way, any action that does not conform to an applicable State Implementation Plan (SIP) for the purpose of attaining the National Ambient Air Quality Standards (NAAQS). The purpose of Section 176(c) is to ensure that Federal actions do not adversely affect the timely attainment and maintenance of air quality standards.

The U.S. Environmental Protection Agency (USEPA) published its final general conformity rules (amending 40 Code of Federal Regulations [CFR] 50 and 93) in November 1993, which established procedures and requirements that Federal agencies must satisfy in determining the conformity of certain actions. The intent of these provisions is to foster long-range planning for the attainment and maintenance of air quality standards by evaluating air quality impacts of Federal actions before they are taken.

The general conformity rule requires that all reasonably foreseeable direct and indirect emissions from an action be addressed in the analysis of conformity, including all point, area, and mobile sources under USAF control. This includes military aircraft, on-base motor vehicles, off-base motor vehicles associated with employees' commute trips, and other sources that would not be subject to existing federally enforceable permit requirements (e.g., New Source Review Programs). If the total of direct and indirect emissions for a proposed action creates a non-conforming situation, the action cannot proceed until mitigation measures are developed and committed, and other conformity procedural requirements are met.

##### **4.1.1.2 McCHORD AFB AIR QUALITY SETTING**

To focus conformity requirements on those Federal actions with the potential to have significant air quality impact, threshold (i.e., *de minimis*) rates of emissions were established in the general conformity rule. These *de minimis* thresholds vary by the

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severity of the non-attainment area. The *de minimis* thresholds for McChord AFB are listed in Table 4-1.

Pollutant	Status	Classification	<i>De minimis</i> Limit (tons/yr)
Ozone (measured as "precursors": Nitrogen Oxides (NO <sub>x</sub> ) SO <sub>2</sub> )	Attainment	Maintenance	100
Ozone (measured as "precursors": Volatile Organic Compounds (VOCs))	Attainment	Maintenance	50
Carbon Monoxide (CO)	Attainment	Maintenance	100

**Table 4-1: Conformity *de minimis* Emission Thresholds for McChord AFB**

A Conformity Determination is required when the total annual direct and indirect emissions from a Federal action equals or exceeds the *de minimis* thresholds within a non-attainment or maintenance area. Actions which do not exceed these thresholds are deemed "clearly *de minimis*" and no conformity determination is required. A Conformity Determination is also required if the total annual direct and indirect emissions are regionally significant by representing 10 percent or more of the region's total emissions for the particular pollutant in a non-attainment or maintenance area. Regional emissions would far exceed *de minimis* limits for the area around McChord AFB. Therefore, the limiting factor (the lesser of the two thresholds) for comparison with results of this analysis will be the *de minimis* limits for NO<sub>x</sub>, VOCs, and CO. A Conformity Analysis is performed to quantify emissions and show whether the action is clearly *de minimis* or if a full Conformity Determination is needed.

Implementation of the proposed action or no action alternative, would have no net effect on the overall air quality at McChord AFB and the surrounding community. The proposed action and alternative do not involve a stationary source. In accordance with the Clean Air Act, this action will not cause or contribute to any new violations of any standard in any area, will not increase the frequency or severity of any existing violation in any area, will not delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The proposed action complies with the State of Washington Implementation Plan. The proposed action is not "regionally significant" and does not require a conformity determination in accordance with 40 CFR 93.153(b)(2). The total emission of criteria pollutants from the proposed action are below the *de minimus* thresholds and less than ten percent of the Air Quality Region's planning inventory.

#### **4.1.2 GEOLOGY AND SOILS**

##### Short Term Construction Impacts

Potential impacts to geology and soils from the proposed action would be limited to short term impacts associated with construction. The proposed construction of the bypass channel would require excavation of existing soil material present along the channel path. It is estimated that approximately 1200 cubic yards of material would need to be removed for the channel construction. Erosion control measures, such as use of filter fabric, mats or straw bales would be implemented to minimize erosion during construction period, as shown on Drawing 3, Appendix A. Construction would be conducted during the dry season, which would further minimize any potential for erosion. Once the construction is complete, the disturbed areas would be graded and re-vegetated as shown on Drawing 2 Appendix A.

The no action alternative would have no impact on geology or soils.

#### **4.1.3 GROUNDWATER**

Implementation of the proposed action or no action alternative, would have no long term effect on groundwater at McChord AFB. Construction of the bypass channel will not alter the water level of the pond nor groundwater levels in the surrounding area.

##### Short Term Construction Impacts

None of the construction requirements, regardless of alternative selected, would impact groundwater levels or quality.

#### **4.1.4 SURFACE WATER**

Implementation of the proposed action would result in a bypass channel connecting the south bank of Morey Pond with the south bank of Clover Creek. There will be no change in the water level of the pond. Outflow from the pond will be primarily via the outflow channel, flow over the dam spillway will only occur during very high precipitation events.

Potential impacts from construction of the bypass channel to streamflow, floodplains and water quality in Clover and Morey Creek from the proposed action and the no action alternative are discussed below.

##### **4.1.4.1 CLOVER CREEK STREAMFLOW**

Implementation of the proposed alternative would have no impacts on Clover Creek streamflow. The bypass channel will maintain the pond level and also allow outflow to Clover Creek. Whether the water leaves the pond via the bypass channel or over the dam

spillway the amount of water draining from Morey Pond into Clover Creek will remain unchanged from pre-bypass channel conditions.

#### Short Term Construction Impacts

Construction of the proposed action would be accomplished during the dry, low flow season (July - October). It will be necessary to lower the water level slightly when the bypass channel is connected to the pond and the juvenile habitat bench is constructed. Release of water from the pond to lower the level for construction will be at sufficiently low rates to prevent erosion or scouring of the Clover Creek channel.

#### **4.1.4.2 CLOVER CREEK FLOODPLAINS**

Implementation of the proposed action, including no action alternative, would have no long term impact on Clover Creek floodplains. After completion of the channel construction outflow from Morey Pond will be the same as it would have been without channel construction

#### Short Term Construction Impacts

Construction of the proposed action or the no action alternative would be accomplished during the dry, low flow season (July - October). There would be no impact to floodplains.

#### **4.1.4.3 CLOVER CREEK WATER QUALITY**

Implementation of the proposed action, including the no action alternative, would have no long term effect on water quality in Clover or Morey Creek at McChord AFB. Any potential water quality impacts would be associated with construction.

#### Short Term Construction Impacts

Construction of proposed action would be accomplished during the dry, low flow season (July - October). Filter fabric and mats would be used on the Clover Creek bank to minimize soil entry into the creek. No changes in water quality parameters of concern (dissolved oxygen, temperature, pH) would be expected.

#### **4.1.5 COASTAL ZONE MANAGEMENT AREA**

The Coastal Zone Management Act was passed by Congress in 1972 to promote the effective management, beneficial use, protection and development of the nations' coastal zone. The proposed project is located within the Washington State Coastal Zone in central Pierce County. Under the Washington State CZMP, activities undertaken at the channel bypass site must comply with the six laws listed below.

- Shoreline Management Act
- State Environmental Policy Act
- Clean Water Act

## DRAFT

- Clean Air Act
- Energy Facility Site Evaluation Council
- Ocean Resource Management Act

Activities and development potentially affecting Washington State's coastal resources that involve the Federal Government are evaluated for compliance with the Coastal Zone Management Program (CZMP) through a process called "federal consistency". This process allows the public, local governments, tribes, and state agencies an opportunity to influence federal actions likely to affect Washington's coastal resources or uses. Federal consistency requires that federal agency activities be consistent to the maximum extent practicable with the policies of the CZMP (Ecology, 2001). If a federal agency determines that the proposed activity is likely to affect a land or water use or natural resources of the coastal zone, the agency prepares a consistency determination along with supporting documentation. For the proposed bypass channel, the Air Force is responsible for determining whether or not the proposed activity or development may affect any natural resource, land use, or water use in Washington's coastal zone.

Based on a review of the applicable laws and regulations and the scope of the project it was determined that the proposed action does not affect Washington States coastal resources or uses. The Federal Consistency Determination for this project is included in Appendix B.

### **4.1.6 COASTAL BARRIERS**

Coastal barriers are unique land forms that provide protection for diverse aquatic habitats and serve as the mainland's first line of defense against the impacts of severe coastal storms and erosion. There are no coastal barriers associated with the estuary of Chambers Creek at Puget Sound and the proposed project will have no effect on coastal barriers present within Washington's coastal zone.

### **4.1.7 SHORT TERM USE AND LONG TERM PRODUCTIVITY**

Short term recreation use of the south bank of Morey Pond may be reduced during the construction phase as a safety precaution for pond visitors. The north bank of the pond will remain open for fishing and wildlife viewing.

The presence of the proposed bypass channel would result in a significant long term improvement to the environment and the Clover Creek watershed. Construction of the bypass channel around Morey Dam will allow salmonid migration around the current blockage and passage to upstream habitat. Creation of the juvenile habitat bench along the south shore of Morey Pond will provide habitat for juvenile salmonid on their downstream migration. Passage of migratory salmonid will provide educational and recreational viewing for pond visitors.

#### **4.1.8 SOLID WASTE**

The presence of the bypass channel will generate no long-term solid waste, other than that normally generated by recreational visitors to Morey Pond. The no action, would generate no solid waste.

##### Short Term Construction Impacts

The proposed action would generate solid waste in the form of miscellaneous construction materials which would be hauled off-site for proper disposal.

#### **4.1.9 HAZARDOUS MATERIALS**

Neither the proposed action or no action alternative would require the use of hazardous materials other than common materials used by construction equipment (motor oil, lubricant, coolant, fuel).

#### **4.1.10 HAZARDOUS WASTE**

Implementation of the proposed action will not generate hazardous waste.

### **4.2 NATURAL RESOURCE ELEMENTS**

#### **4.2.1 FLORA**

Riparian vegetation (primarily blackberry bushes, Scot's broom and reed canarygrass) removed as part of the bypass channel construction would be replaced with appropriate native species upon completion of the work. The replacement of these invasive species with native flora would benefit the riparian habitat.

The no action alternative would have no impact on Clover or Morey Creek flora.

#### **4.2.2 FAUNA**

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires federal agencies to consult with NOAA Fisheries on activities that may adversely affect Essential Fish Habitat (EFH).

The objective of an EFH assessment is to determine whether or not the proposed action(s) may adversely affect designated EFH for relevant commercially, federally-managed fisheries species within the proposed action area. Adverse effects are considered to be

## DRAFT

those project effects that result in permanent impacts to the EFH. The assessment also describes conservation measures proposed to avoid, minimize, or otherwise offset potential adverse effects on designated EFH resulting from the proposed action. An EFH assessment for coho salmonid may be completed for this project and submitted to NOAA Fisheries, National Marine Fisheries Service.

Potential short and long term adverse effects are described below.

Short-term adverse effects:

- Construction of the bypass channel may cause a small and temporary increase in turbidity in Clover Creek. The sediment would settle out quickly in the low streamflow and dense vegetation found in Clover Creek during the construction period.

Long-term adverse effects:

- The proposed construction of the bypass channel and juvenile habitat bench will result in the loss of approximately 200 square feet of wetland and several large trees.

The following measures will be implemented to minimize the potential short-term adverse effects. Construction would be accomplished during the dry, low flow season (July through October). Filter fabric and mats would be used on the streambank during construction to minimize sediment (soil) entry into the creek. Planting of native species and seeding of Roemer's or Idaho fescue grasses would be accomplished as quickly as possible following channel construction to stabilize the disturbed soil and prevent erosion of the bypass channel banks.

The no action alternative would have no impact on Clover Creek fauna.

### **4.2.3 THREATENED AND ENDANGERED SPECIES**

No ESA-designated critical habitat or species exist within the proposed action area. Thus, project development will not affect any endangered or threatened species, or affect destroy or adversely modify designated critical habitat.

### **4.2.4 WETLANDS**

Completion of the proposed action would result in the loss of approximately 200 square feet of the nearly 65,000 square feet of wetlands currently present adjacent to Clover Creek and Morey Pond. Two areas of wetlands will be removed due to the excavation of the bypass channel, one at the channel connection to Morey Pond and one at the channel connection to Clover Creek. Mitigation for the loss of these wetlands will result from the riparian/wetland habitat created on the banks of the bypass channel.

The proposed action is located in two wetland areas, however no practicable alternative exists. Any of the alternatives, with the exception of the no action alternative, would require wetland disturbance. There is no feasible method of providing migratory fish passage around Morey Dam without some wetland disturbance.

#### Short Term Construction Impacts

All of the impacts to wetlands from the proposed action will result from the excavation of the bypass channel. In addition to the wetland areas noted above two trees currently providing shade will also be removed as part of the bypass channel construction. Timber from these trees will be utilized on-site as part of the channel bed construction and to provide habitat in the juvenile habitat bench area along the south bank of Morey Pond.

### **4.3 CULTURAL RESOURCE ELEMENTS**

Historic resources and archaeological resources have been inventoried at McChord AFB. No historic buildings, structures or districts exist in or adjacent to the project site. The “no action” alternative would not have any impact on any cultural or historical resources on the installation.

However, the proposed action may impact two possible archaeological sites in the project area. The two possible archaeological sites are located at or adjacent to the bypass project on the south side of Morey Pond – the Sastuc Outstation (Sheep Station) and the Rigney Farmstead. These sites may have previously been affected and/or destroyed by construction of the base runway and/or being covered by 3 feet of fill dredged from Morey Pond in the 1970s. A pedestrian survey and shovel testing completed in these areas revealed that the area was generally to heavily disturbed. Previous archaeological surveys recommend that machine-assisted excavations be conducted in the area in advance of any planned ground-disturbing activities. This recommendation is reiterated in the McChord Cultural Resources Management Plan. This would determine whether any intact subsurface features still exist.

After a discussion with a Washington Department of Archaeology and Historic Preservation (DAHP) archaeologist on 6 January 2009, a decision was made that an archaeologist would be on site during the entire bypass channel excavation (construction) process of the project. The archaeologist would be able to verify the depth and condition of the original surface. Since the anticipated depth of burial (overburden) is 3 feet, soil will be removed in lifts of approximately 6 inches to maximize the ability to determine when the original soil surface is reached while minimizing potential damage to any archaeological sites present. When the original surface is reached, the archaeologist would then observe the continued excavation and ensure the protection of any discovered artifacts. If artifacts are discovered/uncovered during the bypass excavation, work will cease immediately. The individual responsible for implementing the work or the archeologist on site will notify the base Cultural Resources Manager (CRM). The CRM will notify the DAHP of the discovery. The CRM will take actions to evaluate the discovery and provide guidance within 24 hours to the project engineer on any actions

## DRAFT

that should be taken to provide appropriate management treatment of the resource. These findings and recommendations may lead to the following actions:

1. Resumption of work.
2. Change order to redirect construction activity or alter siting to avoid impact.
3. Data recovery within the 24-hour stoppage.
4. Extension of 24-hour stoppage for a specified period of time to allow for data recovery consultation with the DAHP and/or National Park Service.
5. Construction stoppage at the affected location for an undetermined period of time pending completion of mitigation.

If human remains are uncovered during monitoring, the individual responsible for implementing the work or the archeologist on site will notify the CRM immediately. In those instances where emergency data recovery measures are recommended, every effort will be made to accomplish study objectives within the shortest time frame possible and within the spatial confines of areas subject to construction-related disturbance.

These procedures/actions should ensure that no impacts to archaeological sites/artifacts occur during the excavation/construction of the Morey Pond bypass.

## **4.4 SOCIOECONOMIC ELEMENTS**

### **4.4.1 ENVIRONMENTAL JUSTICE**

The proposed action is located completely on McChord AFB. McChord AFB's presence in the Tacoma area provides a positive economic benefit to the local community. McChord AFB contracting practices include preferences for small and minority-owned businesses. Small construction projects such as the proposed action may be accomplished through an 8A contractor (designated small business) providing economic benefit.

The proposed action and alternatives, including no action, would have no effect on socially or economically disadvantaged groups residing around McChord AFB.

### **4.4.2 NOISE**

The McChord AFB Air Installation Compatible Use Zone (AICUZ) report contains noise contours plotted in increments of 5 dB ranging from 65 to 80 decibels. The proposed project location is within the 75-80 decibel level for aircraft noise.

Neither the proposed action or the no action alternative would generate noise emissions.

### Short Term Construction Impacts

Temporary construction at the site would generate some noise, but the noise levels would be typical for small construction sites on the installation.

#### **4.4.3 LIGHT EMISSIONS**

There would be no light emissions from any construction activities associated with the proposed action or the no action alternative. All work would be performed during normal working daylight hours.

### **4.5 CUMULATIVE EFFECTS**

Cumulative effects result from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions. The location for the proposed action is within the boundaries of McChord AFB and occurs on Morey Creek. Other proposed projects on or near Morey Creek at McChord AFB include:

- **Invasive Species Control**  
This on-going, long-term project is removing invasive species from the banks of Clover Creek and replacing them with native species. This will have the ultimate effect of increasing native species and reducing the amount of invasive species along the creek bank.
- **Redirect Storm Water Drainage**  
This project would re-direct storm water drainage that currently discharges from NPDES-permitted outfalls to infiltration areas. This would benefit Clover Creek by reducing storm event peak flow that can cause erosion and damage creek habitat. Storm water infiltration also provides recharge to the shallow aquifer and potentially increases down-stream baseflow. This project is currently awaiting funding.
- **Install Grates at Three Locations on Clover Creek and Morey Creeks**  
This project would install metal security grates at three locations: east entrance of Clover Creek to base, east entrance of Morey Creek to base and west exit of Clover Creek from base. This project is designed to increase perimeter security (McChord AFB, 2008). Project design and permitting are complete; however the project has not been funded.
- **Install Vehicle Barrier Along 1100-Foot Distance From Runway Centerline**  
This project would install metal posts and cables on a line 1100 feet east of the runway centerline. This would preclude vehicles from driving from Outer

## DRAFT

Drive onto the runway. One segment of this barrier would pass through the proposed project area. This project is currently awaiting funding.

The first two proposed projects noted above are designed to improve Clover Creek hydraulics and habitat. The proposed bypass channel would complement these projects by allowing migratory fish passage from Clover Creek to Morey Creek, Spanaway Lake and other upstream habitat. The other two projects are designed to improve installation and runway security. The proposed bypass channel would complement these efforts by reducing the distance of vehicle barrier that would need to be installed. The presence of the bypass channel will act as a natural blockage to vehicle traffic toward the runway.

The no action alternative would have no cumulative effects.

## **5.0 CONCLUSION**

The environmental impacts involved with construction of a bypass channel to circumvent the Morey Dam have been examined and discussed in this Environmental Assessment. The environmental impacts associated with the proposed action are minimal.

The proposed action is located in two wetland areas, however no practicable alternative exists. Any of the alternatives, with the exception of the no action alternative, would require wetland disturbance. There is no feasible method of providing migratory fish passage around Morey Dam without some wetland disturbance. Accordingly, a Finding of No Practicable Alternative (FONPA) for this proposed project is appropriate.

In conclusion, the proposed action has been found to be a feasible and justifiable option and will result in no long-term loss of significant resources or significant impacts to the environment. The project will result in potential improvements to resources by allowing migratory fish passage into habitat areas currently blocked by the dam. Therefore, the preparation of a Finding of No Significant Impact (FONSI) is appropriate.

## 6.0 LIST OF PREPARERS & PERSONS CONSULTED

This chapter provides the names and qualifications of staff members who were primarily responsible for the information in and preparation of this environmental assessment. Table 6-1 includes the key management personnel, investigators and technical personnel that contributed to this document.

Table 6-1. List of Preparers and Persons Consulted

<b>Preparers</b>	<b>Office</b>	<b>Position</b>
Joseph Gibbens	62 CES/CEV	Environmental Engineer/Hydrologist
Valerie Elliott	62 CES/CEV	Cultural & Natural Resources Manager
Christa Jones	62 CES/CEV	Air Quality Program Manager
<b>Person Consulted</b>	<b>Office</b>	<b>Position</b>
Mike Grenko	62 CES/CEV	Chief, Environmental Management Flight
Ron Reid	62 OSS/OSAA	Airfield Manager
Kirk Bryant	62 CES/CEC	Civil Engineer
Jim McCormick	62 AW/JA	Environmental Attorney
Helmut Schmidt	Pierce County Surface Water Management	Civil Engineer

## 7.0 REFERENCES

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APPENDIX A  
BYPASS CHANNEL DESIGN DRAWINGS

SEC. 18, T. 19 N., R. 3 E., W. M.

SHEET INDEX

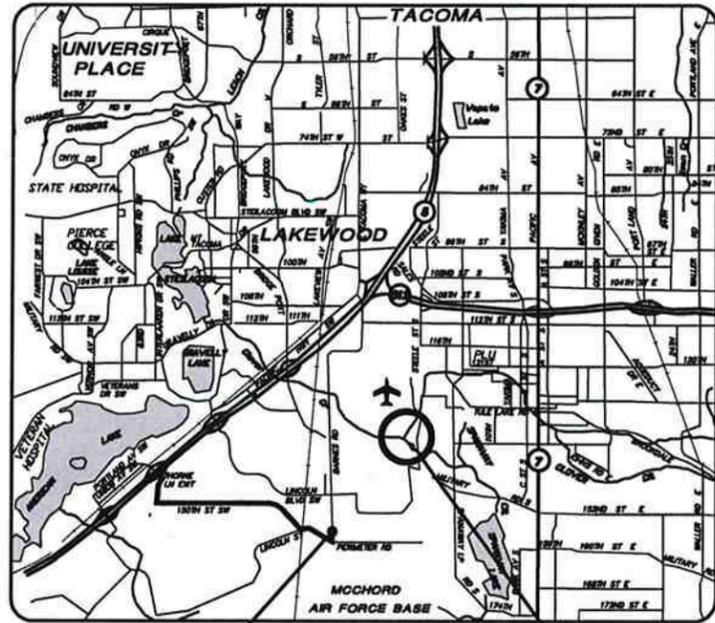


**Pierce County**  
SURFACE WATER MANAGEMENT

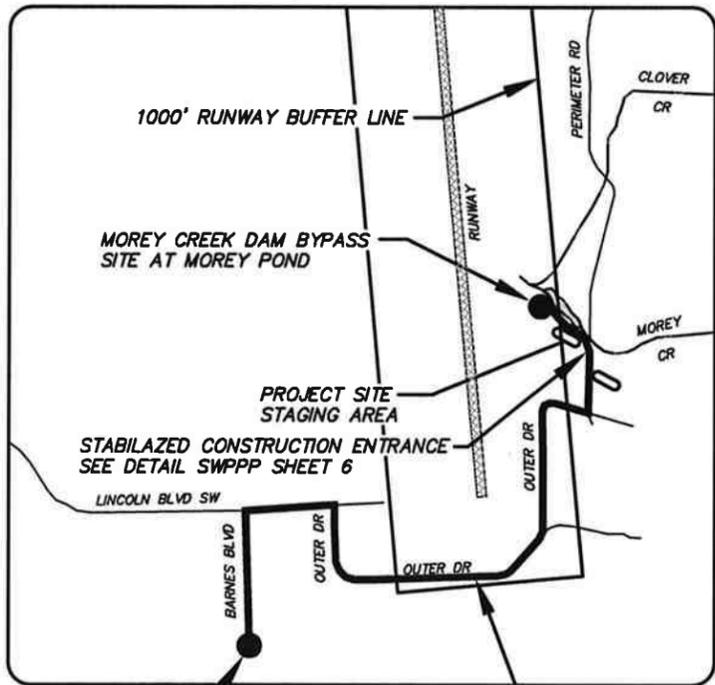
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PLAN QUANTITIES AND DAM WEIR PLATE DETAIL	2
DAM BYPASS CHANNEL PLAN	3
DAM BYPASS CHANNEL PROFILE AND SECTIONS	4
MISC. DETAILS	5
PLANTING PLAN	6
STORMWATER POLLUTION PREVENTION PLAN	7

# MOREY CREEK DAM BYPASS CHANNEL

## C.I.P. # D618-006



VICINITY MAP  
CONTRACTOR GATE (BASE ENTRANCE) PROJECT SITE



PROJECT MAP  
CONTRACTOR GATE (BASE ENTRANCE) PROJECT "ON BASE" ACCESS ROUTE

NOTES:

- ALL CONSTRUCTION EQUIPMENT SHALL ENTER AND EXIT McCHORD AFB VIA THE DELINEATED "CONTRACTOR GATE" AS SHOWN ON PLANS. SEE SPECIAL PROVISION: "SUPERINTENDENTS, LABOR, AND EQUIPMENT OF CONTRACTOR"
- THE CONTRACTOR SHALL ONLY USE THE PROJECT "ON BASE" ACCESS ROUTE, AS INDICATED IN THE PLANS, TO ACCESS THE MOREY CREEK DAM BYPASS PROJECT SITE UNLESS OTHERWISE DESIGNATED BY THE ENGINEER OR BY McCHORD AFB PERSONNEL.
- BASIS OF BEARING FROM PIERCE COUNTY CORS NETWORK  
NAD 83 (CORS 980)  
NAD 83 (HARN 91)  
HORIZONTAL DATUM: NAD 1983-1991  
VERTICAL DATUM: N.A.V.D 88
- TBM = TOP SW CORNER OF EXISTING DAM (MARKED WITH "X")  
N = 682557.5924  
E = 1149406.2761  
ELEV = 291.86
- SURVEY METHODOLOGY

THIS SURVEY WAS ACCOMPLISHED USING CLOSED TRAVERSE METHODS USING A LEICA SYSTEM 1200 THREE SECOND TOTAL STATION AND A LEICA SYSTEM 500 GPS RECEIVER INCORPORATING THE PIERCE COUNTY CORS GPS NETWORK.

ALL MEASURED CONTROL POINTS WERE DONE WITH "PSEUDO-STATIC" RTK BASED ON A PIERCE COUNTY COOPERATIVE CORS (PC3N) IMMAX SOLUTION. THE BROADCAST DATUM IS NAD 83 (WGS84) CORS 96 EPOCH 2002.0 THE CONTROL OCCUPATIONS WERE DONE A MINIMUM OF TWICE, LASTING FOR A MINIMUM 50+SECONDS AND SEPARATED BY A MINIMUM OF ONE DAY.

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Drawing: P14618 - MOREY CREEK DAM BYPASS.DWG  
Xref: S7

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DRAWN BY: J. DAVIDSON	DATE SURVEYED: 8-23-08				
DESIGNED BY: J. DAVIDSON	BOOK NO.				
CHECKED BY: T. NELSON	DATE:				
		NO.	DATE	REVISION	BY
					APPROVED



**Pierce County**

DEPARTMENT OF PUBLIC WORKS AND UTILITIES  
SURFACE WATER MANAGEMENT  
2702 SOUTH 42nd STREET, SUITE 201  
TACOMA, WA 98403-7322

APPROVED BY:  
HAROLD SWIFT, P.E. SURFACE WATER MANAGEMENT MANAGER

**MOREY CREEK DAM BYPASS CHANNEL**

COVER SHEET

C.I.P. # D618-006



SEC. 18, T. 19 N., R. 3 E., W. M.

BEGIN BYPASS CHANNEL CONSTRUCTION  
 STA. "BP" 1+00.00  
 N XXXXXX  
 E XXXXXX

McCHORD AFB

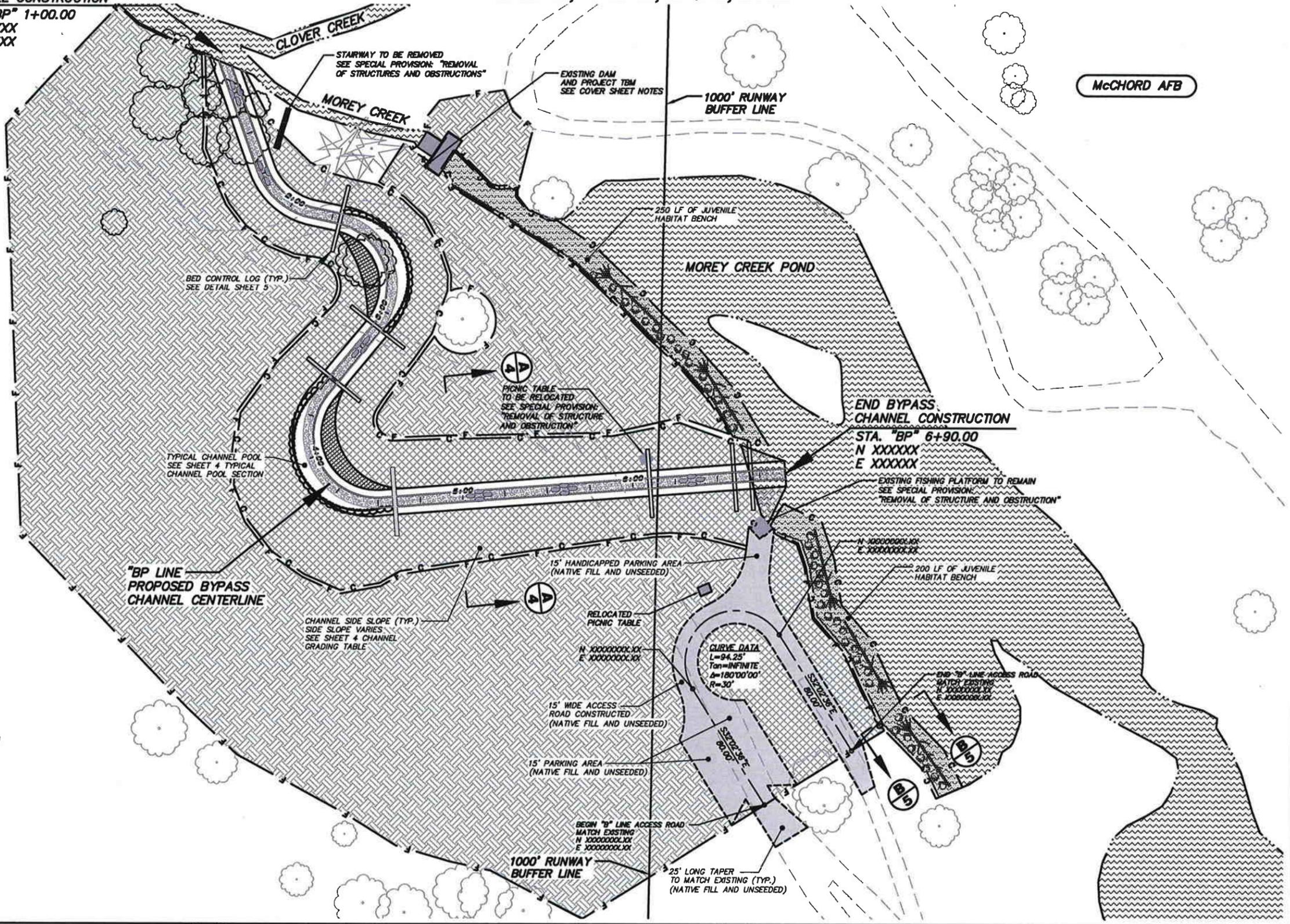


PLAN: 1" = 30' H  
 PROFILE: 1" = 30' H  
 1" = 5' V

CALL 2 WORKING DAYS BEFORE YOU DIG  
**1-800-424-5555**  
 UTILITIES UNDERGROUND LOCATION CENTER

**LEGEND**

- EXISTING**
- TREE TO BE REMOVED (DESIDUOUS)
  - TREE TO REMAIN (EVERGREEN)
  - TREE TO REMAIN (DESIDUOUS)
  - VEGETATION BOUNDARY
  - STREAM/POND BOUNDARY
  - GRAVEL ROAD
  - FISHING PLATFORM
  - PICNIC TABLE
- PROPOSED**
- DAYLIGHT LINE (CUT)
  - DAYLIGHT LINE (FILL)
  - DAM BYPASS CENTERLINE
  - EDGE OF STREAMBED GRAVEL CHANNEL
  - STREAMBED GRAVEL CHANNEL W/TRANSITION POOL (OUTSIDE CURVE)
  - INSIDE POOL BENCH
  - EXCAVATION SPOILS SITE TO BE SEEDDED
  - JUVENILE HABITAT BENCH CREATION AREA
  - CHANNEL SIDE SLOPE W/ DAYLIGHT CATCH (CUT LINE)
  - ACCESS ROAD AND PARKING AREAS
  - BED CONTROL LOG
  - NEAR VERTICAL KEYED BOULDER
  - IN-CHANNEL HORIZONTAL KEYED BOULDER
  - HABITAT LOG WITH PLANT STAKE CLUSTERS



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 User: JSD

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CHECKED BY: T. NELSON	DATE: XXX				
		NO.	DATE	REVISION	BY
					APPROVED

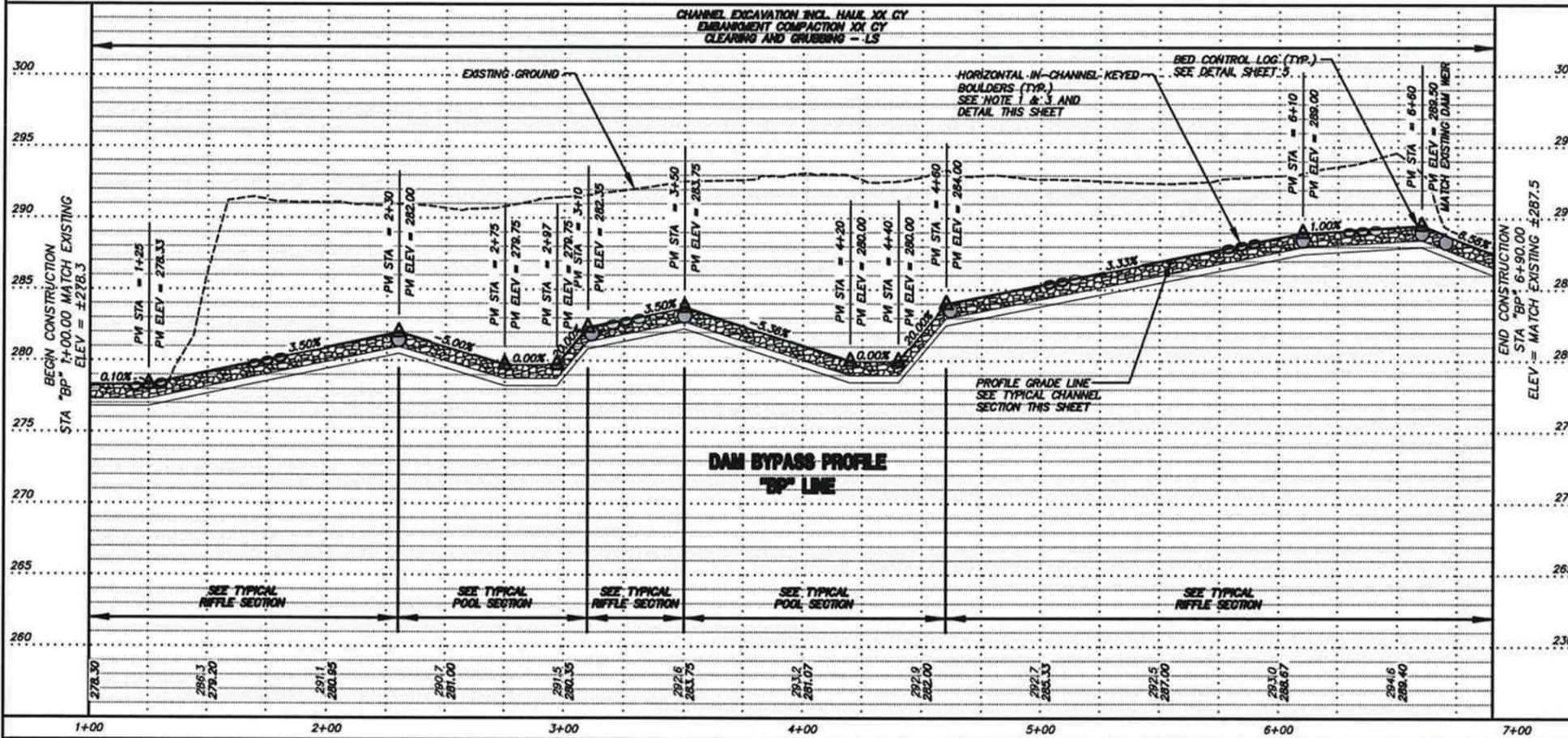
**Pierce County**  
 DEPARTMENT OF PUBLIC WORKS AND UTILITIES  
**SURFACE WATER MANAGEMENT**  
 2702 SOUTH 43rd STREET, SUITE 201  
 TACOMA, WA 98409-7532

APPROVED BY:  
  
 HAROLD SMITH, P.E. SURFACE WATER MANAGEMENT MANAGER

**MOREY CREEK DAM BYPASS CHANNEL**  
 DAM BYPASS CHANNEL PLAN  
 C.I.P. # D618-006

SHEET 3 OF 7

PROFILE: 1" = 30' H  
1" = 5' V

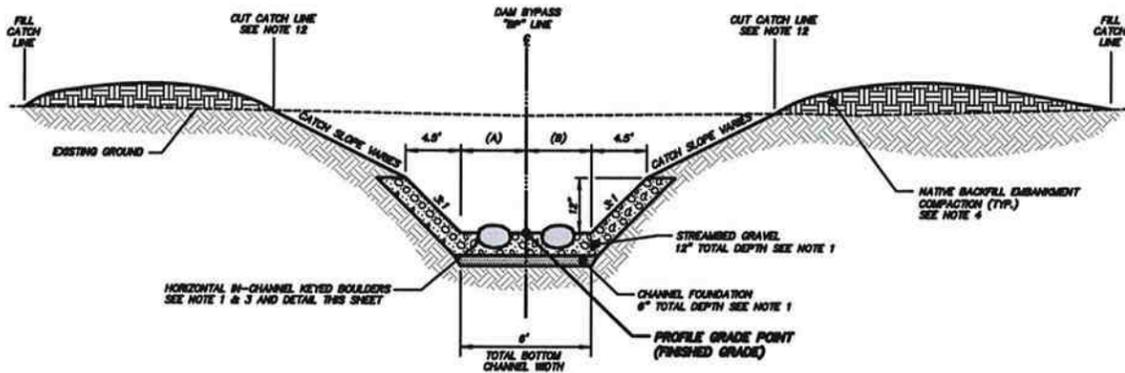


**GENERAL DAM BYPASS NOTES:**

- SEE SPECIAL PROVISION: "WRAP" FOR THE FOLLOWING ITEMS:
  - CHANNEL FOUNDATION
  - STREAMBED GRAVEL
  - KEYED BOULDERS
- SEE SPECIAL PROVISION: "ROADWAY EXCAVATION AND EMBANKMENT" FOR CHANNEL EXCAVATION.
- HORIZONTAL IN-CHANNEL KEYED BOULDERS SHALL BE PLACED IN A DIAMOND PATTERN (4 EACH) AND SHALL BE ANCHORED 3/4 THE WAY INTO STREAMBED GRAVEL AT LOCATIONS SHOWN ON THE CHANNEL GRADING TABLE.
- NATIVE BACKFILL SHALL BE PLACED ON EMBANKMENTS IN LOCATIONS SHOWN ON PLANS AND PER SPECIAL PROVISION: "ROADWAY EXCAVATION AND EMBANKMENT". THE TOP 6" OF NATIVE BACKFILL MATERIAL SHALL ONLY BE LIGHTLY COMPACTED PRIOR TO MULCHING AND SEEDING.
- KEYED BOULDERS SHALL BE PLACED ALONG ALL TRANSITION POOL SECTIONS "OUTSIDE OF CURVE NEAR VERTICAL SIDE SLOPE" PER TYPICAL CHANNEL POOL SECTION THIS SHEET. KEYED BOULDER SLOPES SHALL BE AS FOLLOWS:
  - 3:1 AT POOL CURVE FC CONTROL LOG STATION
  - NEAR VERTICAL (0.5:1) AT CENTER OF POOL STATION
  - 3:1 AT POOL CURVE FT CONTROL LOG STATION
- SET BED CONTROL LOG 3" BELOW THE TOP OF THE PROPOSED PROFILE GRADE ELEVATION. BACKFILL WITH KEYED BOULDERS AND STREAMBED GRAVEL SO THAT STREAMBED GRAVEL MATERIAL IS COVERING THE TOP OF THE LOG. SEE SPECIAL PROVISION: "BED CONTROL LOG"
- AS DIRECTED BY THE ENGINEER, MARKED TREES TAKEN FROM SITE SHALL BE USED AS HABITAT LOGS. SEE SPECIAL PROVISION: "HABITAT LOG"
- PLANT STAKE CLUSTERS OF PACIFIC WILLOWS, AND IN CLUSTERS OF RED OSER DOGWOOD, WITHIN JUVENILE HABITAT BENCH CREATION AREAS AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER SHALL BE INCIDENTAL TO HABITAT LOG INSTALLATION. SEE SPECIAL PROVISION "HABITAT LOG".
- DEWATER A MIN. OF 6" BELOW CHANNEL EXCAVATION INCL. HAUL VERTICAL LIMITS. SEE SPECIAL PROVISION: "DEWATERING"
- WATTLES SHALL BE INSTALLED PRIOR TO CHANNEL EXCAVATION INCL. HAUL ACTIVITIES. WATTLES SHALL BE PLACED IN A HAND DUG, 2" TRENCH, AND FIRMLY STAKED AT 10' OC. STAKE WATTLES PER TYPICAL JUVENILE HABITAT BENCH CREATION AREA DETAIL (THIS SHEET) AND STANDARD PLAN I-8 "WATTLE INSTALLATION ON A SLOPE". SEE STANDARD SPECIFICATION 8-01.3(10), 8-01.3(15), AND 8-01.3(16).
- SEE CHANNEL GRADING TABLE, THIS SHEET FOR TYPICAL CHANNEL SECTION VARIABLE WIDTHS.
- THE CONTRACTOR WILL BE PROVIDED CHANNEL SLOPE STAKING CATCH POINT DATA. ALL CHANNEL SLOPE CATCHES WILL BE STAKED IN THE FIELD BY THE CONTRACTOR IN ADVANCE OF CHANNEL EXCAVATION ACTIVITIES. NO CHANNEL EXCAVATION ACTIVITIES WILL BE ALLOWED OUTSIDE TO THE SLOPE STAKING UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

CHANNEL GRADING TABLE						
"BP" LINE STATION	BOTTOM WIDTH (A)	BOTTOM WIDTH (B)	NEAR VERT. WIDTH (C)	BENCH WIDTH (D)	CATCH SLOPE EACH SIDE	
CHANNEL RIFFLE SECTION	1+00	3'	3'	-	0'	2:1
	2+30	3'	3'	4.5'	0'	2:1
CHANNEL POOL SECTION	2+70	10'	3'	0.5'	10'	*
	3+10	3'	3'	4.5'	0'	*
CHANNEL RIFFLE SECTION	3+50	3'	3'	4.5'	0'	*
CHANNEL POOL SECTION	4+05	10'	3'	0.5'	10'	*
	4+60	3'	3'	4.5'	0'	*
CHANNEL RIFFLE SECTION	5+00	3'	3'	-	0'	*
	6+30	3'	3'	-	0'	6:1
	6+90	3'	3'	-	0'	6:1

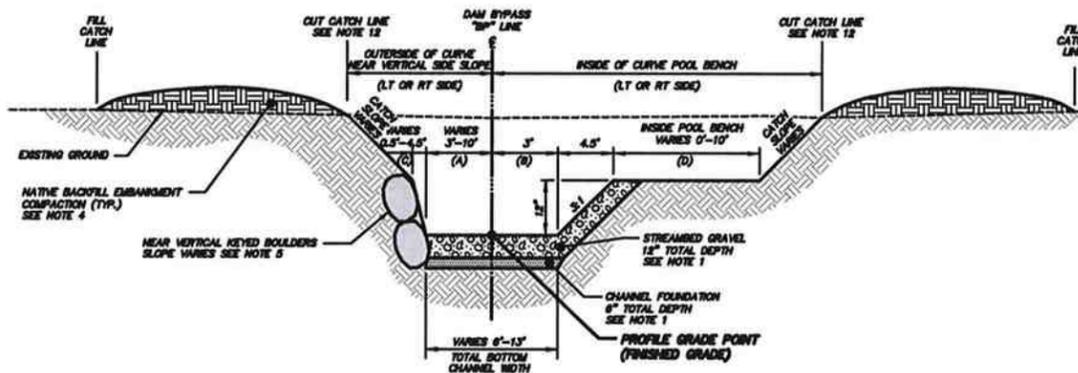
\* CATCH SLOPE TRANSITIONS 2:1 TO 6:1 (0.1:1 PER EVERY 10 STATIONS) FROM STA "BP" 2+30 TO STA "BP" 6+30 ARE APPROXIMATE. SEE NOTE 12.



**TYPICAL CHANNEL RIFFLE SECTION**

NOT TO SCALE

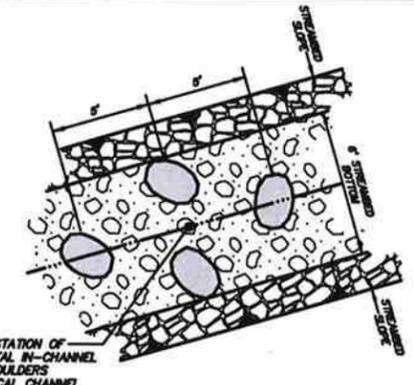
STA "BP" 1+00 TO STA "BP" 2+30  
STA "BP" 3+10 TO STA "BP" 3+50  
STA "BP" 4+60 TO STA "BP" 6+90



**TYPICAL CHANNEL POOL SECTION**

NOT TO SCALE

STA "BP" 2+30 TO STA "BP" 3+10  
STA "BP" 3+50 TO STA "BP" 4+60



**TYPICAL HORIZONTAL IN-CHANNEL KEYED BOULDERS DETAIL**

NOT TO SCALE

STA "BP" 1+25  
STA "BP" 1+75  
STA "BP" 3+25  
STA "BP" 5+10  
STA "BP" 5+60  
STA "BP" 6+35

Date: Feb 25, 2009 11:53:32 AM  
Drawing: P:\D618 - MOREY CREEK DAM BYPASS\DWG\MOREY CREEK DAM BYPASS BASE.DWG  
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DESIGNED BY: J. DAVIDSON	BOOK NO.				
CHECKED BY: T. NELSON	DATE: XXX				
		NO.	DATE	REVISION	BY
					APPROVED



**Pierce County**

DEPARTMENT OF PUBLIC WORKS AND UTILITIES  
SURFACE WATER MANAGEMENT  
2703 SOUTH 43rd STREET, SUITE 201  
TACOMA, WA 98409-7322

APPROVED BY:  
HAROLD SHERK, P.E. SURFACE WATER MANAGEMENT MANAGER

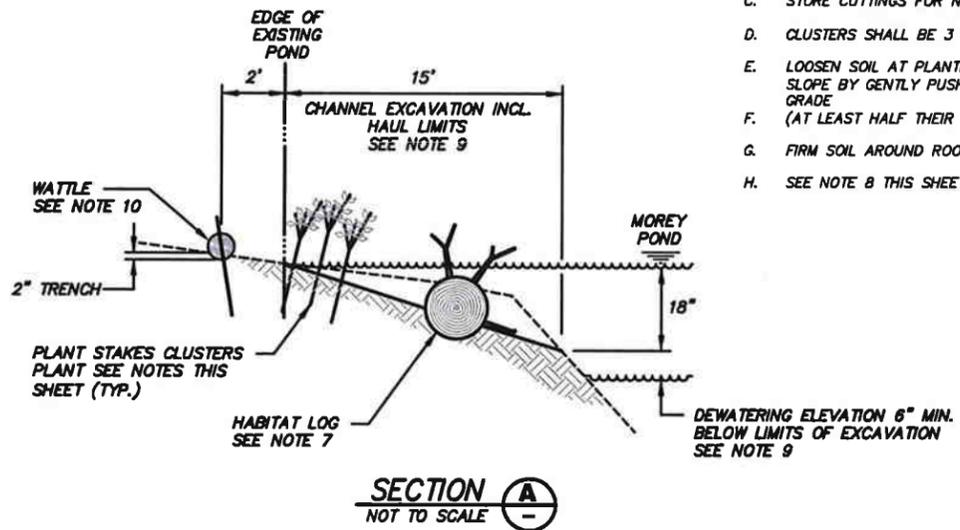
**MOREY CREEK DAM BYPASS CHANNEL**

**DAM BYPASS CHANNEL PROFILE AND SECTIONS**

C.I.P. # D618-006

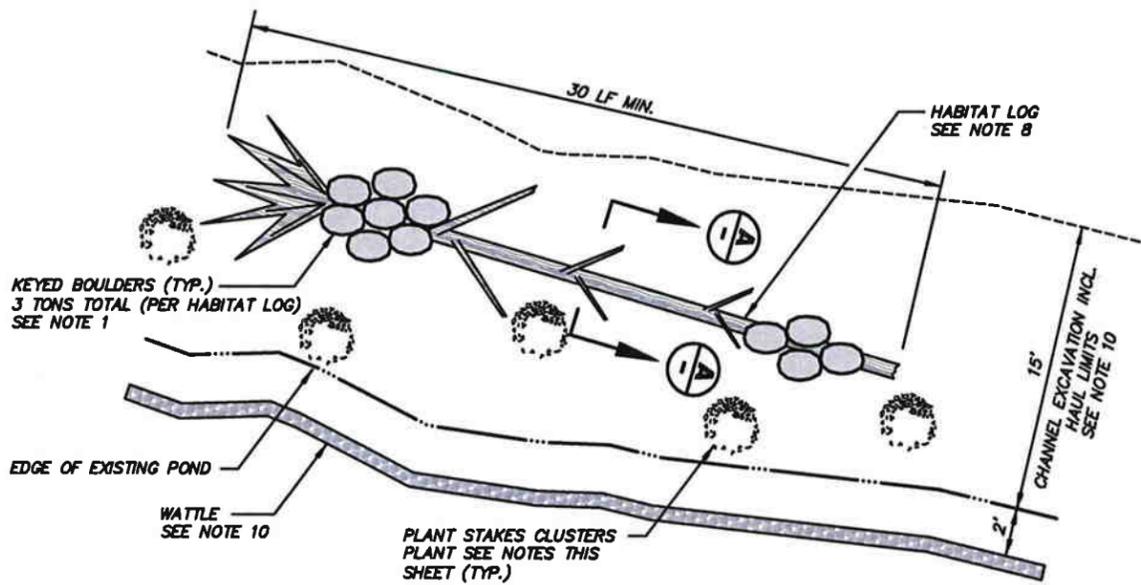
**PLANT STAKES AS FOLLOWS:**

- PLANT SELECTIONS SHALL BE PLANTED IN CLUSTERS OF THREE (3) BY PLANT SECTION TYPE. THE CONTRACTOR SHALL ALTERNATE CLUSTER TYPES AND HAVE A MIN. OF FIVE (5) CLUSTERS PLANTED PER HABITAT LOG. SEE NOTE 8 FOR ADDITIONAL INFORMATION.
- COLLECT CUTTINGS FROM HEALTHY DORMANT PLANTS
- STORE CUTTINGS FOR NO MORE THAN TWO WEEKS AND KEEP MOIST AND SHADED
- CLUSTERS SHALL BE 3 PLANTS 3' OC EACH. CLUSTER SHALL BE ± 8' OC.
- LOOSEN SOIL AT PLANTING SITE AND INSTALL CUTTING PERPENDICULAR TO THE BENCH SLOPE BY GENTLY PUSH CUTTING INTO LOOSENED SOIL, PLACING 12"-18" BELOW FINISH GRADE (AT LEAST HALF THEIR LENGTH)
- FIRM SOIL AROUND ROOTS
- SEE NOTE 8 THIS SHEET.

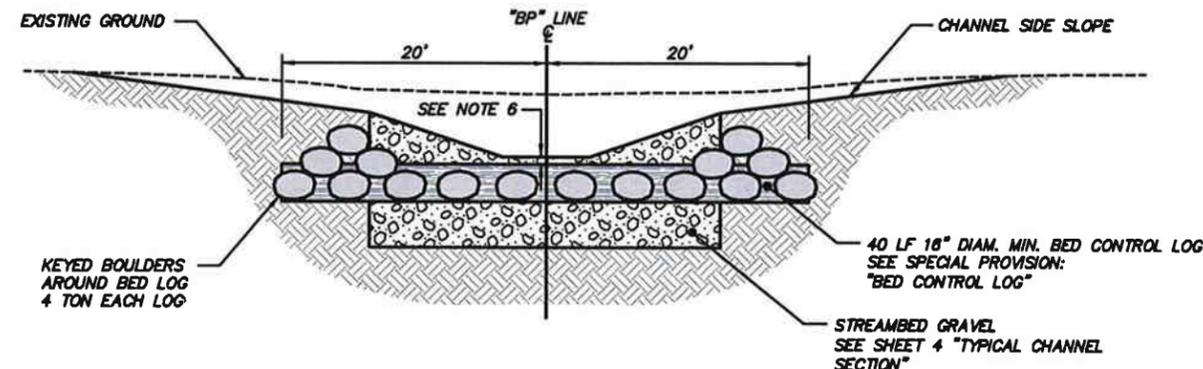


**GENERAL DAM BYPASS NOTES:**

- SEE SPECIAL PROVISION: "TRIPRAP" FOR THE FOLLOWING ITEMS:
  - CHANNEL FOUNDATION
  - STREAMBED GRAVEL
  - KEYED BOULDERS
- SEE SPECIAL PROVISION: "ROADWAY EXCAVATION AND EMBANKMENT" FOR CHANNEL EXCAVATION.
- HORIZONTAL IN-CHANNEL KEYED BOULDERS SHALL BE PLACED IN A DIAMOND PATTERN (4 EACH) AND SHALL BE ANCHORED 3/4 THE WAY INTO STREAMBED GRAVEL AT LOCATIONS SHOWN ON THE CHANNEL GRADING TABLE.
- NATIVE BACKFILL SHALL TO BE PLACED ON EMBANKMENTS IN LOCATIONS SHOWN ON PLANS AND PER SPECIAL PROVISION: "ROADWAY EXCAVATION AND EMBANKMENT". THE TOP 6" OF NATIVE BACKFILL MATERIAL SHALL ONLY BE LIGHTLY COMPACTED PRIOR TO MULCHING, SEEDING.
- KEYED BOULDERS SHALL BE PLACED ALONG ALL TRANSITION POOL SECTIONS "OUTSIDE OF CURVE NEAR VERTICAL SIDE SLOPE" PER TYPICAL CHANNEL POOL SECTION THIS SHEET. KEYED BOULDER SLOPES SHALL BE AS FOLLOWS:
  - 3:1 AT POOL CURVE PC CONTROL LOG STATION
  - NEAR VERTICAL (0.5:1) AT CENTER OF POOL STATION
  - 3:1 AT POOL CURVE PT CONTROL LOG STATION
- SET BED CONTROL LOG 3" BELOW THE TOP OF THE PROPOSED PROFILE GRADE ELEVATION. BACKFILL WITH KEYED BOULDERS AND STREAMBED GRAVEL SO THAT STREAMBED GRAVEL MATERIAL IS COVERING THE TOP OF THE LOG. SEE SPECIAL PROVISION: "BED CONTROL LOG"
- AS DIRECTED BY THE ENGINEER, MARKED TREES TAKEN FROM SITE SHALL BE USED AS HABITAT LOGS. SEE SPECIAL PROVISION: "HABITAT LOG"
- PLANT STAKES CLUSTERS OF PACIFIC WILLOWS, AND IN CLUSTERS OF RED OSIER DOGWOOD, WITHIN JUVENILE HABITAT BENCH CREATION AREAS AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER SHALL BE INCIDENTAL TO HABITAT LOG INSTALLATION. SEE SPECIAL PROVISION "HABITAT LOG".
- DEWATER A MIN. OF 6" BELOW CHANNEL EXCAVATION INCL. HAUL VERTICAL LIMITS. SEE SPECIAL PROVISION: "DEWATERING"
- WATTLES SHALL BE INSTALLED PRIOR TO CHANNEL EXCAVATION INCL. HAUL ACTIVITIES. WATTLES SHALL BE PLACED IN A HAND DUG, 2" TRENCH, AND FIRMLY STAKED AT 10' OC. STAKE WATTLES PER TYPICAL JUVENILE HABITAT BENCH CREATION AREA DETAIL (THIS SHEET) AND STANDARD PLAN I-8 "WATTLE INSTALLATION ON A SLOPE". SEE STANDARD SPECIFICATION 8-01.3(10), 8-01.3(15), AND 8-01.3(16).
- SEE CHANNEL GRADING TABLES THIS SHEET FOR TYPICAL CHANNEL SECTION VARIABLE WIDTHS.
- THE CONTRACTOR WILL BE PROVIDED CHANNEL SLOPE STAKING CATCH POINT DATA. ALL CHANNEL SLOPE CATCHES WILL BE STAKED IN THE FIELD BY THE CONTRACTOR IN ADVANCE OF CHANNEL EXCAVATION ACTIVITIES. NO CHANNEL EXCAVATION ACTIVITIES WILL BE ALLOWED OUTSIDE TO THE SLOPE STAKING UNLESS OTHER WISE DIRECTED BY THE ENGINEER.



**TYPICAL JUVENILE HABITAT BENCH DETAIL**  
NOT TO SCALE



**TYPICAL BED CONTROL LOG SECTION**  
NOT TO SCALE

- STA "BP" 2+00
- STA "BP" 3+00
- STA "BP" 3+50
- STA "BP" 4+80
- STA "BP" 6+10
- STA "BP" 6+80
- STA "BP" 8+70

Date: Feb 25, 2009 11:16:04 AM  
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CHECKED BY: T. NELSON	DATE: XXX				
		NO.	DATE	REVISION	BY
					APPROVED


**Pierce County**  
 DEPARTMENT OF PUBLIC WORKS AND UTILITIES  
**SURFACE WATER MANAGEMENT**  
 3702 SOUTH 42nd STREET, SUITE 201  
 TACOMA, WA 98409-7322  
APPROVED BY:  
HAROLD SARKIS, P.E. SURFACE WATER MANAGEMENT MANAGER

**MOREY CREEK DAM BYPASS CHANNEL**  
 MISC. DETAILS  
**C.I.P. # D618-006**  
 SHEET 5 OF 7



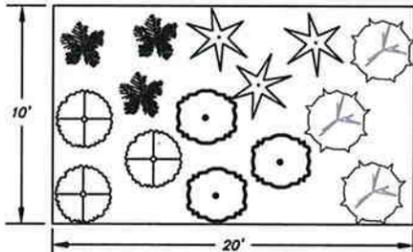
PLAN: 1" = 30' H  
 PROFILE: 1" = 30' H  
 1" = 5' V

CALL 2 WORKING DAYS BEFORE YOU DIG  
**1-800-424-5555**  
 UTILITIES UNDERGROUND LOCATION CENTER

**PROJECT SITE PLANTING SLOPE PLANTING SCHEDULE**



SYMBOL	PLANTING SELECTION -	SCIENTIFIC NAME	TYPE	SIZE	TYPICAL SPACING	TOTAL
	INDIAN PLUM	<i>Oemleria cerasiformis</i>	CONTAINERS	1 GAL.	3' OC	
	SERVICE BERRY	<i>Amelanchier alnifolia</i>	CONTAINERS	1 GAL.	3' OC	
	EVERGREEN HUCKLEBERRY	<i>Vaccinium ovatum</i>	CONTAINERS	4" POT	3' OC	
	SALAL	<i>Gaultheria shallon</i>	CONTAINERS	4" POT	3' OC	
	SWORDFERN	<i>Polystichum munitum</i>	CONTAINERS	4" POT	3' OC	

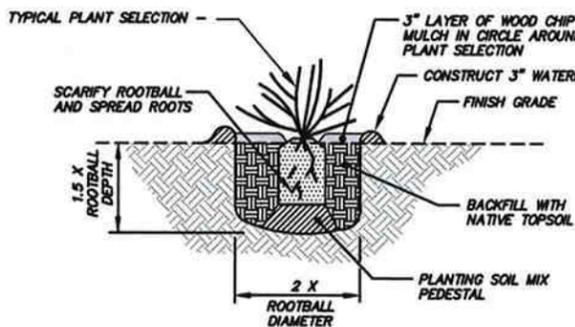


TYPICAL SLOPE PLANTING DENSITY MATRIX

**PROJECT SITE PLANTING CHANNEL PLANTING SCHEDULE**

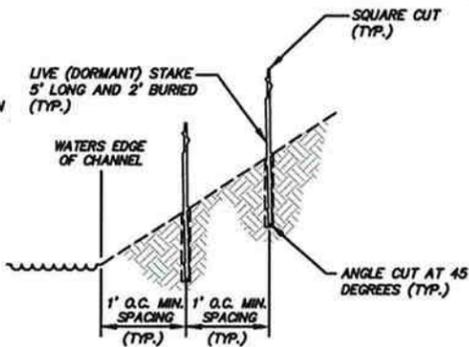
SYMBOL	PLANTING SELECTION -	SCIENTIFIC NAME	TYPE	SIZE	TYPICAL SPACING	TOTAL
	RED-OSIER DOGWOOD	<i>Cornus stolonifera</i>	STAKES	3'	3' OC	

**PROJECT SITE PLANTING SEEDING FERTILIZING AND MULCHING AREA**



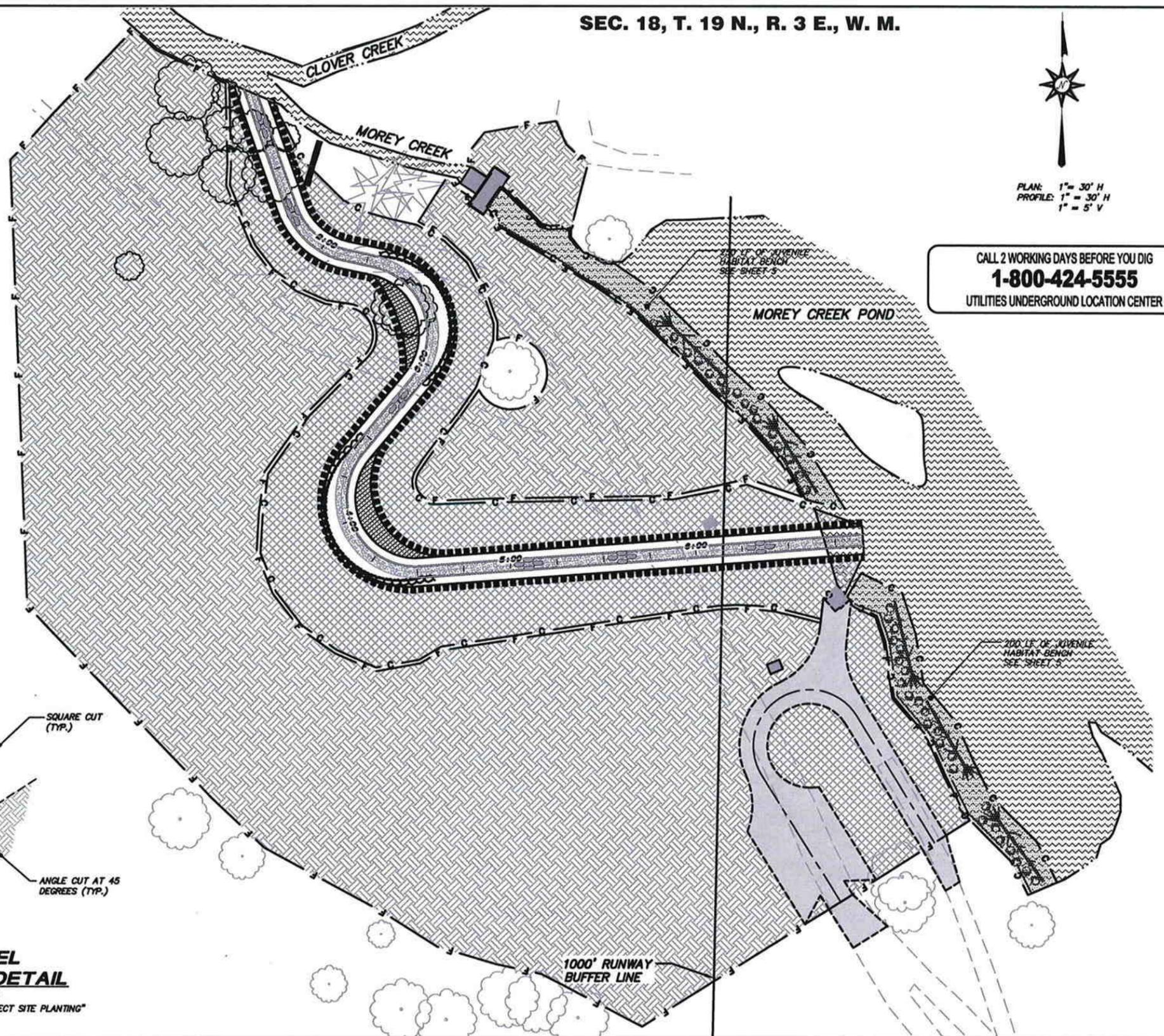
**TYPICAL PLANT SELECTION PLANTING DETAIL**  
 NOT TO SCALE

SEE SPECIAL PROVISION: "PROJECT SITE PLANTING"



**CHANNEL PLANTING DETAIL**  
 NOT TO SCALE

SEE SPECIAL PROVISION: "PROJECT SITE PLANTING"



Date: Feb 25, 2009 11:18:40 AM  
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DESIGNED BY: J. DAVIDSON	BOOK NO.				
CHECKED BY: T. NELSON	DATE: XXX				
		NO.	DATE	REVISION	BY
					APPROVED



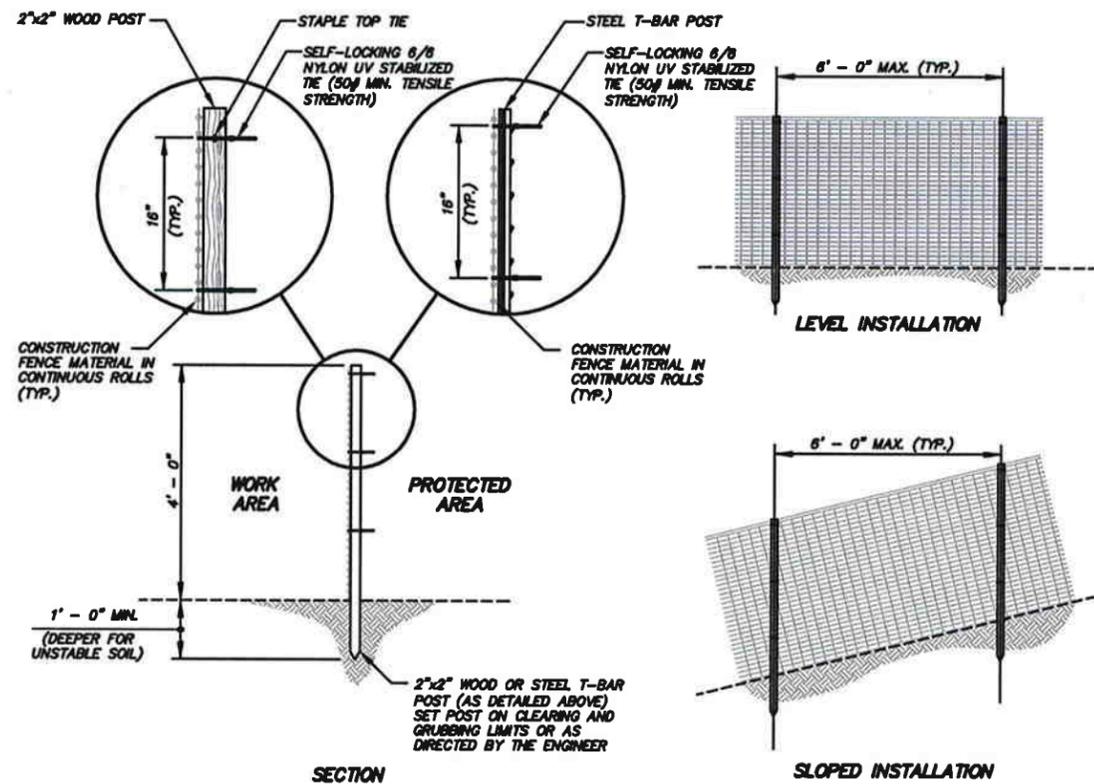
**Pierce County**  
 DEPARTMENT OF PUBLIC WORKS AND UTILITIES  
 SURFACE WATER MANAGEMENT  
 2702 SOUTH 42nd STREET, SUITE 201  
 TACOMA, WA 98409-7322

APPROVED BY:  
 HAROLD SMELY, P.E. SURFACE WATER MANAGEMENT MANAGER

**MOREY CREEK DAM BYPASS CHANNEL**  
 PLANTING PLAN  
 C.I.P. # D618-006

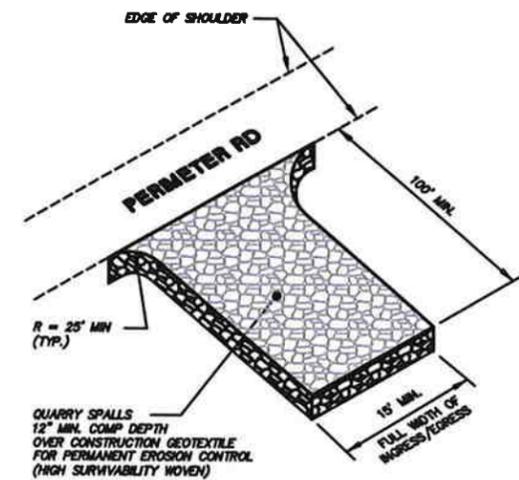
**SWPPP GENERAL NOTES:**

- ON-SITE TEMPORARY EROSION AND SEDIMENTATION CONTROL (TESC) MEASURES INCLUDING BUT NOT LIMITED TO: INSTALLATION, MAINTENANCE, CLEANUP, AND DISPOSAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. ALL TESC MEASURES SHALL BE INSPECTED AND APPROVED BY THE ESC LEAD AND IN ACCORDANCE WITH 8-01 OF THE WSDOT STANDARD SPECIFICATIONS, AS SHOWN IN THE PLANS, OR AS DIRECTED BY THE ENGINEER. ALL TESC BMPs SHOWN ON THE SWPPP PLANS SHALL BE INSTALLED PRIOR TO OR AS PART OF THE FIRST STAGE OF WORK. ALL TESC WORK DONE SHALL BE IN ACCORDANCE WITH THE PIERCE COUNTY STORMWATER MANAGEMENT MANUAL (PCSWMM). SEE SPECIAL PROVISION: "EROSION CONTROL AND WATER POLLUTION CONTROL."
- AS PART OF THE PHASE 1 SWPPP ONLY, THE CONTRACTOR SHALL APPLY "TEMPORARY HYDROSEEDING" AND "WOOD STRAW" OVER ALL BARE GROUND AS SHOWN ON THIS PLAN OR AS DIRECTED BY THE ENGINEER. SEE SPECIAL PROVISIONS: "TEMPORARY SEEDING" AND "WOOD STRAW". ALL TEMPORARY SEEDING SHALL BE IRRIGATED. SEE SPECIAL PROVISION "IRRIGATION SYSTEM".
- INSTALL GEOTEXTILE ENCASED CHECK DAMS IN THE EXISTING CHANNEL REACH WHERE SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER, PRIOR TO POND OR CHANNEL EXCAVATION INCL. HAUL ACTIVITIES. GEOTEXTILE ENCASED CHECK DAMS SHALL MEET THE REQUIREMENTS OF STANDARD SPECIFICATIONS 8-01.3(6) AND 9-14.5(4). PERFORM MAINTENANCE IN ACCORDANCE WITH STANDARD SPECIFICATIONS 8-01.3(15) "GEOTEXTILE ENCASED CHECK DAM INSTALLATION". SEE SHEET 28 "GEOTEXTILE ENCASED CHECK DAM DETAIL" FOR ADDITIONAL INFORMATION.
- THE ENGINEER WILL FLAG TREES THAT SHALL REMAIN (R) OR BE TOPPED (T). CARE SHALL BE TAKEN WHEN CLEARING AND GRUBBING AROUND THESE TREES AS NOT TO DAMAGE THEIR BARK AND/OR ROOTS. SEE SPECIAL PROVISION: "CLEARING, GRUBBING, AND ROADSIDE CLEANUP"
- PRIMARY ACCESS TO AND FROM THE HUGGLER PARCEL SHALL BE FROM THE PIERCE COUNTY DETENTION POND SITE ONLY AND ONLY VIA THE STABILIZED CONSTRUCTION ENTRANCE LOCATIONS SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER. ONLY STANDARD TRUCKS AND/OR CARS MAY USE 88TH ST E/33TH AVE CT E (PRIVATE ROAD) OR 85TH ST E PROJECT SITE FOR ACCESS. ANY AND ALL PARKING OUTSIDE OF THE PROJECT LIMITS ON PRIVATE PROPERTY SHALL HAVE PROPERTY OWNER(S) PERMISSION GRANTED IN ADVANCE. ANY DAMAGE TO PROPERTY OUTSIDE OF THE CLEARING AND GRUBBING OR STRUCTURE EXCAVATION LIMITS INCLUDING BUT NOT LIMITED TO: THE ROADWAYS, LANDSCAPING, FENCING, OR LAWNS, SHALL BE REPAIRED TO THE PROPERTY OWNERS SATISFACTION AT THE CONTRACTOR'S EXPENSE. SEE "STABILIZED CONSTRUCTION ENTRANCE" DETAIL ON SHEET 28.
- THE PROJECT ENGINEER OR PROJECT INSPECTOR SHALL BE RESPONSIBLE FOR LOCATING AND VERIFYING CLEARING AND GRUBBING LIMITS. THE CONTRACTOR WILL BE PROVIDED WITH CLEARING AND GRUBBING LIMITS STAKING DATA AND/OR AUTOCAD DRAWING FILES UPON REQUEST.
- THE EXISTING CHANNEL REACH SHOWN ON THIS PLAN SHALL REMAIN OPEN (UNFILLED) FOR ALL DEWATERING AND CREEK BYPASS PURPOSES (IF OR WHEN DEWATERING IS REQUIRED) AND REMAIN OPEN UNTIL OCTOBER 1, 2009 OR AS DIRECTED BY THE ENGINEER. SEE SPECIAL PROVISION "DEWATERING AND CREEK BYPASS SYSTEM".
- PHASE 2 HAUL OF MATERIALS SHALL BE DONE VIA 90TH ST E, WITH THE EXCEPTION OF WORK DONE AT 87TH ST CT E. ONLY STANDARD TRUCKS AND/OR CARS MAY USE 88TH ST CT E (PRIVATE ROAD). ANY AND ALL PARKING OUTSIDE OF THE PROJECT LIMITS ON PRIVATE PROPERTY SHALL HAVE PROPERTY OWNER(S) PERMISSION GRANTED IN ADVANCE. ANY DAMAGE TO PROPERTY OUTSIDE OF THE CLEARING AND GRUBBING, OR STRUCTURE EXCAVATION LIMITS INCLUDING BUT NOT LIMITED TO: THE ROADWAYS, LANDSCAPING, FENCING, OR LAWNS, SHALL BE REPAIRED TO THE PROPERTY OWNERS SATISFACTION AT THE CONTRACTOR'S EXPENSE.



**CONSTRUCTION FENCE DETAIL**

NOT TO SCALE  
SEE SPECIAL PROVISION: "CHAIN LINK FENCE AND WIRE FENCE"



**STABILIZED CONSTRUCTION ENTRANCE DETAIL**

NOT TO SCALE

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CHECKED BY: T. NELSON	DATE: XXX				
		NO.	DATE	REVISION	BY
					APPROVED



**Pierce County**

DEPARTMENT OF PUBLIC WORKS AND UTILITIES  
SURFACE WATER MANAGEMENT  
2702 SOUTH 42nd STREET, SUITE 201  
TACOMA, WA 98409-7332

APPROVED BY:  
HAROLD SMELT, P.E. SURFACE WATER MANAGEMENT MANAGER

**MOREY CREEK DAM BYPASS CHANNEL**

STORMWATER POLLUTION PREVENTION PLAN

C.I.P. # D618-006

APPENDIX B  
FEDERAL CONSISTENCY DETERMINATION

## **FEDERAL CONSISTENCY DETERMINATION MOREY DAM BYPASS CHANNEL**

### **McCHORD AIR FORCE BASE, WASHINGTON**

This document provides the State of Washington with the U.S. Department of the Air Force's (Air Force) Consistency Determination under Section 307 (c) (1) of the federal Coastal Zone Management Act (CZMA) of 1972, as amended, for the construction of a bypass channel around Morey Dam, McChord Air Force Base (AFB), Washington.

#### **Proposed Federal Agency Action**

The proposed action is construction of a bypass channel around the south side of Morey Dam that will connect Clover Creek to Morey Pond. Morey Dam is located on the eastern edge of McChord AFB. The bypass channel would provide a passage for migratory salmon around the dam and into Morey Pond and ultimately Morey Creek and Spanaway Lake. The dam and Morey Pond would remain in place, with the pond acting as a refuge habitat for juvenile salmon on their way downstream through the channel.

The channel will be approximately 590 feet long with an average slope of 2.2 % and will incorporate the "riffle pool" approach. The base channel will range in width from 6 to approximately 30 feet with additional 10 foot benches in the curves. The design also provides a shallow water habitat component at the connection to Morey Pond. This habitat is design to provide refuge for juvenile salmon from predators.

A 7.5-inch weir plate will be installed at the dam and the new outlet channel will match the invert elevation of the existing overflow elevation of the dam. This will maintain the current size of the pond and allow the pond to continue to be utilized for recreational purposes. Flow will be split in varying proportion between the dam spillway and the new channel, so that some flow continues to pass through the pond and over the dam at low flow. As flows increase, a larger proportion of the flow will go over the dam.

Approximately 200 linear feet of pond shoreline on each side of the bypass channel connection to the pond will be enhanced under this alternative. This habitat bench creation will include placement of habitat logs and keyed boulders to provide shelter for juvenile salmon to hide from predators on their way downstream. The habitat logs will be obtained from trees removed from the site as part of the channel construction. The entire pond will also act as habitat for juvenile salmon.

#### **Background**

The CZMA, enacted in 1972, created the National Coastal Management Program for management and control of the uses of and impacts on coastal zone resources. The program is implemented through federally approved state coastal management programs (CMPs).

Federal approval of a state CMP triggers the CZMA Section 307 federal consistency determination requirement. Section 307 mandates that federal actions within a state's coastal zone (or outside the coastal zone if the action affects land or water uses or natural resources within the coastal zone) be consistent to the maximum extent practicable with the enforceable policies of the state CMP. Federal agency actions include direct and indirect federal agency activities, federal approval activities, and federal financial assistance activities. Accordingly, federal agency activities (direct, indirect, or cumulative) reasonably affecting the state's coastal zone must be fully consistent with the enforceable policies of the state's CMP, unless compliance is otherwise prohibited by law. There are no categorical exemptions or exclusions to or from the Section 307 federal consistency requirement.

The state of Washington has developed and implemented a federally approved CMP describing current coastal legislation and enforceable policies. Under the program, activities that impact any land use, water use, or natural resource of the coastal zone must comply with six laws, or "enforceable policies." These include the Shoreline Management Act, the State Environmental Policy Act, the Clean Air Act, the Clean Water Act, the Energy Facility Site Evaluation Council, and the Ocean Resource Management Act.

### **Program and Policy Analysis**

Statutes addressed as part of the Washington Coastal Management Program consistency review and considered in the analysis of the proposed action are noted in the following table.

## Washington Coastal Management Program Consistency Review

Statute	Scope	Consistency
---------	-------	-------------

**Washington Coastal Management Program Consistency Review**

Statute	Scope	Consistency
<p>Shoreline Management Act – Applicable Regulations</p> <p><b>Ch. 173-18 WAC</b> Delimits streams and rivers constituting shorelines of the state. Chapter 173-18-310 delimits the streams and rivers in Pierce County including Clover Creek.</p> <p><b>Ch. 173-22 WAC</b> Designates wetlands associated with shorelines of the state.</p>	<p>Designates preferred uses for protected shorelines. Provides for the protection of shoreline natural resources and public access to shoreline areas.</p> <p>Protected shorelines include the following:</p> <ul style="list-style-type: none"> <li>- Marine waters;</li> <li>- Streams with greater than 20 cubic feet per second of mean annual flow;</li> <li>- Lakes 20 acres or larger;</li> <li>- Upland areas, e.g., shorelands, that extend 200 feet landward from the edge of these waters; and</li> <li>- Wetlands and floodplains associated with any of the above waters.</li> </ul>	<p style="text-align: center;">CONSISTENT</p> <p>Clover Creek has a mean annual flow of 43 cubic feet per second and thus falls under the protected shorelines regulation.</p> <p>Implementation of the proposed action would result in the loss of approximately 200 square feet of wetlands currently present adjacent to Clover Creek and Morey Pond. Two areas of wetlands will be removed due to the excavation of the bypass channel, one at the channel connection to Morey Pond and one at the channel connection to Clover Creek. Some mitigation for the loss of these wetlands will result from the riparian/wetland habitat created adjacent to the bypass channel.</p> <p>There is no feasible method of providing migratory fish passage around Morey Dam without some wetland disturbance.</p>

**Washington Coastal Management Program Consistency Review**

Statute	Scope	Consistency
<p>State Environmental Protection Act</p> <p><b>Ch. 173-802 WAC - SEPA Procedures.</b></p> <p><b>Ch. 197-11 WAC - SEPA Rules</b></p>	<p>Requires state and local agencies to consider the likely environmental consequences of a proposal before approving or denying the project.</p>	<p>CONSISTENT</p> <p>A National Environmental Policy Act (NEPA) Environmental Assessment (EA) may be adopted to satisfy requirements for a determination of non-significance or EIS, if the requirements of WAC Chapters 197-11-600 and 197-11-630 are met. An EA for the proposed bypass channel was prepared by the Air Force and submitted for agency and public comment.</p> <p>Based on the criteria listed in WAC Chapters 197-11-600, 197-11-610 and 107-11-603, the EA performed by the Air Force for the project will satisfy SEPA requirements.</p> <p>Consequently, a separate State Environmental Protection Act review is not required for the project.</p>

**Washington Coastal Management Program Consistency Review**

Statute	Scope	Consistency
<p>Clean Air Act – Air Quality</p>	<p>Addresses the state’s policy concerning air quality.</p>	<p style="text-align: center;">NOT APPLICABLE</p> <p>Implementation of the proposed action would have no net effect on the overall air quality at McChord AFB and the surrounding community. The proposed action does not involve a stationary source. In accordance with the Clean Air Act, this action will not cause or contribute to any new violations of any standard in any area, will not increase the frequency or severity of any existing violation in any area, will not delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.</p> <p>The proposed action complies with the State of Washington Implementation Plan. The proposed action is not “regionally significant” and does not require a conformity determination in accordance with 40 CFR 93.153(b)(2). The total emission of criteria pollutants from the proposed action are below the <i>de minimus</i> thresholds and less than ten percent of the Air Quality Region’s planning inventory.</p>
<p>Clean Water Act – Water Quality</p> <p><b>Ch. 173-210A WAC</b> Water quality standards for surface waters of the state of Washington.</p> <p><b>Ch. 173-220 WAC -</b> National Pollutant Discharge Elimination System (NPDES) Permit</p>	<p>Addresses the state’s policy concerning water quality and wetlands.</p>	<p style="text-align: center;">CONSISTENT</p> <p>Implementation of the proposed action would have no long term effect on water quality in Clover or Morey Creek at McChord AFB. Any potential water quality impacts would be associated with construction.</p> <p>Construction would be accomplished during the dry, low flow season (July - October). Filter fabric and mats would be used on the Clover Creek bank to minimize soil entry into the</p>

## Washington Coastal Management Program Consistency Review

Statute	Scope	Consistency
<p>Program. The purpose of this chapter is to establish a state individual permit program. This program is applicable to the discharge of pollutants and other wastes and materials to the surface waters of the state, operating under state law as a part of the National Pollutant Discharge Elimination System (NPDES) created by section 402 of the Federal Water Pollution Control Act (FWPCA). Permits issued under this chapter are designed to satisfy the requirements for discharge permits under both section 402(b) of the FWPCA and Chapter 90.48 RCW.</p>		<p>creek. No changes in water quality parameters of concern (dissolved oxygen, temperature, pH) would be expected.</p> <p>The proposed action is located on a federal facility in the state of Washington. Accordingly, NPDES requirements for this project will be met under the US Environmental Protection Agency's (EPA) General Construction Permit. A Notice of Intent (NOI) and Notice of Termination (NOT) for stormwater discharge will be filed with the USEPA.</p>
<p>Ocean Resources Management Act</p>	<p>Addresses the state's policy for leasing tidal or submerged lands.</p>	<p style="text-align: center;">NOT APPLICABLE</p> <p>The proposed action does not include any activities within Washington's tidal or submerged lands.</p>
<p>Energy Facility Site Evaluation Council</p>	<p>Addresses the state's policy for permitting the development of new energy-generating facilities.</p>	<p style="text-align: center;">NOT APPLICABLE</p> <p>The proposed action does not include the construction of any energy-generating facilities.</p>

### Conclusion

We have determined the proposed construction of the bypass channel around Morey Dam will be undertaken in a manner consistent to the maximum extent practicable with the enforceable policies of Washington's Coastal Resources Management Program.

APPENDIX C

WASHINGTON STATE DEPARTMENT OF  
ARCHAEOLOGY AND HISTORIC PRESERVATION  
CORRESPONDENCE



STATE OF WASHINGTON

**DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION**

*1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501*

*Mailing address: PO Box 48343 • Olympia, Washington 98504-8343*

*(360) 586-3065 • Fax Number (360) 586-3067 • Website: [www.dahp.wa.gov](http://www.dahp.wa.gov)*

February 26, 2009

Mr. Michael J. Grenko  
Environmental Management Flight  
HQ 62D Airlift Wing  
555 Barnes Boulevard  
McChord, Air Force Base, Washington 98438

Re: Morey Dam Bypass Channel Project  
Log No: 022609-16-USAF

Dear Mr. Grenko;

Thank you for contacting our department. We have reviewed the materials you provided for the proposed Morey Dam Bypass Channel Project on McChord Air Force Base in Pierce County, Washington.

We concur with your Determination of No Historic Properties with your proposed stipulations for professional archaeological monitoring. Please provide us with the monitoring report when available.

We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

In the event that archaeological or historic materials are discovered during project activities, work in the immediate vicinity should be discontinued, the area secured, and this department and the concerned tribe notified.

These comments are based on the information available at the time of this review and on the behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations 36CFR800.

Should additional information become available, our assessment may be revised. Thank you for the opportunity to comment and a copy of these comments should be included in subsequent environmental documents.

Sincerely,

Robert G. Whitlam, Ph.D.

State Archaeologist

(360) 586-3080

email: [rob.whitlam@dahp.wa.gov](mailto:rob.whitlam@dahp.wa.gov)



**DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION**

*Protect the Past, Shape the Future*