DROP 4 HYDROPOWER PROJECT
NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)
ENVIRONMENTAL ASSESSMENT (EA)

COVER SHEET

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ABSTRACT:

The Confederated Tribes and Bands of the Yakama Nation (YN) Department of Natural Resources (DNR) propose to install an inline turbine on the Wapato Irrigation Project (WIP) Main Canal to generate approximately one megawatt of supplemental hydroelectric power. The Main Canal is a non-fish bearing irrigation canal within the WIP water conveyance system. The project site is located two miles southwest of Harrah, Washington, approximately one-half mile southwest of the Harrah Drain Road and McDonald Road intersection. At the project location, the irrigation canal undergoes an approximately 20 foot (ft) elevation drop (Drop 4). To increase the electrical generation potential at Drop 4, a potential increase in drop height by 2 to 4 ft may occur. This can be accomplished by raising the head gate on the spillway or potentially backfilling select portions of the upstream and downstream canal banks to facilitate the increase in static water level of the Main Canal. As a portion of increase in drop height, approximately 50 cubic feet per second (cfs) of water that is currently being diverted into Harrah Drain at an existing diversion located north of Harrah, may remain in the Main Canal. The water may remain in the Main Canal for a distance of approximately two miles before being diverted into Harrah Drain at a location approximately 1,700 ft southeast of Drop 4.

The project will involve construction of a small generator house, inlet located upstream of the existing spillway, outlet located downstream of the existing spillway, electrical substation adjacent to the generator house, an approximately one-quarter mile of overhead transmission line extending from the generator house to Harrah Drain Road, and a downstream water diversion structure. Temporary construction easements on adjacent private property may be required for construction staging and materials laydown areas. Project design was developed by Yakama Power (YP) staff and through consultation with electrical and mechanical engineers. The project is funded by an approximately $1,100,000 United States Department of Energy (DOE) federal grant with a matching contribution of $1,100,000 provided by YN in available funding or in-kind materials and service. Upon project completion, the Drop 4 hydroelectric system would be owned by YN and operated by YP.

Power generation revenue in excess of operations costs would be directed back to WIP as a potential funding source for differed maintenance and capital improvement projects. The proposed project is funded by a federal grant with a matching contribution provided by YN.

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1.0 INTRODUCTION

Compliance with the *National Environmental Policy Act* [42 *United States Code* (U.S.C.) 4321 *et seq*.; NEPA] of 1969, the Council on Environmental Quality (CEQ) NEPA regulations [40 *Code of Federal Regulations* (CFR), Parts 1500 to 1508], is implemented by the United States (US) Department of the Interior (DOI) Bureau of Indian Affairs (BIA), through Part 516 of their Environmental Quality Programs, and by the US Department of Energy (DOE) NEPA implementing procedures (10 CFR Part 1021). These regulations require that Federal agencies consider the potential environmental impacts of a Proposed Action before making a decision to implement that Action. This requirement applies to decisions about whether to provide Federal financial assistance to government and private entities. The determination that the BIA Yakama Agency would act as the NEPA-Lead Agency and DOE would act as the Cooperating Agency was identified in DOE correspondence dated August 13, 2010. Refer to Appendix A for correspondence associated with this Environmental Assessment (EA).

The BIA, which operates under the US DOI, is, among other responsibilities, charged with engaging in a rigorous Interdisciplinary Team (IDT) approach to ensure that adequate identification and consideration of a wide variety of environmental factors and considerations inherent in NEPA are included early in the project initiation and scoping process. The BIA Environmental Coordinator, Activities Resource Specialists, and other Tribal members comprise the IDT. As a portion of the EA scoping process, the IDT reviewed project planning reports, analyzed alternate locations, completed consultations, and coordinated with regulatory agencies to identify issues that could be eliminated from further EA analysis and those issues that required detailed analysis in the final EA.

This EA fulfills regulatory agency obligations under NEPA and provides decision-makers with the information needed to make an informed decision about the construction and operation of the proposed approximately one megawatt of supplemental hydroelectric power project. This EA evaluates the potential individual and cumulative impacts of the proposed project. For purposes of comparison, this EA also evaluates the impacts that could occur if the project was not completed (the No-Action Alternative). Other alternatives considered were eliminated during the EA scoping phase (see sections 1.1 and 1.4). No other action alternatives are analyzed in this EA.

1.1 THE PROPOSED ACTION BACKGROUND

The Confederated Tribes and Bands of the Yakama Nation (YN) Reservation are located on approximately 1.4 million acres of ancestral grounds in south central Washington State, predominately on the east slope of the Cascade Mountain range. Of the approximately 1.4 million acres, about 600,000 acres are forested, about 400,000 acres are rangelands, and about 400,000 acres are a mix of agriculture, rural, and city residential homes.

The Wapato Irrigation Project (WIP), constructed and operated by the DOI BIA, has supplied irrigation water since 1904 to agricultural land within the Yakama Reservation. Provisions for irrigation water to lands within the bounds of the YN boundaries were presented in Senate Bill 6693 dated May 6, 1912. Refer to Appendix B for a copy of Senate Bill 6693. By 1920, WIP was identified in the City of Wapato's promotional material as a premiere feature of the area. The

WIP has two diversion dams, five pumping stations, two power plants, approximately 765 miles of primary canal system, and approximately 312 miles of laterals and drainage canals. The screening measures in place to prevent salmonid fishes from entering the canal are discussed in the report titled *U.S. Bureau of Indian Affairs Wapato Irrigation Project Biological Assessment Wapato Irrigation project Operations* (Wapato Project BA), dated march 2003 and revised March 2009, prepared by Eco-Northwest of Selah, Washington. The Wapato Project BA was submitted to the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (Fisheries) in 2009.

From inception, the gravity flow WIP system was designed to incorporate low-head power generation facilities at several strategic elevation drops constructed within the system. Initially, the power generated from the two 1930s constructed low-head power generation facilities offset the minor power consumption needs of WIP associated with water pumping. Since initial construction, the amount of irrigated land within the Yakama Reservation, volume of water, pumping power required, need for more efficient irrigation methods, and water conservation measures have increased. Concurrently, the WIP infrastructure has aged with select components nearing end of engineering life.

The Public Utility Regulatory Policies Act of 1978, and the Energy Policy Act of 1992, established the deregulation of the electricity industry. The YN General Council gave approval to the Tribal Council to research the opportunities in the electricity industry (General Council Resolution GC04-98). The Bonneville Power Administration (BPA) recognized the YN as a public body or cooperative, opening the possibility for the YN to form a tribal utility. After several years of planning and inter-governmental negotiations, Yakama Power (YP) was established as a not-for-profit utility. Yakama Power's mission is to provide affordable and reliable electricity that will enhance the quality of life for its consumers and provide a stable, safe and competitive work environment for its employees. Consistent with tribal philosophy, YP intends to take only what is needed from natural resources to generate electricity. Yakama Power continues to evaluate wind, water, sun, biomass, and geo-thermal as potential sources for electricity. Yakama Power began supplying electrical energy to several tribally operated facilities in May 2006. Ultimately, YP plans to serve the approximately 15,000 people residing on the 1.4 million acres of the Yakama Reservation.

Generating renewable energy and creating efficiencies with the WIP canals, pump houses, power lines, and serving the land owners are the goals of the YN, BIA, and YP. In 1990, WIP and the United Stated Bureau of Reclamation (USBR), under a service agreement, completed an inspection of WIP generation plants and pumping facilities to determine the condition of equipment and structures with the intent of providing recommendations for upgrade, repair or replacement. The report titled *Assessment of Hydroelectric Generation and Transmission Facilities*; dated December 28, 1990 summarized the WIP and USBR findings.

In 1994, YN commissioned Harza Engineers (Harza) to complete a *Feasibility Study to Upgrade Hydroelectric Operations of Wapato Irrigation Project* (1994 Harza), and along with WIP, began evaluating the feasibility of retrofitting the existing two power generation facilities located within the irrigation system to increase efficiency and power output.

Subsequently, YP and WIP continued to evaluate the feasibility of retrofitting the two existing power generation facilities and constructing additional low-head power generation facilities within the existing system. The intention of the feasibility studies was to provide a revenue source that could fund improvements to the WIP and benefit WIP stakeholders. Since the inception of the feasibility studies, the previously constructed hydropower facilities at Drop 2 and Drop 3 have been retrofitted and producing electricity during the irrigation season. The repair and retrofitting feasibility assessment of the Drop 1 facility identified engineering and reconstruction challenges that in the short term are not feasible, but remains a viable long term potential project. The feasibility assessment of new hydropower facility construction identified three alternate locations within the WIP system for potential power generation: Drain 2, Harrah Drain, and Drop 4. However, Drain 2 and Harrah Drain were eliminated from further evaluation due to the cost and complexity of construction, environmental consequences, and lower power generation potential. The study concluded that the Drop 4 location was the most viable location within the existing canal system for construction of a new hydropower facility.

1.2 THE SUMMARY OF PROPOSED ACTION

The YN Department of Natural Resources (DNR) proposes to install an inline turbine within the existing WIP right-of-way (ROW) at the Drop 4 location on the WIP Main Canal to generate approximately one megawatt of supplemental hydroelectric power. The DOE proposes to provide federal funding to the YN for design, acquisition, installation, testing and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The YN will contribution matching funding or in-kind materials and service. Power generation revenue in excess of operating costs would be directed to WIP to fund differed maintenance or capital improvement projects. Refer to Figure 1 for site location.

The Drop 4 project site is located two miles southwest of the Town of Harrah (Harrah), Washington, approximately one-half mile southwest of the intersections of Harrah Drain Road and McDonald Road where the irrigation Main Canal undergoes an approximately 20 foot (ft) elevation drop through an existing concrete spillway feature. See Figure 2 for WIP ROW easements associated with the Drop 4 location. The spillway is exhibiting normal wear and tear as identified as part of WIP's deferred maintenance, and will need addressed accordingly by WIP. Routing water through a power generation facility inlet located slightly upstream of the existing spillway could potentially reduce the amount of wear and tear on the existing concrete feature.

To increase the power generation potential at Drop 4, an increase in drop height by 2 to 4 ft is also being considered. This could be accomplished by raising the elevation of the spillway head gate or potentially backfilling select portions of the upstream and downstream canal banks to facilitate an increase in static water level. As a portion of the potential increase in drop height and upstream static water level increase, approximately 50 cubic feet per second (cfs) of water currently diverted from upstream sources into Harrah Drain may be retained or diverted into the Main Canal north of Harrah at an existing diversion. This approximately 50 cfs of water would then be diverted from the Main Canal and into Harrah Drain south of the Drop 4 location where the Main Canal and Harrah Drain cross.

The project will involve construction of a small generator house, substation, inlet, outlet, approximately one-third mile of overhead transmission line extending between Harrah Drain road and the newly constructed generator house, and a downstream diversion structure capable of routing water into Harrah Drain. The project will be constructed within the WIP ROW (see Figure 2) and will incorporate YN required mitigation measures and best management practice (BMP) as a portion of the proposed action. Temporary construction easements on adjacent private property may be required for construction staging and materials laydown areas. Refer to Figure 3 for location of the proposed project area inclusive of the temporary construction staging and materials lay down area. Project design was developed by YP staff and through consultation with electrical and mechanical engineers. Upon completion of the project, the Drop 4 hydroelectric system would be owned by YN and operated by YP. Refer Appendix C for the site plan, top view, and side elevation drawings of the proposed project.

This project will not interfere with the primary purpose of WIP, which is to supply irrigation to approximately 146,000 acres of Yakama Reservation land. The project does not change or modify WIP water withdrawal or return practices associated with the Yakima Basin. There are no proposed significant changes or modifications to WIP water withdrawal or return practices within the foreseeable future. For purposes of this EA, the foreseeable future is defined as the next 5 to 10 years.

1.3 NEED AND PURPOSE FOR THE PROJECT

One of YN's revenue sources is the operation or leasing of irrigated lands for crop production. The agriculture industry generates over $200 million of gross revenues from lands serviced by WIP. Cost effective water delivery to irrigated lands within the Yakama Reservation is critical to the continued viability of profitable crop production within the regions arid climate. In a desire to deliver irrigation water at a rate conducive to continued economically viable crop production, the WIP has allocated funds for operation and necessary repairs only, deferring the cost of less critical maintenance projects and infrastructure improvements to some unspecified future date when additional revenue becomes available. The WIP infrastructure, predominately constructed nearly 80 years ago, has select features that are nearing end of life. Additionally, the changing irrigation practices and expanded water delivery area require WIP to design system modifications and efficiencies that better fit the current needs of users. In order to fund deferred maintenance requirements and institute system modifications for the existing irrigation delivery system without significantly impacting water delivery costs, WIP needs to develop additional revenue sources.

The BIA and DOE need to ensure that Federal funds are used for activities that meet congressional statutory goals for fund allocation, such as improving energy efficiency, reducing dependence on foreign oil, decreasing energy consumption, creating and retaining jobs, and promoting renewable energy.

The BIA Division of Energy and Mineral Development (DEMD) assists Tribes with the exploration, development, and management of energy and mineral resources to create sustainable economies for reservations; generate new jobs and expand entrepreneurship and self-sufficiency.

In compliance with the statutory authority of Title V of the Energy Policy Act (EPAct) 2005, DOE's Tribal Energy Program is promoting the large-scale installation of renewable energy systems (1 Megawatt or more) in Indian Country in the lower 48 States. The hydroelectric facility proposed for construction would meet the requirements of Title V of EPAct by promoting Indian tribal energy development and enhancing to strengthening Indian tribal energy and economic infrastructure.

The purpose of the proposed project is to utilize the existing WIP systems low-head/low-power potential with new construction to generate approximately one megawatt of supplemental hydroelectric power at the WIPs existing Drop 4 location thereby creating a positive seasonal revenue source that can be reinvested back into WIP's aging infrastructure.

The proposed project will assist YN in meeting one of the economic development strategy goals for hydroelectric power development that will create new jobs, improve and increase rural electrification, attract private investments, and generate supplemental electricity within the existing transmission system thereby assisting in reducing the strain on the Alfalfa Substation. The DOE is proposing to provide federal funding ($1,100,000) to YN for the design, construction, and operation of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power.

Providing funding to the YN would partially satisfy the need of both BIA DEMD and DOE Tribal Energy Program in assisting American Indian Tribes in developing, promoting, implementing, and managing energy efficiency and conservation projects and programs that:

- Reduce fossil fuel emissions;
- Reduce the total energy use of the eligible entities;
- Improve energy efficiency in the transportation, building, and other appropriate sectors;
- Create and retain jobs.

1.4 PROJECT PLANNING AND ENVIRONMENTAL ASSESSMENT SCOPING

The following sections provide an overview of the project scope development, identification of potential issues, and resultant conclusions regarding issues eliminated from additional detailed study.

1.4.1 Project Planning

In April of 2009, the YN Engineering Program (YNEP) analyzed the WIP system and summarized findings in a memorandum identified as *Additional 1MW on WIP* (2009 YNEP). The 2009 YNEP memorandum's intent was to identify an existing location within the existing WIP system that had the potential to produce approximately one megawatt of supplemental hydroelectric power within the stated constraints of minimal environmental impact and proximity to existing WIP transmission lines. The YNEP identified the Main Canal Drain 2, Harrah Drain, and Main Canal Drop 4 sites as worthy for further consideration. Following is a summary of the assessment findings and conclusions.

Table 1: 2009 YNEP Summary of Potential Hydropower Production

Feature	Drain 2	Harrah Drain	Drop 4
Flow cfs[1] July 2008	150	150	431
Head (ft of drop)	12	18	21
Potential Power Production, kW[2]	153	229	767

[1] cfs means cubic ft per second

[2] kW means kilowatts

The 2009 YNEP memorandum identified the potential presence of steelhead in Harrah Drain as a potential environmental impact that hydropower construction planning would need to take into consideration. Additionally, the 2009 YNEP memorandum indicated that the flume ramp associated with Drain 2 would need to be lowered or replaced with an acoustic doppler to achieve the drops presented in Table 1. Based on the factors valuated, the YNEP concluded that the Drop 4 site provided the most potential for further hydropower generation assessment. See Appendix D for a copy of the YNEP Report.

In August of 2009, HDR Engineering, Inc. (HDR) completed a preliminary feasibility study identified as *Drop 4 Feasibility Study – Preliminary* (2009 HDR) and conceptual design for the potential construction of a small hydroelectric project on WIP's system. See Appendix E for a copy of the 2009 HDR report. The 2009 HDR report took into consideration findings from the 1994 Harza report and identified the Drop 4 location as warranting further evaluation for hydropower generation.

The 2009 HDR report identified the seasonal generation timeframe as being between April and October for purposes of economic feasibility evaluation. HDR developed a conceptual design similar to the previously constructed Drop 2 and Drop 3 facilities for purposes of developing preliminary construction cost estimates, and completed a review of potential licensing and permitting requirements. The 2009 HDR report presumed that water currently being diverted into Harrah Drain downstream of Drop 3 would be retained or routed into the Main Canal and then diverted back into Harrah Drain downstream of Drop 4 and would result in an approximately 2 ft increase in hydropower facility head intake. The assessment by HDR indicated that there was sufficient freeboard upstream to contain the increased flow and static water elevation; however, downstream canal banks may need to be raised to facilitate the additional through flow.

According to the HDR Report, YNEP had reported that the diversion of Harrah Drain water would not interfere with any of the current consumptive water uses of the irrigation project, if water were diverted to Harrah Drain downstream of Drop 4. However, the HDR Report did not take into consideration any impact to the potential presence of steelhead in Harrah Drain.

As reported by HDR, the ROW extends 55 ft on either side of the canal centerline (110 ft total ROW). The canal width near the Drop 4 location is approximately 30 ft in width, providing approximately 40 ft on either side of the canal for powerhouse construction. HDR reported that construction could feasibly be contained within the ROW, however, a temporary easement may be needed for additional working room and construction lay down areas. The 2009 HDR report also identified the 37.5 kilovolt (kV) line trending parallel with Harrah Drain Road

approximately one-quarter of a mile east of the Drop 4 location as being owned by WIP and presumed to have available capacity to transmit generated electricity.

HDR's review of potential permits suggests that while under the Federal Power Act (FPA) the Federal Energy Regulatory Commission (FERC) has jurisdiction over new hydroelectric projects. The project as proposed will likely qualify for an application for exemption. HDR also indicated that the project would likely need to file with the US Environmental Protection Agency (EPA) for a Clean Water Act (CWA) Section 401 Certification (401 C). HDR concluded that no additional power sales or interconnection agreements are necessary due to the 2008 power sales agreement between YN and the BPA.

While HDR acknowledged that alternate designs should be considered, based on HDR's preliminary design conservative construction costs were estimated at $4,500,000, engineering costs at $450,000, licensing and permitting at $135,000. Based on a power purchase agreement of $0.06 per kilowatt-hour (kWh), HDR estimated that the project could produce revenue of $168,000 per year and predicted at 30-year return on capital investment. Refer to Appendix E for a copy of the HDR Report.

In 2010, the YN retained NAES Power Contractors (NAES) to assess the soils surrounding the project area to facilitate further development of hydropower facility conceptual designs and construction cost estimate. Knight Piesold and Company (KPC) subcontracted to NAES to complete the geotechnical investigation of the proposed Drop 4 project location.

A *Cultural Resources Survey Report of Yakama Power Drop 4 Phase I* was completed by the YN Cultural Resources Program in January 2011 (2011 Cultural Survey), prior to KPC completing the geotechnical work. Subsequently, in January 2011, the YN Cultural Committee approved the Cultural Report for the investigation phase of the proposed project. See Appendix F for a copy of the Cultural Committee Action approval and the associated YP request for cultural resource and archaeological services. The YN Cultural Resource Program issued a subsequent report titled *Cultural Resources Monitoring Report for the Yakama Power Drop 4 Phase I Soil Test Excavations*, authored by Dave M. Woody, M.S., YN Archeologist and dated March 2011 (2011 Cultural Monitoring), that summarized the observation of excavation monitoring by YN Cultural Resource Program representatives.

The final geotechnical report titled *Yakama Power – Drop 4 Powerhouse Addition Test Pit Program,* was published by KPC February 17, 2012 (2012 KPC). Interview with representatives from the YN, YP, and Pacific Energy Network, Inc. (PEN) selected engineering firm that provided schematic design, indicate that the project site soils will support the planned hydropower facility and that existing canal bank construction will support the future potential 2 to 4 ft elevation increase of the upstream backwater.

Based on the geotechnical information, construction budget limitations, and other site-specific criteria, PEN revised the HDR conceptual design consisting of a vertical Kaplan turbine to a low profile inline horizontal turbine, resulting in a schematic design that is slightly different from the HDR conceptual design. The revised schematic design anticipates inflow occurring along the east side of the canal and upstream from the existing spillway, and outflow into the north side of

the canal below the spillway. Additionally, the revised PEN schematic design utilizes a horizontal turbine that is less costly to manufacture, and requires a smaller footprint for generator house construction than the HDR conceptual design. For purposes of this EA and construction feasibility review PEN indicated that the engineered life of the inline turbine could be assessed at 50 years. Preliminary construction estimates suggest that construction could be achieved within the $2,200,000 budget. Based on the PEN design evaluation, the vertical turbine design was eliminated from further study and the horizontal turbine was carried forward for further evaluation. See Appendix C for a copy of the site plan, top view, and side view of the Drop 4 hydropower facility.

1.4.2 Review of Issues

The US statutes and executive orders identified in Section 6.0 were evaluated early in the EA scoping process concurrent with issues identified through the BIA IDT process. The purpose of review was to identify potential regulatory, statutory, or other issues early in the EA process that:

1. Are not applicable and therefore could be eliminated from further environmental analysis.
2. Had only a minor or indirect consequence not requiring extensive environmental analysis and typically mitigated through compliance with current regulation or by industry standard BMP.
3. Require additional environmental analysis to determine potential environmental consequences and, if required, mitigation.

A summary of the initial US statutory and executive order review was initially included in the project scoping document provided to the BIA IDT prior to the October 19, 2010 IDT meeting, and October 27, 2010 site walk. The initial US statutes and executive order review has been subsequently updated to include additional information received through the EA process. Of the 13 initial US statutes and executive orders reviewed, seven were determined not applicable to the project and therefore, eliminated from further environmental analysis. See Section 1.4.3 for additional discussion.

In addition to BIA IDT members, Mr. Kelly, the resident at 1770 Harrah Drain Road, in Harrah, Washington, was invited and participated in the October 27, 2010 site walk. Mr. Kelly's residence is located approximately 250 feet east of the proposed project. During the site walk, Mr. Kelly asked questions about the proposed project and requested that hard copies of draft and final EA be mailed to his residence. In addition to Mr. Kelly, comments were received from BIA, IDT members, and DOE during the EA scoping and document drafting process.

In addition to potential issues identified by the statutory review, the following two additional potential issues were identified during the EA scoping process:

1. Potential impact to presumed steelhead presence in Harrah Drain
2. Geotechnical assessment of soils concerning planned structure design and existing canal system stability

Resource reports providing comments on identified issues and concern were received from the following:

1. YN Fisheries Resource Management, *No effect determination for Drop 4 hydropower project on Steelhead,* December 20, 2011
2. YN Wildlife Resource Management Program, *Drop 4 project – Wildlife Report,* January 4, 2012
3. YN Cultural Resource Program, *Cultural Resources Survey Report of Yakama Power Drop 4 Phase I,* January 2011
4. YN Cultural Resource Program, *Cultural Resources monitoring Report for the Yakama power Drop 4 Phase I Soil Test Excavations,* March 2011
5. YN Fisheries Resource Management, *Fisheries comments on invasive species mitigation in concern to Drop 4,* May 30, 2012

Information provided in resource reports and responses to received comments have been incorporated into this Final EA. Refer to Appendix A for correspondence and Appendix F for non-proprietary resources reports.

1.4.3 Issues Eliminated from Detailed Study

The following items were initially identified as potential issues during the statutory review, EA scoping, site walk and comment review process. However, upon review and subsequent initial investigation, these issues were determined not to present a potential significant environmental impact or were not applicable to the proposed project and were therefore eliminated from detailed study and further environmental analysis. The initial findings are summarized in the table titled *Comparison Matrix: Issues Eliminated from Detailed Study* located in Appendix G.

1. Floodplain Management Act - See Appendix H
2. Coastal Zone Management Act – See Appendix I
3. Sole Source Aquifers Act – See Appendix J
4. Wild and Scenic Rivers Act – See Appendix K
5. Farmland Protection Act – See Appendix L
6. Environmental Justice – See Appendix M
7. Project Siting Near Hazardous Operations – See Appendix N

1.4.4 Issues Identified with Minor Consequence

The following items were initially identified as potential issues during the statutory review, EA scoping, site walk and comment review process. However, upon review and subsequent initial investigation these issues were determined to have only a minor or indirect consequence that did not require extensive environmental analysis, and are typically best mitigated through compliance with current regulation or BMP implementation, and industry standard practice and were therefore not studied in detail. The findings summarized in the table titled *Comparison Matrix: Issues Identified with Minor Consequence* is located in Appendix O. The minor mitigation measures are also discussed in Section 5.0. Following are the issues reviewed and determined to have only a minor or indirect consequence:

1. **Air Quality**. The proposed project is within an air quality attainment area (see Appendix P). Potential short-term temporary impacts to air quality could include dust from ground disturbing activities and pollutant emissions from construction tasks and equipment.

Temporary short-term dust and equipment emissions are consistent in the concentration and duration of agriculture practices common to the region and do not create a significant direct or indirect effect. Prior to commencement of construction, a site specific Federal Air Rule for Reservation (FARR) plan will be developed prior to construction for implementation during construction. Dust mitigation will be additionally addressed under Soil Management requirements discussed below.

2. **Soils Management**. Of the approximately 1.6 acres identified within the proposed project area, ground disturbance will occur to approximately 0.125 acres (5,200 square feet [sf]) within the WIP ROW where the inlet, generator house, substation, outlet and 4 to 6 transmission line poles will be constructed. See Figure 3 for the location of the soil disturbance area within the project area and Appendix L for the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) *Custom Soil Resource Report for YN Irrigated Area, Washington, Part of Yakima County WIP Drop 4 Vicinity*. The ROW predominately slopes to the east and away from the canal. The 5,200 sf of ground disturbance represents approximately 0.003 percent (%) of WIPs ROW associated with the main canal system and 0.00003% of YN Reservation agriculture, rural, and city residential mixed acreage. The remaining approximately 1.5 acres of the project area are surfaced with gravel (access roads) or grasses and low shrubs common to the region (predominately on adjacent private property), that can be mowed prior to use for construction staging and materials lay down. With the exception of construction occurring within the ROW, no additional ground disturbance will occur within the project area. Prior to commencement of construction and consistent with EPA regulation, a site specific Stormwater Pollution Prevention Plan (SWPPP), inclusive of post construction exposed ground surface restoration, will be developed and implemented for the construction task.
3. **Wetlands**. There are no designated wetlands at the project site or near the immediate vicinity of the project site. The Yakima County Geographical Information System (GIS) Land Information Portal (LIP) does not identify the Main Canal as a wetland; rather, the Main Canal is designated as a manmade steam. A portion of the Main Canal adjacent to the spillway is lined with concrete. Other portions of the Main Canal are unlined (surfaced with native soils). The USFW Wetlands Map shows a freshwater emergent wetland approximately one mile west of the project site. See Appendix H pertinent FEMA Floodpland, USFW wetlands, and Yakima County GIS maps showing wetlands and manmade canal locations. By design, both the Main Canal and Harrah Drain contain seasonal irrigation water. As a result, limited vegetation and potential habitat is present along the margin of these features. Waterborne invasive species and noxious weeds were identified as potential issues associated with manmade streams. See Section 3.4, 4.4 and 5.4 for additional discussions associated with waterborne invasive species and noxious weeds.
4. **Noise Control**. Ambient noise levels during hydroelectric power generation are expected to be reduced because of this project. The selected inline turbine and generator will be housed in an insulated generator house that is partially located below finished grade. The sound of water passing through a below grade penstock and turbine is expected to be lower decibels than the sound of water falling approximately 20 ft over a concrete structure before impacting water or concrete located at the lower elevation. However, short-term temporary increase in noise generation will occur during select construction

activities. Short-term temporary construction noise is anticipated to be within the range common to agriculture crop production procedures common to the region and does not create a significant direct or indirect effect. Construction noise generating activities will be limited to the extent feasible and will be restricted to daylight hours.

5. **Hazardous Materials**: Neither EPA's Enviromapper or Ecology Facility Site Atlas (FSA) identified any locations of toxic or hazardous materials, or known locations of contamination at or near the immediate vicinity of the proposed project. Refer to Appendix N for EPA Enviromapper and Ecology FSA maps. Environmentally compatible products have been selected by YP for Drop 4 operational use consistent with product selection for the currently operation Drop 2 and Drop 3 hydropower facilities. The inline turbine design is such that there is no direct contact between irrigation water and maintenance fluid containing mechanisms. Minimal quantities of surplus materials will be stored onsite. Use and storage of hazardous materials does not create a significant direct or indirect effect. Spill Prevention, Control, and Countermeasure (SPCC) BMPs are designed into the project and will be implemented as a portion of standard operating procedures.

1.4.5 Issues Studied in Detail

The following summary of issues and concerns were identified through the statutory review, IDT scoping process, resource reports, and received comments as appropriate considerations requiring additional study and environmental analysis during the EA process. Following is a summary of identified issues:

1. Cultural and Archeological Resources – See Section 3.2, 4.2 and 5.2
2. Threatened or Endangered Species and Potential Presence of Fish – See Sections 3.3, 4.3 and 5.3
3. Waterborne Invasive Species and Noxious Weeds – See Sections 3.4, 4.4 and 5.4
4. Design Considerations – See Sections 3.5, 4.5 and 5.5
5. Intentional Destructive Acts – See Sections 3.6, 4.6 and 5.6
6. Permit Requirements – See Sections 3.7, 4.7 and 5.7
7. Construction Implementation – See Sections 3.8, 4.8 and 5.8

Refer to Sections 3.0, 4.0 and 5.0 for additional study details associated with these issues. Refer to the table titled *Comparison Matrix: Issues Studied in Detail* located in Appendix Q.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 DETAILED DESCRIPTION OF ALTERNATIVES

During the project planning and scoping phase of this EA, three alternate locations (Drain 2, Harrah Drain and Drop 4), and two turbine designs (vertical and inline horizontal) were considered for the potential hydroelectric power construction site. Two of the alternate sites (Drain 2 and Harrah Drain) were eliminated early in the EA scoping process due to increased potential environmental impact, increased potential construction costs, and lower potential generated revenue. The vertical turbine design was eliminated due to the increased cost of

construction. See Section 1.4.1 for additional discussion on alternate locations and turbine designs considered and eliminated from further analysis during the EA scoping process.

Under this EA, the two alternatives carried forward for EA analysis are Alternative A – No Action and Alternative B – Proposed Project.

2.1.1 Alternative A - No Action

Under this alternative, the power generation facility at the Drop 4 location would not be constructed and DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The proposed action site would remain an elevation spillway and wear and tear on the existing spillway would continue at the present rate. A new potential seasonal (April through October) revenue source would not be created and WIP would not have additional funding available to reinvest back into WIPs aging infrastructure. Approximately 2,800,000-kilowatt hours (kWh) would not be produced within the existing transmission system and the BPA Alfalfa substation would continue to operate in overheated conditions during the summer peak energy demand months. Additionally, YN would not in the short term be able to meet one of their economic development strategy goals for hydroelectric power development to create new jobs, improve and increase rural electrification, and attract private investments.

2.1.2 Alternative B – Proposed Project

Under this alternative, DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The power generation facility would be constructed within the WIP ROW, wear and tear on the existing spillway would be reduced, and funding provided through the DOE would be received. A new potential positive seasonal (approximately April through October) revenue source would be created to be reinvested back into WIP's aging infrastructure and a seasonal source of electricity would be available within the existing transmission system to meet the summer peak demand and reduce the need to continue to operate the BPAs Alfalfa substation in an overheated state. The engineered life of the hydroelectric facility is estimated at 50 years. This project will not interfere with the primary purpose of WIP, which is to supply irrigation to approximately 146,000 areas of Yakama Reservation land, including operators sourced from Harrah Drain. The project does not change or modify WIP's water withdrawal or irrigation water return practices associated with the Yakima River Basin. The proposed project does not occur in fish bearing waters. The YN Fisheries Resource Management (FRM) program has reviewed the available data and concluded that the project, including the retention of approximately 50 cfs of water in the Main Canal until diversion into Harrah Drain downstream of Drop 4, will have no effect on Steelhead within the Yakima Basin. Additionally, YN would in the short term be able to meet one of their economic development strategy goals for hydroelectric power development as the project will create new jobs, improve and increase rural electrification, and attract private investments. See Figure 1 for the project location and Figure 2 for the WIP ROW.

The proposed power generation facility would include construction of the following primary components and associated ancillary features:

- **A water inlet**. The inlet will be located immediately upstream of the Drop 4 spillway on the east face of the WIP Main Canal and will result in an approximately 20 ft by 18 ft opening in the canal bank that will be constructed with a combination of reinforced concrete and metal. The inlet would extend approximately 19 ft southeastwards towards the turbine housed in the generator house and will allow a controlled amount of irrigation water to pass through the turbine resulting in generation of electricity rather than passage over the spillway resulting in no power generation.
- **A small generator house**. The generator house will have an approximate footprint of 30 ft by 40 ft with a substantial portion of the concrete footings and foundations situated below ground surface. The visible elevation portion of the generator house will be approximately 28 ft with the upper elevation of the retaining wall commencing at the approximate upper elevation of the existing canal bank. The generator house will reside against the southeastern face of the canal embankment and will likely not be visible as viewed from either of the residents located approximately 575 ft to the northwest and northeast. The generator house will house the inline turbine, governor, generator and ancillary materials and equipment. The generator house exterior building materials will likely consist of metal, wood or concrete similar in color and style with other agricultural buildings located near the vicinity.
- **The inline turbine**. The inline turbine will be capable of generating approximately one megawatt of supplemental hydroelectric power that will be capable of producing approximately $168,000 per year of seasonal revenue with a predicted 30-year return on capital investment. The inline turbine is designed so irrigation water is not in direct contact with fluid containing components.
- **The substation**. The substation will be located on an approximately 11 ft by 17 ft fenced concrete pad situated northeast and adjacent to the generator house. The transformers would contain a biodegradable environmentally friendly dielectric fluid and would reside within a curbed concrete pad designed for spill containment.
- **The outlet and tailrace**. The outlet will be constructed southeast of the generator building. The outlet and tailrace will extend through the northeast face of the Main Canal located below the spillway. The outlet feature will be approximately 20 ft by 18 ft in dimension and would extend approximately 80 ft from the generator house and within the WIP ROW to the northeast face of the Main Canal embankment.
- **Downstream weir**. A manual water flow weir is located downstream of Drop 4 spillway. As a portion of construction, the downstream weir may be relocated or converted to a remote irrigation water monitoring system.
- **The transmission line**. Four to six additional power poles and transmission wires will be installed adjacent to the shared Drop 4 and east adjacent resident gravel surfaced access road and will connect the newly constructed transformers within the substation with the existing 34.5 kV line present at Harrah Drain Road. The new overhead transmission line will extend approximately 1,700 ft eastward from the newly constructed substation and connecting to the existing transmission line paralleling Harrah Drain road. For this project, poles have been designed according to the Avian Protection Plan Guidelines (APPG; APLIC, USFWS 2005) to further avoid or reduce threats to raptors in the area.

Specifically, the service lines (phases) are spaced at least 60 inches apart to prevent electrical contact from phase to phase. At each pole, where there are supporting structures beneath the distributions, a cover will be used on the phases that are closest to the pole so that there cannot be any phase to phase contact. To minimize collision issues, the APPG suggest the use of marker balls, swinging markers, bird flight diverts or other similar devices to increase the visibility of overhead wires in areas of high bird use. Given the short distance (approximately 1,700 ft) of new transmission line, installation of the new transmission line is not anticipated to present a significant direct or indirect effect.

- **Increase in headwater elevation**. To increase the power generation potential at Drop 4, an increase in headwater height by 2 to 4 ft in being considered. This could be accomplished by increasing the spillway overflow height or potentially backfilling select portions of the upstream and downstream canal banks to facilitate an increase in static water level. Should a turbine outage occur, the additional headwater would bypass the turbine inlet and flow over the spillway into the lower canal before the approximately 50 cfs of water would be diverted into Harrah Drain, or the source water upstream would be diverted from the Main Canal into Harrah Drain.
- **Downstream water diversion**. As a portion of increase in headwater height and upstream static water level increase, approximately 50 cfs of water currently being diverted into Harrah Drain may be retained in the Main Canal at a location north of Harrah at an existing feature designed for this purpose. The retained approximately 50 cfs of water would be diverted back into Harrah Drain south of Drop 4 where the Main Canal and Harrah Drain cross approximately 1,700 feet east of the proposed project. The potential 50 cfs increase represents an approximately 10.4 % increase in the Main Canal flow. The distance between the existing upstream directional water diversion feature and the proposed downstream diversion is approximately two miles. Wapato Irrigation Project indicated that there are no operators within this two-mile section that would be affected by a flow change of 50 cfs. At the proposed downstream diversion location, the WIP Main Canal crosses over Harrah Drain at the intersection with Harrah Drain Road. At the crossover location, a small pump or gravity flow gate system would be installed that allowed water from the WIP Main Canal to be diverted back into Harrah Drain.
- **Temporary construction and material lay down areas**. Temporary areas for construction staging and materials lay down will be located east and adjacent to the proposed project. According to the Yakima County GIS Washington Land Portal web site the proposed temporary construction staging and lay down area is private land owned by K Green Family Land Trust. In conversations with YP, Mr. Green has indicated that he is agreeable with the proposed temporary use of a portion of his property for construction staging and materials laydown, provided that a gate be constructed near the entry to his driveway to preclude traffic and to help separate the work site from his residence.
- **Employment.** The project will result in the temporary employment of approximately 3 design and inspection professionals, and approximately 20 local workers spanning 8 separate trades during the estimated 8 to 9 month construction project. At the conclusion of the project, approximately one additional permanent full time equivalent employee and one additional part time employee will be employed by YP because of this project.
- **Rural Electrification Improvement**. The project will result in the seasonal generation (April to October) of approximately 2,800,000 kWh of electricity that can be supplied through the existing YP owned transmission line system, assisting in offsetting summer

peak electricity demands, and reducing the need to operate BPAs Alfalfa substation in overheated conditions that result from near maximum capacity usage over extended periods of time.

Project design was developed by YP staff and through consultation with electrical and mechanical engineers. Upon completion of the project, the Drop 4 hydroelectric system would be owned by YN and operated by YP. See Design Drawings located Appendix C for the site plan, top view and side elevation of the proposed project. Refer to Figure 3 for the Drop 4 project area usage. Refer to Table 2 in Section 2.2.3 for a comparison between alternatives.

2.2 COMPARISON OF ALTERNATIVES

2.2.1 Alternative A - No Action

Alternative A – No Action, would not meet the purpose or the need for the project. Under this alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. Because no construction would occur, this alternative would not create the potential to affect change to existing environmental resources.

2.2.2 Alternative B – Proposed Action

Alternative B – Proposed Action, meets the purpose and need for the project. Under this alternative DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The power generation facility, including the primary components identified in Section 2.1.2 and associated ancillary features at the Drop 4 location would be constructed. The wear and tear on the existing spillway reduced, a new source of electric supply within the existing transmission system would be created that would offset some of the summer peak demands, and a new seasonal positive revenue source would be created, between the approximate months of April and October. A new generator house, transformer pad, approximately one-quarter mile of transmission line, inlet (head gate) upstream of the existing spillway would be constructed and outlet (discharge point) downstream of the existing spillway would be constructed.

Additionally, approximately 50 cfs of water currently diverted from various upstream sources into Harrah Drain at a location downstream of Drop 3 would be retained or routed into the Main Canal. The water would be retained for an approximate distance of two miles and utilized for power generation purposes before being routed into Harrah Drain downstream of Drop 4.

2.2.3 Summation of Alternative Comparison

While specific topic comparisons between Alternate A – No Action and Alternate B – Proposed Action are discussed in detail throughout the body of the report in the pertinent sections, for ease

of reference the following table has been prepared as a compressed summation of the most apparent differences between the Alternatives.

Table 2: Alternative Comparison Summation

Topic	Alternative A – No Action	Alternative B – Proposed Action
Land use	Remain WIP ROW	Remain WIP ROW. Power generation facility will be constructed within the WIP ROW on the east side of the Main Canal with the inlet located upstream of the existing spillway and the tailrace flowing back into the main canal southeast of the spillway. The project has an estimated approximately 30 year payback on capital investment, and an engineered life of 50 years. The BIA does not have a land use plan for the YN; rather individual YN departments work in cooperation with BIA on various department land use plans. Representatives of the various YN departments involved in land use planning are members of the BIA IDT and were provided the opportunity to review and comment on the proposed project as a portion of the EA scoping, site walk, and subsequent comment process. Comments received during the EA scoping, site walk, and subsequent review process have been incorporated into the final EA. Refer to Appendix A for BIA correspondence related to land use.
Disturbed ground surface	None	Less than one-eighth of an acre of surface disturbance (approximately 5,200 sf) for construction and subsequent operation. An approximate additional one acre of adjacent private land utilized for temporary construction access, staging and materials laydown reserve. As a conservative measure, and to assist with a request for a cultural resource survey, the potential project area boundary was established with an approximate area of 1.6 acres, a subset of which is the 5,200 sf area of ground disturbance.
Disturbance to existing canal and spillway at Drop 4	None	No disturbance to existing spillway. Inlet and outlet features will be constructed upstream and downstream of the spillway feature. A non-irrigation season breach will occur on canal banks, estimated at approximately 20 ft by 20 ft, to facilitate construction at one upstream (inlet) and one downstream (outlet) location.
Downstream Weir for manual water flow measurements	None	The existing downstream weir will potentially be relocated or converted to a remote monitoring system.
Increase in hydropower Generation	None	Approximately 2,800,000 kWh per season (April to October) that will be used to alleviate peak demand at the Alfalfa Substation. Refer to Appendix E for power generation estimates.
Increase in revenue	None	Approximately $168,000 per season (April through October) with an estimated 30 year payback on capital investment will be generated. Refer to Appendix E for revenue estimates.

Topic	Alternative A – No Action	Alternative B – Proposed Action
Main Canal Flow	None	The Main Canal was estimated in 2008 to have a flow of 431 cfs. An increase of approximately 50 cfs (approximately 10.4% increase) may occur for a two mile section for a total estimated increased flow of 481 cfs.
Harrah Drain Flow	None	The 2008 estimated flow for Harrah Drain was 150 cfs. A decrease of approximately 50 cfs (approximately 33%) for a two mile section may occur in the future. Approximately 50 cfs will be returned to Harrah Drain approximately 1,700 ft below existing spillway two miles below the upstream diversion.
Harrah Drain Steelhead and Chinook	None	The YNFRM reviewed the potential for fish to be impacted by the proposed project and issued a **no effect** determination. The YNFRM decision was based on the fact that Steelhead Redds have not been identified in the affected portion of the project area for the last 10 years and the habitat available within the affected reach is extremely marginal. See Appendix F for YNFRM Resource Report.

3.0 AFFECTED ENVIRONMENT

3.1 EXISTING CONDITIONS

The Drop 4 project site is located two miles southwest of Harrah, Washington approximately 0.5 miles southwest of the intersection of Harrah Drain Road and McDonald Road where the WIP Main Canal undergoes an approximately 20 ft elevation drop via a concrete spillway. The Main Canal is a manmade irrigation water conveyance system constructed in the early 1900s consistent with provisions presented in Senate Bill 6693 dated May 6, 1912, for irrigation water to lands within the bounds of the YN boundaries. The flow velocity in the Main Canal near the vicinity of Drop 4 for was estimated in 2008 at 431 cfs. Refer to Figure 1 for the site location and Appendix R for photographs of the current site conditions.

The irrigation canal is lined with concrete for a short distance upstream and downstream of the spillway. The downstream concrete lined canal has a constructed weir, for water flow measurements, located approximately 400 ft below the Drop 4 spillway. The remaining portions of the Main Canal near the vicinity of Drop 4 are constructed of permeable native soils and gravels. According to the USDA NRCS *Custom soil Resource Report for YN Irrigated Area, Washington, part of Yakima County WIP Drop 4 Vicinity* (NRCS Custom Soil) report dated June 4, 2012 the vicinity soil types are well drained with a moderately high to high capacity of the most limiting layer to transmit water (Ksat of 0.57 to 1.98 inches per hour). During irrigation season the project vicinity soils in close proximity to the irrigation canal are saturated with irrigation water loss. Near the vicinity of lower canal elevation at the Drop 4 location, irrigation season groundwater levels are at nearly the same elevation as canal water elevation. The 2012 KPC report identified groundwater at approximately 15 feet below ground surface.

Property use near the immediate vicinity of the proposed project location is agriculture crop production and dry land native vegetation with a few rural residential properties. The closest residential property is located approximately 250 ft east and topographically downgradient of the

proposed project site. The next two closest residences are located approximately 575 ft northwest and southwest of the proposed project site and topographically at a similar elevation to the Main Canal static water level. However, changes in topographic elevation between Drop 4 and the residents prohibits direct line-of-sight to the northwest resident and partially obscures line-of-sight to the southwest resident. Following is a summary of existing environmental components considered as a portion of existing conditions.

3.1.1 Land Resources

Topography: The topography in the proposed project site vicinity slope from the northwest at an approximate elevation of 850 ft above mean sea level (msl) to an approximate elevation of 800 ft above msl to the east and southeast. Refer to the Yakima County GIS topographical map located in Appendix H. The Main Canal north of the proposed project is located on the east side of a naturally occurring downward sloping bench common to the Toppenish Drainage basin. The existing Drop 4 spillway is located at the point where the Main Canal transitions away from the naturally occurring bench to the lower elevation of land surface located east of the bench.

Soils: According to the NRCS Soils report, soils near the vicinity of the proposed project are composed of primarily of Warden silt loam in the 2 to 5 percent (%) and 8 to 15 slope categories. See Appendix L for NRCS Soils report. The Warden 8 to 15% slope soils are located adjacent to the Main Canal and within the WIP ROW with Warden 2 to 5% sloping soils bracketing the steeper sloping terrain and predominately representing the adjacent private land proposed for temporary construction staging and laydown areas. The Warden silt loam soils are not identified as hydric and can be identified as prime farmland if irrigated or farmland of unique importance. Additional soils information has been identified in the 2012 KPC report.

Geologic Setting, Mineral and Paleontological Resources: The proposed project is located within the Yakima River Basin (YRB), an area in the Yakima Folds Geomorphic Province (YFGP), the youngest of three geologic formations comprising the Columbia River Plateau. The YFGP is located on the western margin of the Columbia River Plateau and is comprised of both consolidated and unconsolidated materials. The central, eastern, and southwestern portions of the YFGP are comprised of Miocene Age basalts with intercalated sedimentary deposits. The lowlands within the YFGP consist of erosional sedimentary deposits including: alluvium, lacustrine, glacial, and glacial-fluvial materials with localized areas of wind-blown loess. Anticlinal ridge and synclinal valley structures dominate the topography of the YFGP.

The YRB is located within the boundaries of the YFGP, extends from the northeastern slopes of the Cascade Mountain Range in Kittitas County to the confluence of the Yakima and Columbia Rivers in Benton County. The YRB additionally incorporates portions of Klickitat County and virtually all of Yakima County. The YRB includes the Upper Yakima (39), Naches (38) and Lower Yakima (37) Water Resource Inventory (WRI) Areas. According to a United States Geological Survey report (Scientific Investigation Report 2006-5116) published in 2006, entitled, *Hydrogeologic Framework of Sedimentary Deposits in Six Structural Basins, Yakima River Basin, Washington*; the YRB comprises an area of approximately 6,200-square miles and a total of six structural aquifer basins. The network of Yakima Basin aquifers is supplied by the headwaters of the eastern slopes of Cascade Mountain Range. The Yakima River, eight tributary

rivers, and numerous streams are supplied primarily by annual snow-melt runoff from the Cascade Mountains.

The six identified aquifers, including the Roslyn, Kittitas, Selah, Yakima, Toppenish, and Benton Basins, are located within the YRB. Those areas beyond the six basins provide the collection area for the basins. The project is located within the western portion of the Yakima Basin and within the Toppenish Valley sub-region. The Yakima Basin, located in the central portion of the YRB, comprises approximately 230-square miles. The basin encompasses the area south of the Yakima Ridge and north of the Ahtanum Ridge. The basin is characterized by the east-west trending Ahtanum-Moxee Syncline. The Toppenish sub-region is located along the eastern foothills of the Cascade Range between Ahtanum and Rattlesnake Ridges to the north and Toppenish Ridge to the south. Water originating in the Cascade foothills trends east and south towards Toppenish Creek on the south margin of the valley and the Yakima River along the eastern margin of the valley.

The proposed project location is not the source of significant mineral or paleontological resources. Refer to the discussions on historic and cultural preservations for additional information. See Appendix F for resource reports.

3.1.2 Water Resources

Groundwater: The Yakima Basin fill deposit stratigraphy is divided into three hydrogeologic subunits. The upper unit is comprised of alluvial deposits limited to the Ahtanum Creek and Yakima River floodplains and ranges in thickness from 0 to 120-feet. The second unit consists of unconsolidated alluvial fan, loess, terrace, and Thorp gravel deposits underlying the upper unit and range in thickness from 0 to 350-feet. The third and deepest unit consists primarily of consolidated Ellensburg Formation and similar continental sedimentary deposits and ranges in thickness from 0 to 1,840-feet. The Yakima Basin ranges in total thickness from 0 to 1,840-feet with the greatest thickness present in the northwestern portion of the basin.

Groundwater flow direction is a function of localized variations in geology, topography and irrigation practice, but will generally flow southeast from the site towards Toppenish Creek and the Yakima River. The Main Canal, with the exception of a small section near the Drop 4 spillway is largely unlined and may influence groundwater elevation and flow direction near the immediate vicinity of the canal.

The Main Canal is utilized for irrigation purposes and not as a source of potable water near the vicinity of the proposed project location. The 2009 YNEP report indicated that the July 9, 2008 flow as measured in highest combined sum was 431 cubic feet per second (cfs) for the Drop 4 location. Refer to Appendix D YNEP report.

3.1.3 General Air Quality

According to information on EPA's web site http://www.epa.gov/airdata/ and Ecology's web site http://www.ecy.wa.gov/programs/air/sips/designations/designations.htm the project site is within

an attainment area (that is, not within an area of particulate, ozone or carbon monoxide maintenance issues). See Appendix P for air quality data.

3.1.4 Living Resources

Wildlife: The proposed project is not located within a designated wildlife preserve or set aside area. The land use near the proposed project vicinity is agriculture or rural residential and is not a primary source wildlife habitat. Refer to the YNWRM program letter in Appendix E titled *Drop 4 Project – Wildlife Report,* and dated January 4, 2012, for additional wildlife information.

Power poles and transmission lines, and power service lines are not expected to impact wildlife in or traveling through the area. Historically, power service lines have resulted in the deaths of avian species, specifically raptors. Large wingspans of raptors enable simultaneously touch to energized and grounded wires, potentially resulting in electrocution. Development of design standards by the US Fish and Wildlife Service (USFWS) has resulted in a reduction of this threat to raptors. Incorporation of these features is expected to provide sufficient protection to raptor and other avian species in or passing through the area.

Vegetation: Vegetation near the immediate vicinity of the proposed project is somewhat limited due to the presence of right-of-way access roads, and weed control measures implemented by WIP as a portion of routine maintenance. No noxious weeds or invasive species have been identified at the Drop 4 location. Jason Newquist of the YN Vegetation and Invasive Plant Management (VIPM) program indicated that the program has been surveying and controlling invasive plants associated with BIA WIP operations for two seasons. Vicinity vegetation observed consists of bunch grasses and small shrubs native to the region or common to disturbed soils within the region. Refer to Appendix A for correspondence and Appendix F for resource reports associated with vegetation issues.

Ecosystems and Biological Communities: According to the 2011 Cultural Resources Survey Report, the project area is located within the shrub-steppe environmental zone commonly associated with the arid valley floor and the Columbia River Plateau. Native vegetation, where present falls within the Daubenmire (1970) *Artimesia tridentate-Agropyron spicatum* climatic vegetation zone. Refer to Appendix F for resource reports.

Agriculture: The Main Canal, operating since approximately 1904, is one of the primary routes for the transportation of irrigation water from the originating source to downstream agriculture producers that results in approximately $200 million of gross revenues from agricultural production.

3.1.5 Cultural Resources

Historic, Cultural, and Religious Properties: The Tribal Historic Preservation Officer (THPO) has assumed the functions of the State Historic Preservation officer (SHPO) within the exterior boundaries of the Yakama Reservation. The THPO has reviewed the proposed project in conjunction with the archeological and cultural resources surveys completed by the YN Cultural Resource Program and submitted a recommendation to the YN Cultural Committee.

A *Cultural Resources Survey Report of Yakama Power Drop 4 Phase I* was completed by the YN Cultural Resources Program in January 2011 (2011 Cultural Survey) and authored by authored by Dave M. Woody, M.S., YN Archeologist. The 2011 Cultural Survey stated that the survey did not identify any cultural, archeological or historic properties within the proposed project area. The YN Cultural Resource Program issued a subsequent report titled *Cultural Resources Monitoring Report for the Yakama Power Drop 4 Phase I Soil Test Excavations*, authored by Dave M. Woody, M.S., YN Archeologist and dated March 2011 (2011 Cultural Monitoring), stated that no cultural or archaeological materials were encountered during the test pit excavations.

The Culture Committee reviewed 2011 Cultural Survey and the THPOs recommendation, and approved the survey work under Committee Action Number 033 2011. See Appendix F for resource reports.

In a letter titled *Yakama Power Drop 4 Project* dated June 5, 2012 and authored by Kate Valdez, YN THPO (Ms. Valdez June 5, 2012), Ms. Valdez states that she has reviewed the document submitted by Jillian Taylor, YN Cultural Resource Program Archaeologist, and Randell Corpuz, YN Cultural Resource Program Archaeologist Technician. Ms. Valdez states that the project area has fill material and that no cultural resources were identified within the project area. Ms. Valdez recommended that the project move forward provided that cultural monitoring occur in ground disturbing activities that occur in areas adjacent to the drop that are not fill materials.

The Culture Committee reviewed 2012 cultural survey documents and the THPOs recommendation, and on June 5, 2012 approved the survey work under Committee Action Number 047 2012. See Appendix F for resource reports.

Archeological Resources: The 2011 Cultural Survey and Ms. Valdez June 5, 2012 letter stated that the survey did not identify any cultural, archeological or historic properties within the proposed project area.

3.1.6 Socioeconomic Conditions

Employment and Income: According to the US Census Bureau web site, Yakima County had a population of approximately 243,000 persons (2010), an average population of 56.6 persons per square mile (2010), a per capita annual income of $19,325 (2010), and an average of 21.8% of the population below the poverty line between 2006 and 2010. According to the Yakima County Profile web page, Yakima County's unemployment rate has risen every year for the last four years, and the rate edged upwards from 9.7 percent in 2010 to 9.9 percent in 2011. The Yakima County Profile page estimated that approximately 2 percent of total covered employment in Washington State was in agriculture. In Yakima County, on an annual average basis, almost one in four jobs is agricultural (25%). According to the Yakima County Profile page, the high percentage of agricultural work has a stabilizing effect on the Yakima County economy. The per capita income for the population near the vicinity of the project site, as reported in the EPA EJView, is between $16,000 and $24,000. Refer to Appendix M for EJView maps.

Demographic Trends: According to the EPA EJView, for both the 2000 and 2010 data the proposed project was identified as being located in an area of 40 to 200 persons per square mile with 40 to 100% minority population. According to the US Census Bureau, Yakima County had an approximate average of 56.6 persons per square mile with approximately 53% minorities. According to the EPA EJView, the 2000 data set indicated that 0 to 10 % of the population near the vicinity of the project site is below poverty, which has trended upward to 10 to 20% reported for the 2010 data set. Refer to Appendix M for EJView maps.

Lifestyle and Cultural Values: According to the 2011 Cultural Survey, the WIP Drop 4 site is located within a region that has been populated for at least the past 11,500 years by Native Americans. The annexing of Native American lands by white settlers in the mid-1880s caused the region lifestyle to transition from traditional hunting and gathering cultures to agriculture-based cultures. Although lifestyle changes have occurred, the YN maintains strong cultural values that are based in their extensive history within this region.

Community Infrastructure: The proposed project site is located in a rural setting. According to the Yakima County GIS Land Information Portal and aerial photograph review, the closest public road (Harrah Drain Road) is gravel surfaced and located approximately 1,700 feet east of the Drop 4 location. The Yakima County GIS does not identify any public potable water lines, sewer lines, or natural gas lines near the vicinity of the Drop 4 site. Chad Begay, and Engineer with Yakama Power, indicated that the closest power transmission line is located parallel to Harrah Drain Road.

3.1.7 Resource Use Patterns

Hunting, Fishing, Gathering: Hunting, fishing and gathering continue to occur within the Toppenish basin, though changes to presence, availability, locations, and seasonal restrictions in past 100 years has resulted in a limiting of the extent and location of these activities. The proposed project is not currently the location of prime hunting or gathering activities. The man-made Main Canal, where Drop 4 is located, is not salmonid fish bearing waters and therefore not a location of traditional or current fishing activities. According to the 2011 Cultural Survey, Ms. Valdez June 5, 2012 letter and visual observation by Mr. Jeremy Lynn, a licensed geologist with Fulcrum Environmental Consulting, Inc. (Fulcrum), the surface soils on either side of the canal exhibit indications of disturbance consistent with canal construction and in some locations export or import of fill material.

Timber Harvesting: There are no significant timbered areas visible near the vicinity of the project site on current or historical aerial photographs available for review through the Yakima County GIS department. Review of United States Geological Service (USGS) historical topographic maps did not identify and significant timbered areas near the vicinity of the project site. There is no timber within or in close proximity to the proposed project.

Agriculture: The proposed project location is not currently used for agriculture purposes; rather the irrigation canal where Drop 4 is located facilitates the distribution of irrigation water to agricultural lands for crop production. Visual observation by Peggy Williamson, a Certified Hazardous Materials Manager (CHMM) and Environmental Professional with Fulcrum and

review of historical aerial photographs available through the Yakima County GIS department Land identify agricultural based or undeveloped land use near the vicinity of the proposed project. Agriculture based land use is predominately crop production, rather than livestock grazing.

Mining: Review of USGS historical topographic maps and historical aerial photographs available through the Yakima County GIS did not identify any significant mining operations within the vicinity of the Drop 4 site. The proposed project is not located within an area known for significant mining operations. Permitted gravel mining operations are located within the region; however, none of the permitted gravel mining operations are located within close proximity to the proposed project location.

Recreation: Review of USGS historical topographic maps, historical aerial photographs available through the Yakima County GIS did not identify and significant areas designated for recreational use near the vicinity of the Drop 4 site. The proposed project location is not the sources nor does it facilitate recreational activities.

Transportation Networks: The proposed project location does facilitate the transportation of irrigation water from source locations to delivery point. The proposed project will not interfere with the delivery of water to the approximately 146,000 acres of irrigated agricultural lands.

The WIP operates two diversion dams, five pumping stations, two power plants, approximately 765 miles of primary canal system, and approximately 312 miles of laterals and drainage canals. The screening measures in place to prevent salmonid fishes from entering the canal are discussed in the report titled *U.S. Bureau of Indian Affairs Wapato Irrigation Project Biological Assessment Wapato Irrigation project Operations* (Wapato Project BA), dated march 2003 and revised March 2009, prepared by Eco-Northwest of Selah, Washington. The Wapato Project BA, which additional describes WIP water transportation operations, was submitted to the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (Fisheries) in 2009.

Land Use Plans: Land use for the Drop 4 project site will remain WIP ROW. In a letter dated May 30, 2012, Rocco Clark, a Natural Resource Specialist and Environmental Coordinator with the BIA Yakama Agency, stated that the BIA Yakama Agency does not have a land use plan for the YN. Land use planning on the Yakama Reservation is facilitated through BIA working in cooperation with individual tribal departments. See Appendix A for the May 30, 2012 Letter. Additionally, the individual YN land use planning departments are included in the BIA IDT process that was utilized during the proposed project EA scoping phase. Refer to the BIA IDT

3.1.8 Other Values

Wilderness: The proposed project is not located in a designated wilderness area.

Noise and Light: The current Drop 4 spillway is the source of noise resulting from water falling over the concrete feature approximately 21 ft to the lower canal elevation. Agricultural facilities and residential properties near the vicinity of Drop 4 have randomly placed outdoor lights.

The noise levels at the Drop 4 spillway were evaluated July 12, 2012 by Peggy Williamson, a CHMM and Environmental Professional with Fulcrum and Chad Begay, an Engineer with YP. Noise levels at the base of the Drop 4 spillway on the east side of the canal ranged from approximately 70 to 85 decibels (dB). At a distance of approximately 50 ft east and 150 ft southeast (adjacent to the Main Canal) of the spillway base the noise levels drop to approximately 65 to 75 dB. The closest residence is located approximately 250 ft to the northwest and beyond the curve of the topographic embankment. At a distance of approximately 200 ft northwest of the spillway, adjacent to the northwest residence landscaping and slightly beyond the topographic embankment, the noise levels drop to approximately 44 to 55 dB.

As a comparison the noise levels at the Drop 3 Power Generation Facility located approximately 2.75 miles north and slightly west of the Drop 4 site were also evaluated on July 12, 2012. At the time of the noise evaluation one of the two one-megawatt vertical turbine was operating. Chad Begay, an Engineer with YP, indicated that the vertical configuration and construction of the 1930s constructed vertical turbine is expected to generate more noise than the horizontal turbine planned for the Drop 4 location. The interior noise levels in the single brick constructed un-insulated 1930s constructed power generation building with single panel wood exterior doors ranged from approximately 74 to 90 dB, depending on proximity to the various operating features. The noise levels outside of the generator building dropped to approximately 70 to 75 within approximately 5 ft of an open single panel door. At a distance of approximately 10 feet from the building exterior brick walls where glass windows were present the noise level dropped to approximately 63 to 68 dB. At a distance of approximately 10 ft from the exterior building area where double single panel wood doors were closed the noise level had dropped to 61 to 66 dB.

According to the U.S. Department of Housing and Urban Development Office of Community Planning and Development document titled *The Noise Guidebook*, the sound transmission class (STC) is equal to the number of dB a sound is reduced as it passes through a material. According to *The Noise Guidebook* a standard 4 inch brick walls has a STC of 45 dB, a typical wood exterior wood solid core door has a STC of 23 dB. For comparison purposes *The Noise Guidebook* identifies a standard frame wall has having a STC of 39 dB.

Visual: The Drop 4 site is located approximately 1,700 feet west of a gravel surfaced public road (Harrah Drain road) and within an area visually identified as agriculture crop production. One residence is located approximately 250 feet east of the spillway. The resident located approximately 250 ft east of the proposed project may be able to view the generator house when accessing their property via the shared grave surfaced access road, however, due to tree and other landscape planting will likely not be able to view the structure from their house. Two additional residences are located approximately 575 feet northwest and southwest of the spillway. The Main Canal and the concrete spillway can be viewed from the public road, but is not seen from the two residences northwest and southwest of the spillway due to topography changes and landscaping. The proposed generator house location, east of the spillway is situated against the downward sloping natural topographical bench and canal bank, is not readily visible from the public road or residences and is further obscured from observation during the crop growing season. Refer to pictures located in Appendix R.

Public Health and Safety: There are no barricades in place to prevent the public from accessing the Main Canal banks, spillway, or right-of-way access roads. There is one sign adjacent to where the right-of-way separates from the access road shared with the east residence warning that access is restricted to authorized personnel. There are guardrails located on either side of the spillway crossing. Refer to pictures located in Appendix R.

3.2 CULTURAL AND ARCHEOLOGICAL

The Tribal Historic Preservation Officer (THPO) has assumed the functions of the State Historic Preservation officer (SHPO) within the exterior boundaries of the Yakama Reservation. The YN has determined that the cultural and archeological documents are proprietary and should not be made publically available. Rather cultural and archeological documents along with recommendations from the THPO and YN Cultural Resource Program are submitted to the YN Cultural Committee for review and committee action approval.

The THPO has reviewed the proposed project in conjunction with the 2011 Cultural Survey completed by Dave M. Woody, M.S., YN Archaeologist with the YN Cultural Resource Program. The 2011 Cultural Survey states that the survey did not identify any cultural, archeological or historic properties within the proposed project area. Additionally, the 2011 Cultural Monitoring report did not identify any cultural, archeological or historic issues associated with the geotechnical work completed by KPC.

The YN Cultural Resource Program policy is to utilize non-invasive methods to determine absence or presence of cultural properties within a given project area. Cultural Specialist have identified new construction areas as having a high probability for discovery of cultural or archeological items not identified through other sources due to the invasive nature of ground disturbing activities. In the 2011 Cultural Survey, Dave M. Woody, M.S., YN Archaeologist, recommended that any future ground disturbing activities associated with the planned construction project, such as foundation excavations and transmission line pole placement, be monitored by a YN Cultural Specialist as a best management practice.

The THPO and YN Cultural Resource Program submitted recommendations to the YN Cultural Committee based on their respective reviews. The YN Culture Committee reviewed the 2011 Cultural Survey and THPO recommendations, and approved the survey work under Committee Action Number 033 2011. The YN Cultural Committee clearance was issued January 2010 for the investigation phase of the proposed project. See Appendix F for a copy of the Cultural Committee clearance memos.

In a letter titled *Yakama Power Drop 4 Project* dated June 5, 2012 and authored by Kate Valdez, YN THPO, Ms. Valdez states that she has reviewed the document submitted by Jillian Taylor, YN Cultural Resource Program Archaeologist, and Randell Corpuz, YN Cultural Resource Program Archaeologist Technician. Ms. Valdez states that the project area has fill material and that no cultural resources were identified within the project area. Ms. Valdez recommended that the project move forward provided that cultural monitoring occur in ground disturbing activities that occur in areas adjacent to the drop that are not fill materials.

The Culture Committee reviewed 2012 cultural survey documents and the THPOs recommendation, and on June 5, 2012 approved the survey work under Committee Action Number 047 2012. See Appendix F for resource reports.

3.3 THREATENED OR ENDANGERED SPECIES

In a letter dated January 4, 2012, and titled *Drop 4 Project – Wildlife Report,* Mark Nuetzmann a Wildlife Biologist with the YN Wildlife Resource Management Program identified the following federally listed and candidate species that could potentially be located within Yakima County:

- Northern Spotted Owl and associated habitat
- Grizzly Bear and Gray Wolf
- Wolverine
- Fisher
- Yellow-billed Cuckoo
- Marbled Murrelet
- Greater Sage Grouse
- Mardon Skipper
- Ute Ladies'-Tresses
- Witebark Pine

Mr. Nuetzmann's January 4, 2012 letter concludes that the proposed project is anticipated to have no effect on the federally listed and candidate species identified. Refer to Appendix F for a copy of Mr. Nuetzmann's letter.

A Washington State Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) Map, dated February 8, 2010 and reconfirmed in June 3, 2012, was reviewed by Jason Stewart, a Biologist with Fulcrum, to determine if species or habitats of concern were potentially present within the project area. The WDFW PHS map did not identify the Main Canal as having fish present. However, the WDFW PHS map did identify Harrah Drain with priority fish presence. The WDFW PHS cautions that locations of fish and wildlife resources are subject to variation caused by disturbance, changes in season and weather, and other factors, and notes that mapped wildlife and habitat features are generally within a quarter mile of the locations displayed.

Harrah Drain trends generally in a north to south direction east of the Main Canal and connects with the western end of Marion Drain. According to the 2005 United States Department of Agriculture (USDA) report titled *Surface Water Monitoring Program for Pesticides in Salmonid-Bearing Streams, 2003-2005 (2005 USDA)*, Marion Drain is a 19-mile long drainage ditch with a watershed area of approximately 85,786 acres that collects water from Harrah Drain, Toppenish Creek, Wanity Slough and groundwater extrusion. The 2001 Washington State Conservation Commission (WSCC) report titled *Habitat Limiting Factors Yakima River Watershed Water Resource Inventory Areas 37 – 39 Final Report* (2001 WSCC) indicates that Marian Drain was initially constructed to drain wetlands and subsequently enlarged to serve as a major delivery canal for WIP. The 2001 WSCC report indicates that Wanity Slough historically flowed in the lower portion of Toppenish Creek, but is currently intercepted by the eastern portion of Marion

Drain. The 2005 USDA report indicated that historical detections of eight types of pesticides have been documented within Marion Drain. According to the 2005 USDA report Marion Drain discharges to the Yakima River 2.2 miles upstream of the mouth of Toppenish Creek at river mile 82.6.

The primary purpose of Harrah Drain is to collect irrigation water run-off from agricultural fields for delivery and reuse by downstream users. While the purpose of Harrah Drain is irrigation water transport, the various interconnections with other drains and canals ultimately connects irrigation water drain water with fish bearing streams. One of the unintended consequences of the drain interconnections is that Steelhead and Chinook have been reported in portions of Harrah Drain. The 2001 WSCC report documents Harrah Drain to be artificial (man-made) and indicated that spawning of Steelhead and spawning and rearing of Fall Chinook may occur as far north as the railroad crossing near the Town of Harrah.

The 2001 WSCC reported identified "data gaps" across all rating 10 areas of Salmonid habitat condition associated with Harrah Drain. Marion Drain was rated Poor for temperature/dissolved oxygen; fair for fish access; good for peak flow and low flow; and as "data gap" for channel conditions, substrate, riparian conditions, and toxics. Wanity Slough is rated poor for fish access, floodplain connectivity, riparian conditions, temperature/dissolved oxygen, and toxics; good for peak flow and low flow; and "data gap" for channel conditions and substrate. The action recommendations from the 2001 WSCC report included the following:

- Eliminate or reduce the diversion of Toppenish Creek and upper Yakima surface and sub-surface waters to Marion and Harrah Drains.
- Reconnect Wanity Slough to lower Toppenish Creek, restore hydrology of springbrooks in lower Toppenish Creek.
- Install screening at water diversions on Wanity Slough.
- Implement upland BMPs to reduce nutrient loading and erosion of fine sediment to streams and drains.
- Restore riparian function along entirety of Wanity Slough.

In a January 3, 2012 e-mail from Phil Rigdon, YN Department of Natural Resources (DNR) Deputy Director, Mr. Rigdon indicated that YN has completed a study with the Yakima River Basin Watershed Enhancement Project that would require $100 million to separate Toppenish Creek from the WIP and similar work. Mr. Rigdon indicated that as an ongoing project YN and BIA are working on a Biological Assessment that will be reviewed and approved by the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) and USFWS.

The YNFRM program reviewed the available data associated with the planned project and internal and external agency reports associated with fish identified within the project area. In a letter authored by Brad Parrish, YNFRM Biologist, dated December 20, 2011 titled *No effect determination for Drop 4 Hydropower Project on Steelhead* (YNFRM 2011 Letter), the YNFRM stated that steelhead have not been documented in the WIP Main Canal (the location of the project), however the project may affect flows for a distance of two miles in the Harrah Drain where Steelhead have been identified. Refer to Appendix F for a copy of Mr. Parrish's letter.

During a June 5, 2012 telephone interview with Mr. Nathan Longoria, YNFRM Fisheries Biologist confirmed that Chinook have not been identified in this portion of Harrah Drain. The YNFRM letter additionally states that the proposed Drop 4 Hydropower Project **will not affect Steelhead populations** in the Yakima basin.

3.4 INVASIVE SPECIES AND NOXIOUS WEEDS

The United States Geologic Service (USGS) non-indigenous aquatic species (NAS) web site list identified one amphibian (native), 12 fish (10 native and two exotic), 1 mammal (exotic) and 10 plant species (1 native, 9 exotic) as potentially invasive species within in Yakima County. None of the species identified by the USGS NAS were identified within irrigation canals; rather they were predominately associated with lakes, ponds and in a few cases the Toppenish Wildlife Refuge.

In a letter issued by Nathan Longoria, YNFRM Fisheries Biologist, dated May 30, 2012 and titled *Fisheries comments on invasive species mitigation in concern to Drop* 4, there are 12 invasive vertebrates, 10 invasive plants and two other invasive biologics identified within Yakima County that are of potential concern. Additionally, the May 30, 2012 YNFRM letter identified three invertebrates that are not present in the county, but should be mitigated against due to their prolific potential. The May 30, 2012 YNFRM letter did not identify any invasive species present at the project site; rather the letter provided a general overview of species that may be present within the region. As a best management practice, Mr. Longoria recommended that the following USFWS mitigation prescriptions be incorporated into the proposed action to control the identified invasive species.

All in Stream Equipment (from Excavators to Boots and Rakes)

- All equipment will be clean, inspected for leaks, and in good working order.
- Remove any visible invertebrates, aquatic plants, and soil.
- Pressure wash equipment with hot water (≥120° F) and allow equipment to dry completely (4+ hours).
- Scrub all small gear and equipment, soak in hot water (≥120° F) for at least 5 minutes, and allow equipment to dry completely (4+hours).
- Monitor and document the ambient air temperatures.
- Document that heavy equipment was inspected.
- Monitor the water soak temperature and the soak time to meet stated targets.
- Conduct a secondary visual inspection after cleaning and drying.
- If not properly cleaned, Re-scrub, re-soak, re-dry, and re-inspect the equipment.

The *Priority Invasive Plant List* division works to protect Tribal natural resources from the invasion of non-native plant species. The YN VIPM goals are to protect natural resources, cultural and human resources, political integrity, economic security, and to promote a desire for an improved quality of life for the YNs' citizens. The YN VIPM has developed an *Integrated Weed Management Plan* for the Yakama Reservation and a *Priority Invasive Plant List*. The Integrated Weed Management Plan is a programmatic plan to assist tribal and BIA programs in collaborating on and improving weed management throughout the Reservation. In a June 7, 2012

email, Mr. Jason Newquist, YN VIPM, stated that for the past two years the YN VIPM has been completing surveys and controlling noxious weeds on the BIA WIP. In the email Mr. Newquist concurred that incorporation of the following best management practices into the proposed action would be appropriate to control invasive plants.

All Soil Disturbing Activities

- Inspect the area prior to soil disturbance and remove any noxious weeds identified.
- Clean equipment before it is brought on site to remove any seed, etc. that could result in noxious weed being brought onto the site.
- Clean equipment before it leaves the site so any seed, etc. from the ground disturbance is not spread to a new location.
- Reseed or restore the site as soon as feasible to prevent undesirable weed getting started.
- Monitor the project site after completion to confirm that noxious weeds have not started growing.
- If new noxious weed are identified, eradicate them.

3.5 DESIGN CONSIDERATIONS

During the EA scoping process the following design considerations were identified as potential issues:

3.5.1 Right-of-Way

The WIP right-of-way near the vicinity of Drop 4 is 140 ft in width. Presuming an approximately 30 ft canal width at the spillway, the remaining right-of-way on either side of the canal would be 55 ft. North of the spillway the WIP right-of-way is 120 ft. Again, presuming an approximately 30 ft canal width, the remaining right-of-way on either side of the canal north of the spillway would be 45 ft. South of the spillway the WIP right-of-way is 110 ft. With the approximately 30 ft canal width, the remaining right-of-way on either side of the canal south of the spillway would be 40 ft. See Figure 2 for a WIP provided drawing showing the right-of-way in the proximity of Drop 4.

The proposed action is designed to be contained within the existing WIP right-of-way. As a portion of the proposed action the WIP right-of-way boundaries will be surveyed to confirm location. Any boundary line discrepancies will be resolved prior to construction implementation.

3.5.2 Power

A 34.5 kV transmission line, trending parallel with Harrah Drain Road and approximately one-quarter of a mile east of the Drop 4 location, is owned and operated by YP. The BPA, through the Alfalfa Substation located approximately 20 miles from the Drop 4 site, is the primary electricity supplier to the YP owned transmission line. During the summer electric consumption peak, a large number of electric irrigation pumps are turned on that draw electricity from the various points along the YP transmission line located between the Alfalfa Substation and the Drop 4 site. The significant increase in summer peak electricity demand results in the BPA's

Alfalfa substation operating at maximum capacity, occasional failing to meet peak demands, and often operating in overheated conditions.

The location of the planned Drop 4 hydropower transmission line interconnects with the existing 34.5 kV transmission line facilitates introduction of a new electricity source into the transmission system between the Alfalfa Substation and the end users.

3.5.3 Water Quality Parameters

Under the Clean Water Act (CWA), water quality standards consist of designated uses for waterbodies, numeric or narrative criteria to protect those uses, and an antidegradation policy to maintain water quality (40 CFR Part 131). Such standards serve both as a description of the desired water quality for particular waterbodies and as a means of ensuring that such quality is attained and maintained.

There is no water quality parameter data available for the Main Canal near the vicinity of Drop 4. During the November 11, 2011 BIA IDT meeting Steve Wangemann, BIA Soil Scientist, indicated that under BIA regulations only effluent meeting Class A Drinking Water Standards may be discharged to the irrigation system. During the subsequent November 15, 2011 interview with Mr. James Thomas, YN Environmental Management Program (YNEMP), Mr. Thomas confirmed the Class A Drinking Water requirements for discharge to the irrigation system. While the BIA regulations restrict effluent discharge to the irrigation system, the water quality parameters associated with an open irrigation conveyance system are not identified.

While the 2001 WSCC report did not include the WIP Main Canal in the study, it did identify "data gaps" across all rating 10 areas of Salmonid habitat condition associated with Harrah Drain. Marion Drain was rated Poor for temperature/dissolved oxygen; fair for fish access; good for peak flow and low flow; and as "data gap" for channel conditions, substrate, riparian conditions, and toxics.

Near the vicinity of the Town of Harrah, the Harrah Drain is located approximately one-half mile to the west. Harrah's public waste water treatment plant (WWTP) is located west of Harrah Drain and east of the WIP Main Canal, immediately north of Branch Road and south of the WIP diversion feature locations north of Harrah. Under the National Pollutant Discharge Elimination System (NPDES) permit number WA0022705 issued by the EPA, the Harrah WWTP discharges treated effluent into the Harrah Drain. The Harrah Public Works Director, Gary Decker, during a November 7, 2011 telephone interview, indicated that effluent discharge ranges between 30,000 and 38,000 gallons per day (gpd). A value of 40,000 gpd, representing a reasonably conservative peak flow volume, would equate to approximately 0.06 cfs. Compared with the approximately 150 cfs maximum Harrah Drain flow reported in 2009 by YNEP, the Harrah WWTP effluent discharge represents approximately 0.04% of the total flow volume. The 2009 YNEP Report did not quantify the non-irrigation season flow in Harrah Drain; however, Harrah Drain reportedly continues some volume of flow during non-irrigation season.

A review of Harrah WWTP public domain records, November 7, 2011 telephone interview with the Gary Decker and November 15, 2011 interview James Thomas of the YN Environmental

Management Program (YNEMP) suggests that the Harrah WWTP generally operates within NPDES permit limits, with occasional noncompliance events. Mr. Thomas indicated that at the request of the YNEMP the Harrah WWTP has been collecting and monitoring nutrient data in addition to the required NPDES permit data collection information. Currently Gary Decker is completing Discharge Monitoring Reports (DMR) monthly and submitting them to EPA and YNEMP. Mr. Thomas indicated that as a portion of permit renewal additional nutrient criteria would likely be incorporated into the NPDES renewal requirements.

Mr. Decker indicated that Harrah had submitted a NPDES permit renewal package to EPA in February 2011 as the existing permit was schedule to expire in September 2011. As of November 2011, EPA had not provided comment, requested additional information, or issued a NPDES renewal to the Harrah facility. The EPA's direction to Mr. Decker has been to continue operation under the existing permit requirements.

The proposed project includes the installation of an inline turbine at the Drop 4 site for power generation purposes. The inline turbine design is such that there is no direct contact between irrigation water and maintenance fluid containing mechanisms. The water quality parameters associated with irrigation water passing through the inline turbine for power generation purpose will not change significantly.

The EPA Clean Water Act Section 401 permit review and application, if required, has been incorporated into the proposed action. See Section 3.7 for additional permit discussion.

3.5.4 Flow Reduction in a Portion of Harrah Drain

A diversion gate structure is present and operational at the selected location for the upstream retention or diversion of water into the Main Canal. Quantity of water flow being directed into the WIP Main Canal, Harrah Drain, and Sub Drain is currently being managed at this location.

At the proposed downstream diversion location, the WIP Main Canal crosses over Harrah Drain at the intersection of Harrah Drain Road. At the crossover location a small pump or gravity flow gate system will be installed that would allow water from the WIP Main Canal to be diverted back into Harrah Drain.

3.5.5 Decommissioning

There is no decommissioning plan in place for the Drop 4 spillway or Main Canal located near the vicinity of the Drop 4 site. The spillway was likely constructed in the 1920s or 1930s and has remained operational for the past 80 to 90 years.

As a portion of the proposed action, a decommissioning plan will be developed for the Drop 4 hydropower facility.

3.6 INTENTIONAL DESTRUCTIVE ACTS

Transportation, storage, or use of radioactive, explosive, or toxic materials does not occur at the Drop 4 location. The existing feature does not offer any particularly attractive targets of opportunity for terrorists or saboteurs to inflict adverse impacts to human life, health, or safety. Impacts resulting from intentional destructive acts would be those resulting from the acts themselves, and would not be magnified by any aspect of the proposed project or alternatives.

3.7 REGULATORY AND PERMIT REQUIREMENTS

Provisions for irrigation water to lands within the bounds of the YN boundaries were presented in Senate Bill 6693 dated May 6, 1912. The BIA WIP continues to operate under the Senate Bill provisions. Refer to Appendix B for a copy of Senate Bill 6693.

In 1987, Congress amended the CWA to add Section 518 which allows the Administrator of EPA to treat a Tribe in the same manner as a State, commonly referred to as "treatment as a State" (TAS) for purposes of various Clean Water Act provisions. The YN submitted an application for TAS in 1994 but as of 2011 had not achieved EPA TAS. In November 2005, the YN adopted the *YN Water Quality Standards*.

In the November 16, 1993, memo titled *Guidance on EPA's NPDES and Sludge Management Permit Procedures on Federal Indian Reservations,* authored by Cynthia Dougherty, EPA's position on NPDES permitting on tribal lands was set forth. The memo states that, to the extent practical, EPA should ensure that NPDES permits issued on the reservation achieve compliance with Tribe adopted water quality standards, even if those Tribes have not been TAS authorized under Section 303. Until a Tribe achieves TAS, EPA is the certification authority. Under 40 CFR § 121.21(b), EPA issued 401 certifications where water quality standards have been established but the state/agency has not been authorized to issue the certification.

The EPA Clean Water Act Section 401 permit review and application, if required, has been incorporated into the proposed action.

3.8 CONSTRUCTION IMPLEMENTATION

During the EA scoping process the following potential issues were identified that could influence construction implementation.

Irrigation Season: The WIP irrigation season is weather dependent and generally commences in early April and extends through late October. During this time period water is present in all of the canals and drains. The proposed action does not change the irrigation season or reduce the amount of available irrigation water. The seasonal nature of irrigation canal usage coincides with peak power consumption demands.

Shared Access Road: One residential property, located approximately 250 east of Drop 4, shares a common gravel surfaced road with the WIP ROW access road. As a portion of the

proposed action and at the request of the adjacent landowner to the northwest, a gate will be installed at the entry to the residential property.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 EXISTING CONDITIONS

4.1.1 Land Resources

4.1.1.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and the proposed project site would continue to be used for agricultural irrigation water transportation purposes. The existing land resources as described in Section 3.1.1 would not change.

4.1.1.2 Alternative B – Proposed Project

Under the Proposed Action Alternative, DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. There are no significant projects planned for the surrounding vicinity in the foreseeable future that would add to the environmental consequences of the proposed action. The environmental consequences associated with topography, soils, and geologic setting, mineral and paleontological resources would not result in a direct, indirect, cumulative, or disproportionate effect.

No mitigation measures are required to address environmental consequences associated with topography, soils, and geologic setting, mineral and paleontological resources.

4.1.2 Water Resources

4.1.2.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and the proposed project site would continue to be used for agricultural irrigation water transportation purposes. The existing water resources as described in Section 3.1.2 would not change.

4.1.2.2 Alternative B – Proposed Project

Under the Proposed Action Alternative, DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on

the existing WIP to generate approximately one megawatt of hydroelectric power. There are no significant water resource related projects planned for the surrounding vicinity in the foreseeable future that would add to the environmental consequences of the proposed action. The environmental consequences associated with groundwater resources would not result in a significant direct, indirect, cumulative, or disproportionate effect.

No mitigation measures are required to address environmental consequences associated with water resources.

4.1.3 General Air Quality

4.1.3.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and the proposed project site would continue to be used for agricultural irrigation water transportation purposes. The existing general air quality as described in Section 3.1.3 would not change.

4.1.3.2 Alternative B – Proposed Project

Under the Proposed Action Alternative, DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. There are no significant general air quality related projects planned for the surrounding vicinity in the foreseeable future that would add to the environmental consequences of the proposed action.

During construction there is a potential for short term temporary increase in airborne dust and pollutant emissions from vehicles and machinery may occur, but are not anticipated to be significant contributors of air quality pollutants. As portion of the proposed action, prior to construction a management plan consistent with the Federal Air Rule for Reservation (FARR) requirements will be developed. The short-term temporary increase in dust and vehicle emissions that will occur during construction, consistent with agriculture production practices in the region, is not a significant contributor to a cumulative effect.

Post construction power generation operations are not anticipated to be significant contributors of air pollutants. The environmental consequences associated with general air quality would not result in a direct, indirect, cumulative, or disproportionate effect.

No mitigation measures are required to address environmental consequences associated with general air quality.

4.1.4 Living Resources

4.1.4.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and the proposed project site would continue to be used for agricultural irrigation water transportation purposes. The existing living resources as described in Section 3.1.4 would not change.

4.1.4.2 Alternative B – Proposed Project

Under the Proposed Action Alternative, DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. In a letter authored by Brad Parrish, YNFRM Biologist, dated December 20, 2011 titled *No effect determination for Drop 4 Hydropower Project on Steelhead* (YNFRM 2011 Letter), Mr. Parrish stated that the proposed Drop 4 Hydropower Project **will not affect Steelhead populations** in the Yakima basin. In a letter authored by Mark Nuetzmann, YNWRMP Wildlife Biologist, dated January 4, 2012, titled *Drop 4 Project – Wildlife Report,* Mr. Nuetzmann stated that the proposed project is anticipated to have **no effect** on the federally listed and candidate species identified.

As a standard YP practice transmission line poles that have been designed according to the Avian Protection Plan Guidelines (APPG; APLIC, USFWS 2005) have been incorporated into the proposed action. Use of the APG pole design will further avoid or reduce potential threats to raptors in the area. Specifically, the service lines (phases) are spaced at least 60 inches apart to prevent electrical contact from phase to phase. At each pole, where there are supporting structures beneath the distributions, a cover will be used on the phases that are closest to the pole so that there cannot be any phase to phase contact. To minimize collision issues, the APPG suggest the use of marker balls, swinging markers, bird flight diverts or other similar devices to increase the visibility of overhead wires in areas of high bird use. Given the short distance (approximately 1,700 ft) of new transmission line, installation of the new transmission line is not anticipated to present a significant direct or indirect effect. Incorporation of these features is expected to provide sufficient protection to raptor and other avian species in or passing through the area.

There are no significant wildlife, vegetation, ecosystems and biological communities, or agriculture related projects planned for the surrounding vicinity in the foreseeable future that would add to the environmental consequences of the proposed action. The environmental consequences associated with wildlife, vegetation, ecosystems and biological communities, and agriculture would not result in a direct, indirect, cumulative, or disproportionate effect.

Other than pole design consistent with APG criteria, no mitigation measures are required to address environmental consequences of living resources associated with wildlife, vegetation, ecosystems and biological communities, and agriculture.

4.1.5 Cultural Resources

4.1.5.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and the proposed project site would continue to be used for agricultural irrigation water transportation purposes. The existing historic, cultural, religious properties and archeological resources as described in Section 3.1.5 would not change.

4.1.5.2 Alternative B – Proposed Project

Under the Proposed Action Alternative, DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. A *Cultural Resources Survey Report of Yakama Power Drop 4 Phase I* was completed by the YN Cultural Resources Program in January 2011 (2011 Cultural Survey) and authored by authored by Dave M. Woody, M.S., YN Archeologist. The 2011 Cultural Survey stated that the survey did not identify any cultural, archeological or historic properties within the proposed project area. The YN Cultural Resource Program issued a subsequent report titled *Cultural Resources Monitoring Report for the Yakama Power Drop 4 Phase I Soil Test Excavations*, authored by Dave M. Woody, M.S., YN Archeologist and dated March 2011 (2011 Cultural Monitoring), stated that no cultural or archaeological materials were encountered during the test pit excavations.

In a letter titled *Yakama Power Drop 4 Project* dated June 5, 2012 and authored by Kate Valdez, YN THPO, Ms. Valdez states that she has reviewed the document submitted by Jillian Taylor, YN Cultural Resource Program Archaeologist, and Randell Corpuz, YN Cultural Resource Program Archaeologist Technician. Ms. Valdez states that the project area has fill material and that no cultural resources were identified within the project area. Ms. Valdez recommended that the project move forward provided that cultural monitoring occur in ground disturbing activities that occur in areas adjacent to the drop that are not fill materials.

Refer to Section 4.2 for a discussion on direct, indirect, cumulative and disproportionate effects of environmental consequences associated with historic, cultural, religious properties and archeological resources.

4.1.6 Socioeconomic Conditions

4.1.6.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and the proposed project site would continue to be used for agricultural irrigation water

transportation purposes. The existing employment and income; demographic trends; lifestyle and cultural values; and community infrastructure as described in Section 3.1.6 would not change.

4.1.6.2 Alternative B – Proposed Project

Under the Proposed Action Alternative, DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The project does not unfairly displace populations or impose environmental or health hazards on any specific population group.

As a result of the project approximately 3 design and inspection professionals and approximately 20 local workers spanning 8 separate trades during the estimated 8 to 9 month construction project will be created. At the conclusion of the project one full time equivalent and one part time equivalent employment position will be available. Increasing potential short term temporary employment of approximately 20 workers and long term employment of one full time equivalent and one part time equivalent employment position in a community that has approximately 24,000 unemployed individuals (approximately 0.08%), while of minor benefit, is not a significant consequence.

There are no significant socioeconomic conditions related projects planned for the surrounding vicinity in the foreseeable future that would add to the environmental consequences of the proposed action. The environmental consequences associated with employment and income; demographic trends; lifestyle and cultural values; and community infrastructure would not result in a significant direct, indirect, cumulative, or disproportionate effect.

No mitigation measures are required to address environmental consequences associated with employment and income; demographic trends; lifestyle and cultural values; and community infrastructure.

4.1.7 Resource Use Patterns

4.1.7.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and the proposed project site would continue to be used for agricultural irrigation water transportation purposes. The existing hunting, fishing, gathering; timber harvesting; agriculture; mining; recreation; transportation networks; and land use patterns as described in Section 3.1.7 would not change.

4.1.7.2 Alternative B – Proposed Project

Under the Proposed Action Alternative, DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on

the existing WIP to generate approximately one megawatt of hydroelectric power. There are no significant changes to the existing hunting, fishing, gathering; timber harvesting; agriculture; mining; recreation; or transportation networks resource use patterns. However minor changes will occur to the land use pattern in the localized Drop 4 area. Following is a summary of the direct, indirect, cumulative and disproportionate effect associated with the minor change in land use.

Direct Effect: Less than one-eight acre of existing ROW would be converted to power generation facility use. Impact to the canal banks would occur at two limited (approximately 20 ft by 20 ft) locations near Drop 4 and one location where the Main Canal crosses over Harrah Drain below the spillway. Approximately 5,200 square feet of previously permeable surface will be covered with impermeable materials or will be converted into an uncovered raceway. This represents approximately 0.003% of WIP ROW associated with the Main Canal system only and does not take into consideration the amount of ROW associated with drains and other ancillary features. The 0.003% decrease of WIP Main canal system ROW impermeable surface is not considered a significant direct effect.

Indirect Effect: Approximately 2,800,000 kWh of additional power may be generated between April and October offsetting some of the summer peak demand that is currently supplied through the Alfalfa Substation thereby reducing the frequency of substation overheating and increasing the reliability of power delivery to consumers. Additionally, the project would result in an approximate increase of $168,000 of revenue that could be generated per irrigation season to fund differed WIP maintenance issues or capital projects and an increase of approximately one full time employee equivalent and one part time employee equivalent. The increase in energy generation, revenue generation, and local employment is a minor beneficial effect.

Cumulative Effect: Revenues generated in excess of capital expenditures and operating cost would be used to complete some of WIPs identified differed maintenance issues and capital improvement projects, thereby increasing the life and reliability of the irrigation water delivery system. The introduction of a new electric source into and existing transmission system that does not require passage through the Alfalfa Substation, thereby reducing potential overheating during peak demand, is a minor beneficial effect.

Disproportionate Effect: The change in existing resource use patterns resulting from the project would not result in a disproportionate effect on minority populations, the portion of the population below the poverty line, or introduce new hazardous or dangerous material into the environment.

There are no significant resource use pattern related projects planned for the surrounding vicinity in the foreseeable future that would add to the environmental consequences of the proposed action. The environmental consequences associated with existing hunting, fishing, gathering; timber harvesting; agriculture; mining; recreation; transportation networks; and land use patterns would not result in a significant direct, indirect, cumulative, or disproportionate effect.

No mitigation measures are required to address environmental consequences associated with existing hunting, fishing, gathering; timber harvesting; agriculture; mining; recreation; transportation networks; and land use patterns.

4.1.8 Other Values

4.1.8.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and the proposed project site would continue to be used for agricultural irrigation water transportation purposes. The existing wilderness, noise and light, visual, and public health and safety as described in Section 3.1.8 would not change.

4.1.8.2 Alternative B – Proposed Project

Under the Proposed Action Alternative, DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. There are no significant changes to the existing wilderness; light; and visual. However minor changes will occur to the noise and public health and safety in the localized Drop 4 area.

Noise: According to the U.S. Department of Housing and Urban Development (HUD) Office of Community Planning and Development guidelines associated with the Noise control Act of 1972, The Quiet communities Act of 1978 as amended, average sound level measurements for noise sensitive use are applicable to residential setting, or quiet sensitive commercial uses such as hospital or libraries. The proposed hydropower facility is not considered a noise sensitive use; however, the residence located approximately 250 ft to the northwest would be considered a noise sensitive use. As described in the HUD guidelines the average sound level values are to be achieved in the interior noise sensitive use building space, not necessarily at the generating source. The HUD guidelines state that a sound level of less than 65 dB is acceptable for noise sensitive use. Sound levels that are more than 65 dB but less than 75 dB are considered by HUD to be normally unacceptable and would require some form of attenuation. Noise levels decrease and the distance from the sound generation source increases.

Noise levels at the east side of the Drop 4 spillway base range from approximately 70 to 85 decibels (dB). At a distance of approximately 50 ft east and 150 ft southeast (adjacent to the Main Canal) of the spillway base the noise levels drop to approximately 65 to 75 dB. At a distance of approximately 200 ft northwest of the spillway, adjacent to the northwest residence landscaping and slightly beyond the topographic embankment, the noise levels drop to approximately 44 to 55 dB. While sound levels associated with the existing site conditions adjacent to the spillway are in excess of the values identified by HUD as appropriate for noise sensitive use, the sound levels decrease to acceptable values near the residence.

As a comparison, the noise levels in the interior of the Drop 3 Power Generation Facility brick building with one of the two one-megawatt vertical turbine operating ranged from approximately 74 to 90 dB, depending on proximity to the various operating features. At a distance of approximately 10 feet from the building exterior brick walls where glass windows were present (some opened), the noise level dropped to approximately 63 to 68 dB. At a distance of approximately 10 ft from the exterior building area where double single panel wood doors were closed the noise level had dropped to 61 to 66 dB. The sound levels at approximately 10 ft from the Drop 3 Power Generation Facility building exterior were generally lower than to the sound level at 50 to 150 ft from the existing spillway.

According to the U.S. Department of Housing and Urban Development Office of Community Planning and Development document titled *The Noise Guidebook*, the sound transmission class (STC) is equal to the number of dB a sound is reduced as it passes through a material. The STC is used to assist in evaluating construction material selection capable of adequately attenuation elevated sound locations. According to *The Noise Guidebook* a standard 4 inch brick walls, similar to the Drop 3 Power Generation Facility building, has a STC of 45 dB, presuming the wall is of a consistent material type. For comparison purposes *The Noise Guidebook* lists a typical wood exterior solid core door with a STC of 23 dB and a standard 2 inch by 4 inch wood stud frame exterior wall has having a STC of 39 dB.

If the Drop 4 inline turbine generated 90 dB and the generator building utilized a standard frame wall with a STC of 39, then the predicted exterior noise level would be expected to be approximately 51 dB and below the current noise levels at the Drop 4 spillway and the value established by HUD for noise sensitive use. Review of the selected generator building wall construction materials in incorporated into the proposed action. No additional mitigation measures are required to attenuate the predicted noise levels associated with the operating turbine.

As a best management practice, construction inspection of placed building materials has been incorporated into the proposed action to confirm that expected sound attenuation values have been achieved.

Public Health and Safety: Public safety features associated with the existing spillway are limited to a hand rail adjacent to the spillway gate access and one sign along the WIP access road warning that access is restricted to authorized personnel. Public safety features have been incorporated into the project design and include such items as a fenced transformer yard, locking building doors, and guardrails. The increase in public safety features associated with the Drop 4 spillway is a minor beneficial effect.

There are no significant wilderness; noise and light; visual; and public health and safety related projects planned for the surrounding vicinity in the foreseeable future that would add to the environmental consequences of the proposed action. The environmental consequences associated with existing wilderness, noise and light, visual, and public health and safety would not result in a significant direct, indirect, cumulative, or disproportionate effect.

No mitigation measures are required to address environmental consequences associated with existing wilderness; noise and light; visual; and public health and safety.

4.2 CULTURAL AND ARCHEOLOGICAL

4.2.1 Alternative A – No Action

Under the No Action Alternative DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The proposed project site would likely continue to be used for irrigation water delivery purposes. Potential Cultural and Archeological issues associated with the site would likely remain unchanged from the current condition.

4.2.2 Alternative B – Proposed Project

Under the Proposed Project Alternative DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. Ground disturbance to approximately 5,200 sf would occur and previously unknown historical, cultural or archeological items may be identified.

Direct Effect: A *Cultural Resources Survey Report of Yakama Power Drop 4 Phase I* was completed by the YN Cultural Resources Program in January 2011 (2011 Cultural Survey) and authored by authored by Dave M. Woody, M.S., YN Archeologist. The 2011 Cultural Survey stated that the survey did not identify any cultural, archeological or historic properties within the proposed project area. The YN Cultural Resource Program issue a subsequent report titled *Cultural Resources Monitoring Report for the Yakama Power Drop 4 Phase I Soil Test Excavations*, authored by Dave M. Woody, M.S., YN Archeologist and dated March 2011 (2011 Cultural Monitoring), stated that no cultural or archaeological materials were encountered during the test pit excavations.

In a letter titled *Yakama Power Drop 4 Project* dated June 5, 2012 and authored by Kate Valdez, YN THPO, Ms. Valdez states that she has reviewed the document submitted by Jillian Taylor, YN Cultural Resource Program Archaeologist, and Randell Corpuz, YN Cultural Resource Program Archaeologist Technician. Ms. Valdez states that the project area has fill material and that no cultural resources were identified within the project area. Ms. Valdez recommended that the project move forward provided that cultural monitoring occur in ground disturbing activities that occur in areas adjacent to the drop that are not fill materials.

Under the proposed action, ground disturbance to an expected depth of 4 to 20 ft below existing grade would occur in an approximately 5,200 sf area. Due to the potential for cultural, archeological or historical issues not previously identified being exposed during ground disturbing activities, Mr. Dave Woody and Ms. Valdez, recommended that as a best management practice construction related ground disturbing activities be monitored by the Cultural Resources Program. The Cultural Resource Program best management practices for monitoring

coordination and appropriate responses should newly discovered items be identified have been incorporated into the proposed action.

Indirect Effect: As a result of the project, a qualified individual with the YN Cultural Resource Program was retained to complete a Cultural Resource Survey of the entire project area, including east adjacent private property that may be used for temporary construction staging and materials lay down areas that will be mowed but not excavated. Additionally the YN Cultural Resource Program recommended that cultural monitoring be incorporated into the proposed action. As a result of this incorporation one qualified individual with the YN Cultural Resource Program will be retained to complete monitor of ground disturbing activities during construction.

Cumulative Effect: No Historical, Cultural or Archeological issues have been identified for the project area in either the 2011 Cultural Survey, the 2011 Cultural Monitoring, or Ms. Valdez June 5, 2012 letter. The likelihood of new historical cultural or archeological issues being identified during construction is low. As a result of the YN Culture Resource Program recommendation to include monitoring during ground disturbing construction activities the potential for new historical, cultural, or archeological items being significantly disturbed is low.

Disproportionate Effect: The completion of a Cultural Resource Survey and Monitoring during ground disturbing activities would not result in a disproportionate effect on minority populations or the portion of the population below the poverty line.

4.3 THREATENED AND ENDANGERED SPECIES AND POTENTIAL FISH PRESENCE

4.3.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and the potential impact to TES would remain unchanged.

4.3.2 Alternative B – Proposed Project

Under the Proposed Project Alternative DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The facility would be constructed and no effect to TES or potential fish presence would occur. Following is a summary of the direct, indirect, cumulative and disproportionate effect associated with TES and Potential Fish presence:

Direct Effect: The Main Canal, where the proposed project will occur, is not salmonid fish bearing waters. In a letter authored by Brad Parrish, YNFRM Biologist, dated December 20, 2011 titled *No effect determination for Drop 4 Hydropower Project on Steelhead* (YNFRM 2011 Letter), Mr. Parrish stated that the proposed Drop 4 Hydropower Project **will not affect Steelhead populations** in the Yakima basin. See Appendix F for a copy of the resource report.

In a letter authored by Mark Nuetzmann, YNWRMP Wildlife Biologist, dated January 4, 2012, titled *Drop 4 Project – Wildlife Report,* Mr. Nuetzmann stated that the proposed project is anticipated to have **no effect** on the federally listed and candidate species identified. See Appendix F for a copy of the resource report.

Indirect Effect: Approximately 50 cfs of water currently diverted into Harrah Drain may remain or be diverted to the Main Canal for a distance of approximately 2 miles before being routed into Harrah Drain. The potential withholding of 50 cfs of water from being directed into Harrah Drain represents approximately 33% of the current 150 cfs estimated Harrah Drain flow in this area, but only a 10.4% increase in Main Canal flow.

During a June 5, 2012 telephone interview, Mr. Longoria, Fisheries Biologist with YNFRM, confirmed that Chinook have not been identified in Harrah Drain near the vicinity of Drop 4. The most recent record documenting Steelhead presence in Harrah Drain was over 10 years ago. The screening measures in place to prevent salmonid fishes from entering the canal are discussed in the report titled *U.S. Bureau of Indian Affairs Wapato Irrigation Project Biological Assessment Wapato Irrigation project Operations* (Wapato Project BA)*,* dated march 2003 and revised March 2009, prepared by Eco-Northwest of Selah, Washington. The Wapato Project BA was submitted to the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (Fisheries) in 2009. Long term resource management recommendations discussed in the Wapato Project BA have included construction of features that would preclude fish from habiting Harrah Drain. The YNFRM reviewed the project details and available information on fish identified within Harrah Drain and issued a **letter of no effect**. See Appendix F for a copy of the resource reports. The proposed project has no indirect effect on potential salmonid fish presence in Harrah Drain.

Cumulative Effect: While irrigation water usage in the Yakima Basin may have a cumulative effect on salmon and steelhead recovery in the Columbia River and its tributaries, the proposed project does not change or modify WIP's water withdrawal or return practices to the Yakima River. Irrigation practices in the Toppenish Valley commenced approximately 100 years ago and drives an approximate $200 million gross revenue industry in an area that has a 40 to 100% minority population with an increasing percentage (10 to 20%) earning less than $24,000 per capita. While WIP continues to work on irrigation water delivery efficiency and conservation irrigation practices, within the foreseeable future, identified as the next 5 to 10 years, WIP has no significant changes planned related to the amount of water diverted for irrigation, or the source of irrigation water, or the water return practices.

Disproportionate Effect: Since there is no effect on TES or on fish potentially present within Harrah Drain there would be no disproportionate effect on minority populations or the portion of the population below the poverty line.

4.4 INVASIVE SPECIES AND NOXIOUS WEEDS

4.4.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the

design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and mitigation to preclude translocation of invasive species or noxious weeds would not be required.

4.4.2 Alternative B – Proposed Project

Under the Proposed Project Alternative DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The facility would be constructed and invasive species or noxious weeds could be transferred to the project site. Following is a summary of the direct, indirect, cumulative and disproportionate effect associated with invasive species and noxious weeds:

Direct Effect: In a letter issued by Nathan Longoria, YNFRM Fisheries Biologist, dated May 30, 2012 and titled *Fisheries comments on invasive species mitigation in concern to Drop* 4, did not identify any invasive species present at the project site; rather the letter provided a general overview of species that may be present within the region. As a best management practice, Mr. Longoria recommended that the following USFWS mitigation prescriptions be incorporated into the proposed action to control the identified invasive species.

All in Stream Equipment (from Excavators to Boots and Rakes)

- All equipment will be clean, inspected for leaks, and in good working order.
- Remove any visible invertebrates, aquatic plants, and soil.
- Pressure wash equipment with hot water (≥120° F) and allow equipment to dry completely (4+ hours).
- Scrub all small gear and equipment, soak in hot water (≥120° F) for at least 5 minutes, and allow equipment to dry completely (4+hours).
- Monitor and document the ambient air temperatures.
- Document that heavy equipment was inspected.
- Monitor the water soak temperature and the soak time to meet stated targets.
- Conduct a secondary visual inspection after cleaning and drying.
- If not properly cleaned, Re-scrub, re-soak, re-dry, and re-inspect the equipment.

In a June 7, 2012 email, Mr. Jason Newquist, YN VIPM, stated that for the past two years the YN VIPM has been completing surveys and controlling noxious weeds on the BIA WIP. In the email Mr. Newquist has concurred that incorporation of the following best management practices into the proposed action would be appropriate to control invasive plants.

All Soil Disturbing Activities

- Inspect the area prior to soil disturbance and remove any noxious weeds identified.
- Clean equipment before it is brought on site to remove any seed, etc. that could result in noxious weed being brought onto the site.

- Clean equipment before it leaves the site so any seed, etc. from the ground disturbance is not spread to a new location.
- Reseed or restore the site as soon as feasible to prevent undesirable weed getting started.
- Monitor the project site after completion to confirm that noxious weeds have not started growing.
- If new noxious weed are identified, eradicate them.

The recommendations from Mr. Longoria and Mr. Newquist have been incorporated into the proposed action.

Indirect Effect: Given the proximity to the irrigation canal transportation pathway, should noxious weeds or invasive species become established in the project area the seed or eggs could be transported throughout the WIP delivery area. If equipment and tools are not adequately cleaned before they are brought onto the site for construction they could transfer noxious weeds or invasive species to the project location. Once established the noxious weeds or invasive species would increase the areas that WIP is currently mitigating for these issues.

Cumulative Effect: Both YN and Yakima County have invasive species and noxious weed programs designed to assist in the eradication of these undesirable species and plants. Additionally, the YN VIPM has programs to identify, monitor and if needed, mitigate identified invasive species. For the past two years the YN VIPM program has included surveying and controlling noxious weeds within WIPs ROW. Natural resources can be seriously impacted when noxious weeds displace native vegetation with monocultures, lowering biodiversity. Following are some examples of potential invasive species and noxious weed impacts:

- Fish habitat is threatened by having unstable soils which leads to poorer water quality and increased sediment yields;
- Wildlife habitat is disrupted and degraded;
- Traditional root-grounds and berry fields can become unproductive;
- Visual beauty is decreased;
- Tree regeneration in timber harvest areas is suppressed;
- Agricultural farmland that is left idle becomes inundated with weed populations, which lower the potential for economic viability;
- Uncontrolled weed infestations stress the political integrity with our neighboring governments

Disproportionate Effect: The spread of noxious weeds and invasive species reduces land productivity, increases the cost of managing crop land, and increases agency services, such as the YN and Yakima County noxious weed programs to mitigate the spread of these species. In an area where 10 to 20 percent of the per capita population is below the poverty level, increased crop management costs means less available capital for employees and for baseline services. In addition invasive species can spread throughout native species habitat reducing the availability and health of native plants, agricultural crops and traditional food gathering areas.

4.5 DESIGN CONSIDERATIONS

4.5.1 Right-of-Way

4.5.1.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and changes to the right-of-way would not be required.

4.5.1.2 Alternative B – Proposed Project

Under the Proposed Project Alternative DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The facility would be constructed and minor changes to the right-of-way would occur. Following is a summary of the direct, indirect, cumulative and disproportionate effect associated with design considerations:

Direct Effect: Under the proposed action approximately 5,200 sf of the existing WIP right-of-way would be used to contain the newly constructed inlet, generator house, transformer pad, and tailrace that would be used for power generation. Additionally 4 to 6 utility poles and associated transmission wire would be installed adjacent to the Drop 4 access road terminating at the existing 34.5 kV transmission line that extends parallel with Harrah Drain road. Modification to the downstream weir would occur and construction of a small water diverting feature would be constructed downstream of Drop 4. WIP currently owns two additional power generation facilities upstream of the Drop 4 location and has operating agreements in place with YP for both facilities. Land use by WIP for purposes of power generation is consistent with the irrigation system design and current operations.

The proposed action is designed to be contained within the existing WIP right-of-way. As a portion of the proposed action the WIP right-of-way boundaries will be surveyed to confirm location. Any boundary line discrepancies will be resolved prior to construction implementation.

Indirect Effect: A construction lay down and materials staging area will be located northwest of the Drop 4 location on the adjacent landowner's property. The construction lay down and materials staging area will be temporarily fenced during the short construction time period. The area will be mowed, consistent with existing landowner practice, but ground disturbance is not expected to occur in this area. Additionally a gate will be installed on the existing shared gravel surfaced road access road between the construction lay down and materials staging area and the residential site to the northwest.

Cumulative Effect: There are no significant right-of-way related projects planned for the surrounding vicinity in the foreseeable future that would add to the environmental consequences of the proposed action. The Drop 4 project would result in less than one-eighth (approximately 5,200 sf) acre ground disturbance of which approximately 2,500 sf may be an uncovered outlet

raceway. The proposed ground disturbance area represents approximately 0.003% of WIPs main canal system ROW area or 0.00006% of the combined agricultural, rural and city residential properties contained within the Yakama Reservation boundaries. No mitigation measures are required to address the environmental consequences associated with the minor change in right-of-way use.

Disproportionate Effect: The minor changes to the right-of-way do not have a disproportionate effect on minority populations or the portion of the population below the poverty line.

4.5.2 Power

4.5.2.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and the continued design considerations review would not be required.

4.5.2.2 Alternative B – Proposed Project

Under the Proposed Project Alternative DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The facility would be constructed and additional electricity would be generated. Following is a summary of the direct, indirect, cumulative and disproportionate effect associated with the generation of additional power:

Direct Effect: Hydropower produced by YP operated facilities would increase by approximately 2,800,000 kWh between April and October. Power generated at the Drop 4 location would provide an alternate source of electricity supply within the transmission system that would assist in meeting the summer peak electric demands. On June 4, 2012 during telephone interviews both Steve Rigdon, YP General Manager, and Chad Begay, YP Engineer, indicated that the capacity of the YP owned 34.5 kV transmission line has been evaluated and determined to have sufficient capacity to transmit the additional proposed one megawatt of generated power.

Indirect Effect: The primary power supplier to the YP owned transmission line, BPA, is restricted on the amount of power that can be provided during summer peak demands by the size and capacity of the Alfalfa Substation. The Drop 4 hydropower project would facilitate an infusion of electricity into the transmission system from a source other than through the substation that could help alleviate some of the restraints associated with peak power demands and result in a more reliable transmission system. The infusion of a new electric source into the transmission system extending from the Alfalfa substation has a minor beneficial environmental consequence.

Cumulative Effect: There are no significant power generation, planned infrastructure changes, mining activities occurring in the surrounding vicinity in the foreseeable future that would add to the environmental consequences of the proposed action.

Disproportionate Effect: The addition of approximately 1,700 ft of transmission power lines does not have a disproportionate effect on minority populations or the portion of the population below the poverty line.

4.5.3 Water Quality Parameters

4.5.3.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and changes to water quality parameters would not occur.

4.5.3.2 Alternative B – Proposed Project

Under the Proposed Project Alternative DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The facility would be constructed and no significant changes to water quality parameters would occur. Following is a summary of the direct, indirect, cumulative and disproportionate effect associated with design considerations:

Direct Effect: There is no water quality parameter data available for the Main Canal near the vicinity of Drop 4. The 2001 WSCC report did not include the WIP Main Canal in the study; however, water quality data was reported for Marion Drain a downstream receiving water location. Marion Drain was rated Poor for temperature/dissolved oxygen; fair for fish access; good for peak flow and low flow; and as "data gap" for channel conditions, substrate, riparian conditions, and toxics.

The inline turbine design is such that there is no direct contact between irrigation water and maintenance fluid containing mechanisms. The water quality parameters associated with irrigation water passing through the inline turbine for power generation purpose will not change significantly. The EPA Clean Water Act Section 401 permit review and application, if required, has been incorporated into the proposed action. See Section 4.7 for additional regulatory requirement and permit discussion.

Indirect Effect: As a portion of the proposed action the flow of irrigation water into Harrah Drain may be reduced by reduced by 50 cfs. Given that no irrigation flow is directed into Harrah drain in the non-irrigation season and Harrah WWTP is generally within the required NPDES permit constraints, a change of 0.02% of total Harrah Drain volume during the irrigation season would likely pose no significant change to the composition of downstream constituents. This EA did not evaluate Harrah WWTP compliance with NPDES permit requirements or compliance with the BIA requirement to discharge only Class A water to the WIP system; rather this EA reviewed the Harrah WWTP data as a means of describing the indirect effect the proposed action may of on water quality conditions in Harrah Drain.

Cumulative Effect: Due to the penstock design, very little air or oxygen will be mixed into the irrigation water during power generation; however some mixing with oxygen may occur during discharge through the tail race. By comparison, the water churn that occurs from the approximately 20 ft free fall over the existing spillway before plunging into the lower canal, likely measurably increases the amount of dissolved air or oxygen in the irrigation water. No mitigation measures are required to address environmental consequences associated with water quality parameters.

Disproportionate Effect: There are no significant water quality related projects planned for the surrounding vicinity in the foreseeable future that would add to the environmental consequences of the proposed action. Water quality associated with the Main Canal near the vicinity of Drop 4 does not have a disproportionate effect on minority populations or the portion of the population below the poverty line.

4.5.4 Flow Reduction in a Portion of Harrah Drain

4.5.4.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and flow reduction in portions of Harrah Drain would not occur.

4.5.4.2 Alternative B – Proposed Project

Under the Proposed Project Alternative DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The facility would be constructed and the volume of water directed to Harrah Drain at an upstream diversion may be reduced for an approximate distance of two miles. Following is a summary of the direct, indirect, cumulative and disproportionate effect associated with the reduction of flow into Harrah Drain:

Direct Effect: As a result of the proposed action the flow in Harrah Drain may be reduced from approximately 150 cfs to 100 cfs or approximately 33%. Concurrently the flow in the Main Canal may increase from approximately 431 cfs to 481 cfs or 10.4%. See Section 4.5.3 for a discussion on potential water quality parameters associated with the flow changes. No mitigation measures are required to address the direct environmental consequences associated with the flow reduction in a portion of Harrah Drain.

Indirect Effect: The screening measures in place to prevent salmonid fishes from entering the Main Canal are discussed in the report titled *U.S. Bureau of Indian Affairs Wapato Irrigation Project Biological Assessment Wapato Irrigation project Operations* (Wapato Project BA), dated march 2003 and revised March 2009, prepared by Eco-Northwest of Selah, Washington. In a letter authored by Brad Parrish, YNFRM Biologist, dated December 20, 2011 titled *No effect*

determination for Drop 4 Hydropower Project on Steelhead (YNFRM 2011 Letter), the YNFRM stated that steelhead have not been documented in the WIP Main Canal (the location of the project), however the project may affect flows for a distance of two miles in the Harrah Drain where Steelhead have been identified. Refer to Appendix F for a copy of Mr. Parrish's letter. During a June 5, 2012 telephone interview with Mr. Nathan Longoria, YNFRM Fisheries Biologist confirmed that Chinook have not been identified in this portion of Harrah Drain. The YNFRM letter additionally states that the proposed Drop 4 Hydropower Project **will not affect Steelhead populations** in the Yakima basin. No mitigation measures are required to address the indirect environmental consequences associated with the flow reduction in a portion of Harrah Drain.

Cumulative Effect: There are no significant Harrah Drain flow reduction related projects planned for the surrounding vicinity in the foreseeable future that would add to the environmental consequences of the proposed action.

Disproportionate Effect: The reduction of approximately 50 cfs of flow in Harrah Drain for an approximate distance of two mile does not have a disproportionate effect on minority populations or the portion of the population below the poverty line.

4.5.5 Decommissioning

4.5.5.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and decommissioning considerations would not be required.

4.5.5.2 Alternative B – Proposed Project

Under the Proposed Project Alternative DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The facility would be constructed and decommissioning at end-of-life would need to be considered. Following is a summary of the direct, indirect, cumulative and disproportionate effect associated with the generation of additional power:

Direct Effect: For purposes of this EA the end-of-life for the hydropower facility has been estimated at 50 years. At end-of-life the facility will be evaluated to determine if retrofitting, repair, or removal is the best option. The construction design is such that the turbine can be isolated from the canal system by closing the head gate and tailrace. Structures constructed without considering decommissioning at end-of-serviceable life can increase the future cost of demolition. As a portion of the proposed action, a decommissioning plan will be developed for the Drop 4 hydropower facility prior to construction commencement.

Indirect Effect: There is no decommissioning plan in place for the Drop 4 spillway or Main Canal located near the vicinity of the Drop 4 site. The spillway was likely constructed in the

1920s or 1930s, and operated for the past 80 to 90 years. Engineered features will eventually reach end-of-serviceable life. At some date in the unforeseeable future, the decommissioning of the Drop 4 spillway could have a minor environmental consequence on the decommissioning plan for the Drop 4 site. Prior to construction a decommissioning plan for the Drop 4 Hydropower project will be developed that will take into consideration the existing spillway feature.

Cumulative Effect: There are no significant decommissioning related projects planned for the surrounding vicinity in the foreseeable future that would add to the environmental consequences of the proposed action.

Disproportionate Effect: The decommissioning of the Drop 4 hydropower project does not have a disproportionate effect on minority populations or the portion of the population below the poverty line.

4.6 INTENTIONAL DESTRUCTIVE ACTS

4.6.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and no preventative action would be required to mitigate intentional destructive acts.

4.6.2 Alternative B – Proposed Project

Under the Proposed Project Alternative DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The facility would be constructed and environmental consequences associated with intentional destructive considered. Following is a summary of the direct, indirect, cumulative and disproportionate effect associated with intentional destructive acts:

Direct Effect: The construction and operation of this hydropower energy project would not involve the transportation, storage, or use of radioactive, explosive, or toxic materials. The proposed project would not attract intentional destructive, and is not anticipated to encourage intentional destructive acts.

Indirect Effect: The proposed project does not offer any particularly attractive targets of opportunity for terrorists or saboteurs to inflict adverse impacts to human life, health, or safety. The proposed project will not indirectly attract potential destructive acts, and will not result in indirect effect on intentional destructive acts.

Cumulative Effect: There are no particularly attractive targets of opportunity for terrorists tor saboteurs to inflict adverse impacts to human life, health, or safety near the vicinity of the proposed action. The proposed project does not have any cumulative effect on intentional destructive acts.

Disproportionate Effect: The proposed project does not have any disproportionate effect on minority populations or the portion of the population below the poverty line.

4.7 REGULATORY AND PERMIT REQUIREMENTS

4.7.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur and no permits would be required.

4.7.2 Alternative B – Proposed Project

Under the Proposed Project Alternative DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The facility would be constructed and permit requirements would be considered. Following is a summary of the direct, indirect, cumulative and disproportionate effect associated with permit requirements:

Direct Effect: A FERC application of exemption would be prepared and submitted to the regulatory agency for review, concurrence and approval prior to commencement of construction. Additionally a WIP agreement would be established and a CWA 401 C, if required, would be prepared and submitted to EPA for review and concurrence. Prior to construction, or as a portion of selected contractor requirements, a FARR dust suppression plan and SWPPP Best Management Practice (BMP) plan would be developed. A delay in submitting permit applications or submitting incomplete applications can result in construction delays and increased project expense. Failure to complete regulatory required plans could result in construction delays and monitory penalties.

Indirect Effect: The proposed project may require WIP to complete differed maintenance repairs scheduled for the Drop 4 spillway and downstream weir concurrent with planned construction rather than on future as needed basis.

Cumulative Effect: There are no other planned infrastructure projects near the vicinity that would contribute to the cumulative regulatory and permit requirements associated with the project. During select agricultural tasks, such as field tilling, dust originating from farming task near the vicinity of the project could be a minor contribution to dust suppressions requirements under the FARR.

Disproportionate Effect: The proposed project does not have any disproportionate effect on minority populations or the portion of the population below the poverty line.

4.8 CONSTRUCTION IMPLEMENTATION

4.8.1 Alternative A – No Action

Under the No Action Alternative, DOE would not provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. No project would occur, and construction implementation would not be required.

4.8.2 Alternative B – Proposed Project

Under the Proposed Project Alternative DOE is proposing to provide federal funding to the YN for the design, acquisition, installation, testing, and connection of an inflow turbine at Drop 4 on the existing WIP to generate approximately one megawatt of hydroelectric power. The facility would be constructed and construction implementation would be considered. Following is a summary of the direct, indirect, cumulative and disproportionate effect associated with construction implementation:

Direct Effect: Under the proposed action alternative the project development, including architectural and engineering design review, constructability review, engineers estimate, sequential construction phasing plan and construction management will need to be completed. One of the objectives of the constructability review will be to evaluate total construction cost and efficiency of the construction process. Final construction plans will be submitted to the permitting agency for review and permit issuance prior to construction commencement.

One of the objectives for the construction phasing plan will be to sequence work so that activities that potentially impact the canal bank, such as the inlet or outlet, are constructed during non-irrigation season. With the exception of the inlet and outlet impact to the canal banks, other portions of the project are not restricted to non-irrigation season work. Installed gate systems or coffer-type dams may be used to isolate power generation facilities features that intersect the canal banks from other portions of the project that are still under construction during irrigation season.

The temporary construction staging and materials laydown area is located on private land adjacent to the construction site. The primary access road to the Drop 4 site is shared with the adjacent landowner. During construction there will be a temporary short-term increase in traffic on the shared access road.

Indirect Effect: The WIP differed maintenance repairs scheduled for the Drop 4 spillway and downstream weir modifications may need to be scheduled concurrent with planned construction rather than on future as needed basis. Attempting to complete construction out of sequence could result in completion time delays or additional expense.

Cumulative Effect: There are no significant construction projects near the vicinity of the Drop 4 site that would contribute to the cumulative effect of construction implementation. The cumulative effect of the project will be an increase in hydropower generation, and increase in

revenue available for WIP differed maintenance, increase transmission line reliability, increase in temporary short term construction workers, and an increase of one full time and one part time employee.

Disproportionate Effect: The proposed project does not have any disproportionate effect on minority populations or the portion of the population below the poverty line.

5.0 MITIGATION MEASURES

The following mitigation measures and best management practices incorporated into the project design will be implemented as a portion the proposed action.

5.1 EXISTING CONDITIONS

5.1.1 Land Resources

No mitigation measures are required to address significant environmental consequences associated with land resources.

5.1.2 Water Resources

No mitigation measures are required to address significant environmental consequences associated with water resources.

5.1.3 General Air Quality

No mitigation measures are required to address significant environmental consequences associated with general air quality. See Section 5.7 for a discussion of the FARR plan that is incorporated and will be implemented in the proposed action as a best management practice.

5.1.4 Living Resources

In a letter authored by Brad Parrish, YNFRM Biologist, dated December 20, 2011 titled *No effect determination for Drop 4 Hydropower Project on Steelhead* (YNFRM 2011 Letter), Mr. Parrish stated that the proposed Drop 4 Hydropower Project **will not affect Steelhead populations** in the Yakima basin.

In a letter authored by Mark Nuetzmann, YNWRMP Wildlife Biologist, dated January 4, 2012, titled *Drop 4 Project – Wildlife Report,* Mr. Nuetzmann stated that the proposed project is anticipated to have **no effect** on the federally listed and candidate species identified.

As a standard YP best management practice transmission line poles that have been designed according to the Avian Protection Plan Guidelines (APPG; APLIC, USFWS 2005) have been incorporated and will be implemented in the proposed action.

No mitigation measures are required to address significant environmental consequences associated with wildlife, vegetation, ecosystems and biological communities, or agriculture.

5.1.5 Cultural Resources

A *Cultural Resources Survey Report of Yakama Power Drop 4 Phase I* was completed by the YN Cultural Resources Program in January 2011 (2011 Cultural Survey) and authored by Dave M. Woody, M.S., YN Archeologist. The 2011 Cultural Survey stated that the survey did not identify any cultural, archeological or historic properties within the proposed project area. The YN Cultural Resource Program issued a subsequent report titled *Cultural Resources Monitoring Report for the Yakama Power Drop 4 Phase I Soil Test Excavations*, authored by Dave M. Woody, M.S., YN Archeologist and dated March 2011 (2011 Cultural Monitoring), stated that no cultural or archaeological materials were encountered during the test pit excavations.

In a letter titled *Yakama Power Drop 4 Project* dated June 5, 2012 and authored by Kate Valdez, YN Tribal Historic Preservation Officer, Ms. Valdez states that she has reviewed the document submitted by Jillian Taylor, YN Cultural Resource Program Archaeologist, and Randell Corpuz, YN Cultural Resource Program Archaeologist Technician. Ms. Valdez states that the project area has fill material and that no cultural resources were identified within the project area. Ms. Valdez recommended that the project move forward provided that cultural monitoring occur in ground disturbing activities that occur in areas adjacent to the drop that are not fill materials.

The Culture Committee reviewed 2012 cultural survey documents and the THPOs recommendation, and on June 5, 2012 approved the survey work under Committee Action Number 047 2012. See Appendix F for resource reports.

As best management practices, cultural monitoring during ground disturbing activities has been incorporated and will be implemented in the proposed action. See Section 5.2 for a discussion on specific cultural monitoring best management practices.

No mitigation measures are required to address significant environmental consequences associated with Cultural Resources.

5.1.6 Socioeconomic Conditions

As a result of the proposed action approximately 20 persons would be employed on a short term temporary basis and approximately one full time and one part time employment position would be created. This represents a short term approximate decrease in local unemployment of approximately 0.08% and while a minor benefit is not a significant environmental consequence.

No mitigation measures are required to address environmental consequences associated with employment and income; demographic trends; lifestyle and cultural values; or community infrastructure.

5.1.7 Resource Use Patterns

No mitigation measures are required to address environmental consequences associated with hunting, fishing, gathering; timber harvesting: mining; recreation; transportation networks; or land use plans.

5.1.8 Other Values

Review of the selected generator building construction materials incorporated into the proposed action indicated that expected sound levels outside the generator building will be below the current sound levels resulting from water churning over the existing spillway. As a best management practice, construction inspection of placed building materials has been incorporated and will be implemented into the proposed action to confirm that expected sound attenuation values have been achieved.

No mitigation measures are required to address environmental consequences associated with wilderness, noise and light, visual or public health and safety.

5.2 CULTURAL AND ARCHEOLOGICAL

Construction efforts will require an appropriate level of monitoring throughout the construction process to help ensure that measures protective of potential cultural and archeological features are used and their intended results are achieved. Consistent with recommendations identified in the 2011 Cultural Survey and good industry practice, the following mitigation measures have been incorporated and will be implemented into the proposed action:

- Notify the Cultural and Archeological Department prior to initiating ground disturbance activities so that discretionary observation and monitoring can be scheduled.
- In the event that cultural or archaeological resources are discovered during ground disturbing tasks, work will stop or redirected to another area of the project until the cultural or archaeological resource can be documented, its significance assessed, and appropriate mitigation strategies developed in consultation with the THPO.
- In the event that the anticipated construction zone needs to be expanded, work will stop and an assessment of the potential for the expanded area to impact adjacent area resources will be prepared and the Tribal Cultural and Archeological Department will be consulted.

5.3 THREATENED AND ENDANGERED SPECIES AND POTENTIAL FISH PRESENCE

The YNWRM program has reviewed the TES and determined that the proposed project will have **no effect** on TES. No mitigation measures are required for TES.

The WIP Main Canal, where the project is proposed to occur, is screened to prevent salmonid fish entering the waters. Steelhead have been identified in portions of Harrah Drain. Water currently being diverted into Harrah Drain at an established diversion located north of Harrah may in the future be retained or diverted to the WIP Main Canal. The effect of the reduction of

total water volume flowing into Harrah Drain on fish reported to be present has been reviewed by the YNFRM and determined to have **No Effect** on steelhead populations in the Yakima Basin. No mitigation measures are required for potential fish presence.

5.4 INVASIVE SPECIES AND NOXIOUS WEEDS

No invasive species or noxious weeds have been identified at the Drop 4 site. During the construction process there are multiple pathways that can result in translocation of invasive species and noxious weeds. Through mitigation practices, control of the introduction of invasive species and noxious weeds can be accomplished in a practical way. The following mitigation prescriptions are recommended by the USFWS to control noxious weeds and invasive species. These prescriptions have been incorporated and will be implemented into the proposed action for task that require entering the water or disturbing soil for the first time.

All in Stream Equipment (from Excavators to Boots and Rakes)

- All equipment will be clean, inspected for leaks, and in good working order.
- Remove any visible invertebrates, aquatic plants, and soil.
- Pressure wash equipment with hot water (≥120° F) and allow equipment to dry completely (4+ hours).
- Scrub all small gear and equipment, soak in hot water (≥120° F) for at least 5 minutes, and allow equipment to dry completely (4+hours).
- Monitor and document the ambient air temperatures.
- Document that heavy equipment was inspected.
- Monitor the water soak temperature and the soak time to meet stated targets.
- Conduct a secondary visual inspection after cleaning and drying.
- If not properly cleaned, Re-scrub, re-soak, re-dry, and re-inspect the equipment.

All Soil Disturbing Activities

- Inspect the area prior to soil disturbance and remove any noxious weeds identified.
- Clean equipment before it is brought on site to remove any seed, etc. that could result in noxious weed being brought onto the site.
- Clean equipment before it leaves the site so any seed, etc. from the ground disturbance is not spread to a new location.
- Reseed or restore the site as soon as feasible to prevent undesirable weed getting started.
- Monitor the project site after completion to confirm that noxious weeds have not started growing.
- If new noxious weed are identified, eradicate them.

In addition to the procedures identified above the following procedures has been incorporated and will be implemented into the proposed action for site landscaping and restoration activities associated with the site.

Plants and Seed

- A licensed nursery should provide all trees, grasses and shrubs for location at the site.
- Plants should be inspected by a professional to identify any potential hazards within 48 hours of delivery to project site.

5.5 DESIGN CONSIDERATIONS

A functional and reliable design that can be constructed within the available funding source has relatively low annual maintenance costs, and a seasonal revenue stream is essential to the success of a power generation facility project. A qualified team of YN professionals has reviewed the design plans and will continue to refine the project criteria including considerations for future decommissioning. Construction sequencing will be coordinated such that work impacting stream banks will be completed during non-irrigation season. Additionally, equipment selection will be such that environmentally compatible products in use by YP for Drop 2 and Drop 3 hydropower facilities can be used in the Drop 4 facility. Spill prevention, control, and countermeasure (SPCC) BMPs will be designed into the project and will be implemented as a portion of standard operating procedures.

5.5.1 Right-of-Way

The proposed action is designed to be contained within the existing WIP right-of-way. As a portion of the proposed action the WIP right-of-way boundaries will be surveyed to confirm location. Any boundary line discrepancies will be resolved prior to construction implementation.

The construction lay down and materials staging area will be temporarily fenced during the short construction time period. The area will be mowed, consistent with existing landowner practice, but ground disturbance is not expected to occur in this area. Additionally a gate will be installed on the existing shared gravel surfaced road access, between the construction lay down and materials staging area and the residential site to the northwest.

5.5.2 Power

The infusion of a new electric source into the transmission system extending from the Alfalfa substation has a minor beneficial environmental consequence.

No mitigation measures are required to address environmental consequences associated with Power.

5.5.3 Water Quality Parameters

The water quality parameters associated with the Main Canal are not expected to change significantly as a result of the proposed action. The EPA Clean Water Act Section 401 permit review and application, if required, has been incorporated and will be implemented in the proposed action. See Section 5.7 for additional regulatory requirement and permit discussion.

No mitigation measures are required to address environmental consequences associated with water quality parameters.

5.5.4 Flow Reduction in a Portion of Harrah Drain

As a result of the proposed action the flow in Harrah Drain may be reduced from approximately 150 cfs to 100 cfs or approximately 33%. Concurrently the flow in the Main Canal may increase from approximately 431 cfs to 481 cfs or 10.4%. See Section 5.5.3 for a discussion on potential water quality parameters mitigation measure with associated with the flow changes.

The screening measures in place to prevent salmonid fishes from entering the Main Canal are discussed in the report titled *U.S. Bureau of Indian Affairs Wapato Irrigation Project Biological Assessment Wapato Irrigation project Operations* (Wapato Project BA), dated march 2003 and revised March 2009, prepared by Eco-Northwest of Selah, Washington. In a letter authored by Brad Parrish, YNFRM Biologist, dated December 20, 2011 titled *No effect determination for Drop 4 Hydropower Project on Steelhead* (YNFRM 2011 Letter), the YNFRM stated that steelhead have not been documented in the WIP Main Canal (the location of the project), however the project may affect flows for a distance of two miles in the Harrah Drain where Steelhead have been identified. Refer to Appendix F for a copy of Mr. Parrish's letter. During a June 5, 2012 telephone interview with Mr. Nathan Longoria, YNFRM Fisheries Biologist confirmed that Chinook have not been identified in this portion of Harrah Drain. The YNFRM letter additionally states that the proposed Drop 4 Hydropower Project **will not affect Steelhead populations** in the Yakima basin.

No mitigation measures are required to address environmental consequences associated with flow reduction in a portion of Harrah Drain.

5.5.5 Decommissioning

There is no decommissioning plan in place for the Drop 4 spillway or Main Canal located near the vicinity of the Drop 4 site. Decommissioning of the Drop 4 spillway could have a minor environmental consequence on the decommissioning plan for the Drop 4 site. At end-of-life the Drop 4 Hydropower facility will be evaluated to determine if retrofitting, repair, or removal is the best option. The construction design is such that the turbine can be isolated from the canal system by closing the head gate and tailrace. As a portion of the proposed action, a decommissioning plan will be developed for the Drop 4 hydropower facility prior to construction commencement.

No mitigation measures are required to address environmental consequences associated with decommissioning.

5.6 INTENTIONAL DESTRUCTIVE ACTS

Temporary construction staging and materials lay down areas will be fenced so as not to offer any particularly attractive targets of opportunity for terrorists or saboteurs to inflict adverse impacts to human life, health, or safety. Facility structures will be equipped with locks and fenced yards so as not to offer any particularly attractive targets inflict adverse impacts to human life, health, or safety.

5.7 REGULATORY AND PERMITS REQUIREMENTS

Permit applications and regulatory compliance plan, where required, will be completed early in the construction process so that the reviewing agency will have adequate time to process the application. All required regulatory plans, and permit applications will be completed and approved by the applicable regulatory authority prior to construction completion. Following is a summary of identified permits and regulatory compliance plans:

- FERC application of exemption
- WIP agreement with YP
- CWA 401 Certification, if required
- FARR dust suppression plan
- SWPPP Best Management Practice (BMP) plan

5.8 CONSTRUCTION IMPLEMENTATION

Construction implementation schedule will be developed concurrent with design considerations and permit requirements. Following are the mitigation measures associated with construction implementation issues that have been incorporated and will be implemented into the proposed action:

1. **Canal Work**: Construction that impacts canal banks will be sequenced such that work will occur during non-irrigation season. All other work can be completed without regard to water presence in the canal.
2. **Temporary Short-term Noise Control:** Temporary short-term increases in noise generation will occur during select construction activities. Temporary short-term construction noise is anticipated to be within the range common to agriculture crop production. Construction noise generating activities will be limited to the extent feasible and will be restricted to daylight hours.
3. **Adjacent Residence Gate:** A gate will be installed across the driveway between the temporary construction staging and materials lay down area, and the adjacent residence. The gate is being constructed at the request of the adjacent landowner and will be constructed near the base of his drive to preclude unrestricted traffic from entering his residence during construction. The gate will additionally provide a visible barrier between the work site and his residence.

6.0 CONSULTATION AND COORDINATION

- YN Interdisciplinary Team
- BIA Natural Resources
- BIA Branch of Forestry
- BIA Wapato Irrigation Project
- YN Department of Natural Resources
- YN Cultural Resources Program
- YN Tribal Historical Preservation Office (THPO)

- YN Wildlife Program
- YN Fisheries Program
- YN Forestry Program
- YN Water Resources Program
- YN Water Code
- YN Zoning Program
- YN Facilities Management
- YN Environmental Program
- Washington State Department of Fish and Wildlife

Required coordination and applicable regulatory requirements:

- **American Indian Religious Freedom Act**, Public Law No. 95-341, 92 Stat. 469 (Aug. 11, 1978) (commonly abbreviated to AIRFA), codified at 42 U.S.C. § 1996
- **Antiquities Act of 1906**; 16 U.S.C. § 431 to § 433
- **Archaeological Resources Protection Act of 1979** (Pub.L. 96-95 as amended, 93 Stat. 721, codified at 16 U.S.C. §§ 470aa–470mm), also referred to as ARPA
- **Archeological and Historic Preservation Act** (Public Law 86-523, 16 U.S.C. 469-469c-2)
- **Clean Water Act** 33 U.S.C. §1251 et seq.
- **Endangered Species Act of 1973** (ESA; 7 U.S.C. § 136, 16 U.S.C. § 1531 et seq.)
- **Executive Order No. 11593 Protection and Enhancement of the Cultural Environment** Ex. Ord. No. 11593, May 13, 1971, 36 F.R. 8921
- **Executive Order No. 13007: Indian Sacred Sites** 61 Fed. Reg. 26711
- **Executive Order 13084: Consultation and Coordination with Indian Tribal Governments** 63 Fed. Reg. 27655
- **Historic Sites Act of 1935,** 49 Stat. 666; 16 U.S.C. sections 461-467
- **NEPA,** 42 U.S.C. § 4321
- **National Historic Preservation Act (NHPA)**; Public Law 89-665; 16 U.S.C. 470 et seq.)
- **Native American Graves Protection and Repatriation Act (NAGPRA)**, Pub. L. 101-601, 25 U.S.C. 3001 et seq., 104 Stat. 3048,

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Washington State Department of Ecology (Ecology). Eastern Washington Storm Water Manual. Reviewed June 2012, from http://www.ecy.wa.gov/biblio/0410076.html.

Washington State Department of Ecology (Ecology). Facility Site Atlas. Retrieved October 2010, from http://apps.ecy.wa.gov/website/facsite/viewer.htm.

Washington State Department of Ecology (Ecology). Well Logs. Retrieved June 2012, from http://apps.ecy.wa.gov/welllog/.

Washington State Department of Ecology. 2004, Revised Annotated Version March 2007. WASHINGTON STATE WETLAND RATING SYSTEM for EASTERN WASHINGTON Ecology Publication # 04-06-15. Thomas Hruby, PhD. August 2004.

YN Fisheries Resource Management, *No effect determination for Drop 4 hydropower project on Steelhead,* December 20, 2011

YN Wildlife Resource Management Program, *Drop 4 project – Wildlife Report,* January 4, 2012

YN Cultural Resource Program, *Cultural Resources Survey Report of Yakama Power Drop 4 Phase I,* January 2011

YN Cultural Resource Program, *Cultural Resources Monitoring Report for the Yakama power Drop 4 Phase I Soil Test Excavations,* March 2011

YN Fisheries Resource Management, *Fisheries comments on invasive species mitigation in concern to Drop 4,* May 30, 2012

YNFRM correspondence dated May 30, 2012 and titled *Fisheries comments on invasive species mitigation in concern to Drop* 4

YN Vegetation and Invasive Plant Management (VIPM), *Integrated Weed Management Plan,*

YN Vegetation and Invasive Plant Management (VIPM), *Priority Invasive Plant List*

Yakima County. 2012. Geographical Information System (GIS) Land Information Portal, aerial photographs and Zoning Map. From http://www.yakimap.com/.

EMAIL REFERENCES

Begay, Chad; Lewis, Connie; Rigdon, Steve. 8-Dec-11. Email to PMW. Drop 4 EA figures. Received the report, the figures, part 1 and 2 of the appendix.

Begay, Chad; Lewis, Connie; Rigdon, Steve; Williamson, Peggy. 20-Apr-12. Investigating the land owner at Drop 4 to help with the FERC process.

Begay, Chad; Lewis, Connie; Rigdon, Steve; Williamson, Peggy. 7-Jun-12. Revised draft document sent.

Begay, Chad; Rigdon, Steve; Williamson, Peggy. 1-Jun-12. Need to track down the following: updated drawings, capacity of the Harrah Drain Rd. transmission line, confirmation of the BIA Superintendent.

Begay, Chad; Williamson, Peggy. 12-Jun-12. Gate Placement.

Bell, Robert; Spencer, Michael; Turpin, Theresa. 30-Jun-12. Email to PMW. Project may qualify for a conduit exemption.

Carusona, Christopher; Gillham, Cass; Lewis, Connie; Pierce, Lizana. 20-Mar-11. Email to PMW. Providing DOE a copy of the Cultural Committee Action that states the 106 Consultation has been fulfilled.

Follow up on the DOE Comments on the draft EA for YN Hydropower Project.

Clark, Rocco. 8-Dec-11. Email to PMW. Please review the Drop 4 project.

Part 2 of 4 maps.
Part 3 of 4 maps- Appendix 1
Part 4 of 4- Appendix 2

Clark, Rocco; Lewis, Connie; Rembold, Paul; Wangemann, Stephen; Weasel, Jewell Pretty; Williamson, Peggy. 12-Dec-11. Recommendation to include the US Dept. of Energy, Energy Efficiency and Renewable Energy as a cooperating agency.
Clark, Rocco; Lewis, Connie; Rigdon, Phil; Williamson, Peggy. 03-Jan-12. WIP information.

Clark, Rocco; Lewis, Connie; Rigdon, Steve; Williamson, Peggy. 16-Feb-12. When will BIA file for an exemption with the FERC? What is the deadline for filing comments on the subject EA?

Clark, Rocco; Lewis, Connie; Rigdon, Steve; Williamson, Peggy. 11-Jun-12. Proposed final draft date.

Clark, Rocco; Lewis, Connie; Williamson, Peggy. 4-Jan-12. Mark Neutzmann of Yakama Nation Wildlife Resource Management asking if a "No Effect" documentation on terrestrial species is necessary.

Clark, Rocco; Lewis, Connie; Williamson, Peggy. 5-Jan-12. Please give Mr. Ridgon a copy of the WIP Harrah Drain McDonald Rd. (emails are being rejected).

Clark, Rocco; Lewis, Connie; Williamson, Peggy. 27-Jan-12. Will DOE Provide comment on the Drop 4 EA?

Clark, Rocco; Wangemann, Steve; Williamson, Peggy. 25-May-12. Working through incorporating the DOE comments on the draft Drop 4 EA with a target if issuing a final EA on June 1, 2012. Please provide me an opinion regarding the conformance of the project with BIA's Land Use Plan and the plan reference information.

Clark, Rocco; Williamson, Peggy. 29-Feb-12. Attached is the letter regarding lead agency status.
IDT

Clark, Rocco; Williamson, Peggy. 29-May-12. Fish Issues: No record for Yakima Co. Freshwater Canal Introduction Pathway, All invasive species Yakima Co.

Clark, Rocco; Williamson, Peggy. 14-Jun-12. Would you be up to presenting the final draft Drop 4 EA to the IDT?

Whomever would be sufficient to discuss the final draft EA with all issues being addressed within the document.

Clark, Rocco; Williamson, Peggy. 21-Dec-11. Asking if you need “No Effect" documentation on terrestrial species.“No Effect” determination by Yakama Nation Fisheries

Clark, Rocco; Williamson, Peggy. 9-Feb-12. Have received the resource reports. Do we have all reports needed for the completion of the EA? (Cultural and Archaeological Clearance, Water Resources Report, Water Code Permit, and Geo Technical information.)

Clark, Rocco; Williamson, Peggy. 30-May-12. Here is my response regarding the DOE comments: see attached.

Colfax, Yvonne; Williamson, Peggy. 25-Jun-12. No comments from Scott Ladd.

Driscoll, Diane; Lind, David; Lewis, Connie; Rigdon, Steve; Williamson, Peggy. 28-Feb-12. Drop 4 Turbine Project. Clarification of NON-bearing fish waters.

Gillham, Cass; Lewis, Connie; Pierce, Lizana; Williamson, Peggy. 20-Mar-12. 106 Consultation for the draft EA is completed and then the cultural and archeology survey is completed. If you look at the NEPA Compliance Narrative, that process is described. The YN Cultural Resources will complete the survey and the YN Tribal Historic Preservation officer will review the survey and make final recommendations.

Lewis, Connie. 4-Oct-10. Email to PMW. General site picture see how facility will sit in relationship to site.

Lewis, Connie. 7-Oct-10. Email to PMW. Additional information (preliminary statutory review).

Lewis, Connie. 1-Nov-10. Email to PMW. Finalization question: contract for Drop 4 EA.

Lewis, Connie. 6-Dec-10. Email to PMW. Expectations to be presented at the IDT meeting-request for cultural clearance for the geotechnical work.

Lewis, Connie. 24-Mar-11. Email to PMW. Samples collected with help from Chad Begay. Estimation on how long the testing will take.

Lewis, Connie. 5-Dec-11. Email to PMW. Attached is the Draft Drop 4 EA for your review and comment.

Lewis, Connie; Rigdon, Steve; Williamson, Peggy. 17-Feb-12. Potential outstanding issues: Cultural and Archaeological Clearance, Water Resource Report, Geo Technical information.

Lewis, Connie; Rigdon, Steve; Williamson, Peggy. 11-Apr-12. Property owner at Drop 4: Kelly Green 1770 Harrah Drain Rd. Harrah, WA. 98933.

Lewis, Connie; Rigdon, Steve; Williamson, Peggy. 7-Jun-12. Draft Document Review.

Lewis, Connie; Rigdon, Steve; Williamson, Peggy. 14-Jun-12. Phone call from Christopher (DOE) regarding the threatened and endangered species. He indicated he had some questions.

Lewis, Connie; Williamson, Peggy. 3-Jan-12. How will the problem of fish and WIP be resolved?

Lewis, Connie; Williamson, Peggy. 21-Feb-12. Are you going to want two separate documents produced for the wind power sites or one combined report?

Lewis, Connie; Williamson, Peggy. 21-Feb-12. Soil test report. Will we be presenting again to IDT with new information?

Lind, David; Longoria, Nathan; Rigdon, Steve; Williamson, Peggy. 11-Jun-12. Drop 4 DOE Comments.

Longoria, Nathan; Williamson, Peggy. 30-May-12. Introduction- I do a majority of the IDT consultation for fisheries. Received an email outlining your desire to have an EA drafted for the upcoming Drop 4 project.

Longoria, Nathan; Williamson, Peggy. 30-May-12. Here is a document that contains my comments on translocation of invasive species in regards to Drop 4.

Newquist, Jason. 07-Jun-12. JN to PMW. Drop #4

Newquist, Jason; Rigdon, Steve; Williamson, Peggy. 6-Jun-12. Needing general commentary regarding typical noxious weeds that might be present in the area.

Newquist, Jason; Williamson, Peggy. 7-Jun-12. We have been surveying and controlling invasive for two seasons now for the BIA WIP.

Rigdon Steve; Williamson, Peggy. 18-Jun-12. Have you heard from Christopher yet?

Rigdon, Steve; Williamson, Peggy. 28-Feb-12. Need to clear up the EA for Drop 4 to state that the project is "NOT" near fish bearing water.

Turpin, Theresa. 29-Jun-10. Email to PMW. Permitting process for from FERC on small hydro system.

IN PERSON INTERVIEW/MEETING REFERENCES

Begay, Chad; Lewis, Connie; Rigdon, Steve; Speelash, Jay (PEN). 7-Nov-11.

Begay, Chad; Johnson, Debra; Rigdon, Steve; Williamson, Peggy. Site walk and meeting. 12-Oct-10.

Green, Kelly. Meeting with Resident. 27- Oct-10.

Harrah Waste Water Treatment Plant Meeting. 07-Nov-11.

IDT Meeting. Topic: Project Review. 15-Nov-11.

IDT Meeting. Topic: Project Review. 20-Dec-11.

IDT Meeting. IDT update on project progress. Distribution update and task narrator. 19-Jun-11.

Rigdon, Steve. Meeting with Generation Manager at YP. 27-Oct-10.

Rigdon, Steve. Topic: Power Capacity. Program member: Terry Gromuleous, Air Quality. 04-Jun-12.

Thomas, S. Interview S. Thomas YN Environmental Program Manager. 15-Nov-11.

PHONE INTERVIEW REFERENCES

Begay, Chad. June 4, 2012. Interview by Peggy Williamson. Phone Interview.

Clark, Rocco. June 20, 2012. Interview by Peggy Williamson. Phone Interview. Comment dates.

Deker, Gayle. November 7, 2011. WWTP.

Kauser, Christoper. June 19, 2012. Interview by Peggy Williamson. Phone Interview. None Fish Bearing water- pole plant, API

Longoria, Nathan. June 5, 2012. Interview by Peggy Williamson. Phone Interview.

Newquist, Justin. November 15, 2011. WIP – Energy.

Newquist, Justin. June 1, 2012. Interview by Peggy Williamson. No prove assessment.

Rigdon, Steve. May 25, 2012. BIA DMD, tribal weed program.

Rigdon, Steve. June 1, 4, 2012. Interview by Peggy Williamson. Phone Interview.

8.0 LIST OF PREPARERS

Name	Position Title	Area of Expertise/Discipline
Peggy Williamson	Fulcrum Environmental Consulting, Inc. (Fulcrum), Principal	Primary Author Certified Hazardous Materials Manager (CHMM) Environmental Professional (ASTM AAI) 21 years' experience
Ryan Mathews	Fulcrum, Principal	Certified Industrial Hygienist, Certified Safety Professional
Jeremy Lynn	Fulcrum, Staff Geologist	Washington State Licensed Geology
Jason Stewart	Fulcrum, Staff Scientist	Biologist
Rocco Clark, Jr.	BIA, Natural Resource Specialist	IDT Coordinator and Land Use
Nathan Longoria	YNFRM, Fisheries Biologist	Invasive Species
Mark Nuetzmann	YNWRMP, Wildlife Biologist	Threatened and Endangered Species
Brad Parrish	YNFRM, Biologist	No Effect Determination for Fish in Harrah Drain
Jason Newquist	YN VIPM	Vegetative and Invasive Plants
Steve Rigdon	YP Generation Manager	Permitting and Construction Sequencing
Chad Begay	YP Engineer	Design Review and Transmission Capacity
Jay Spurlock	Pacific Energy Network, Inc.	Engineered Design and Drawings
Dave M. Woody	YN Cultural Resources Program	Cultural Resources Survey

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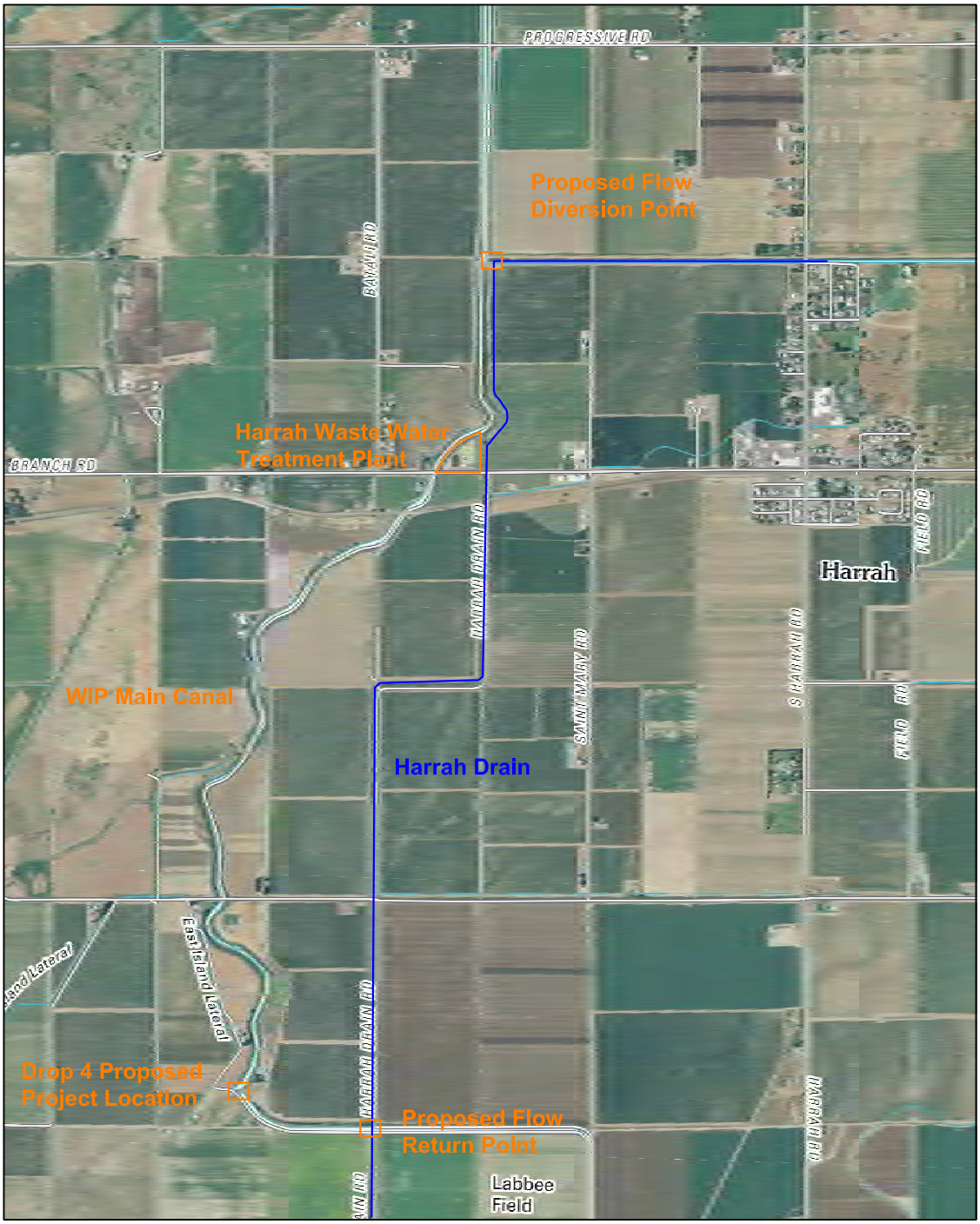

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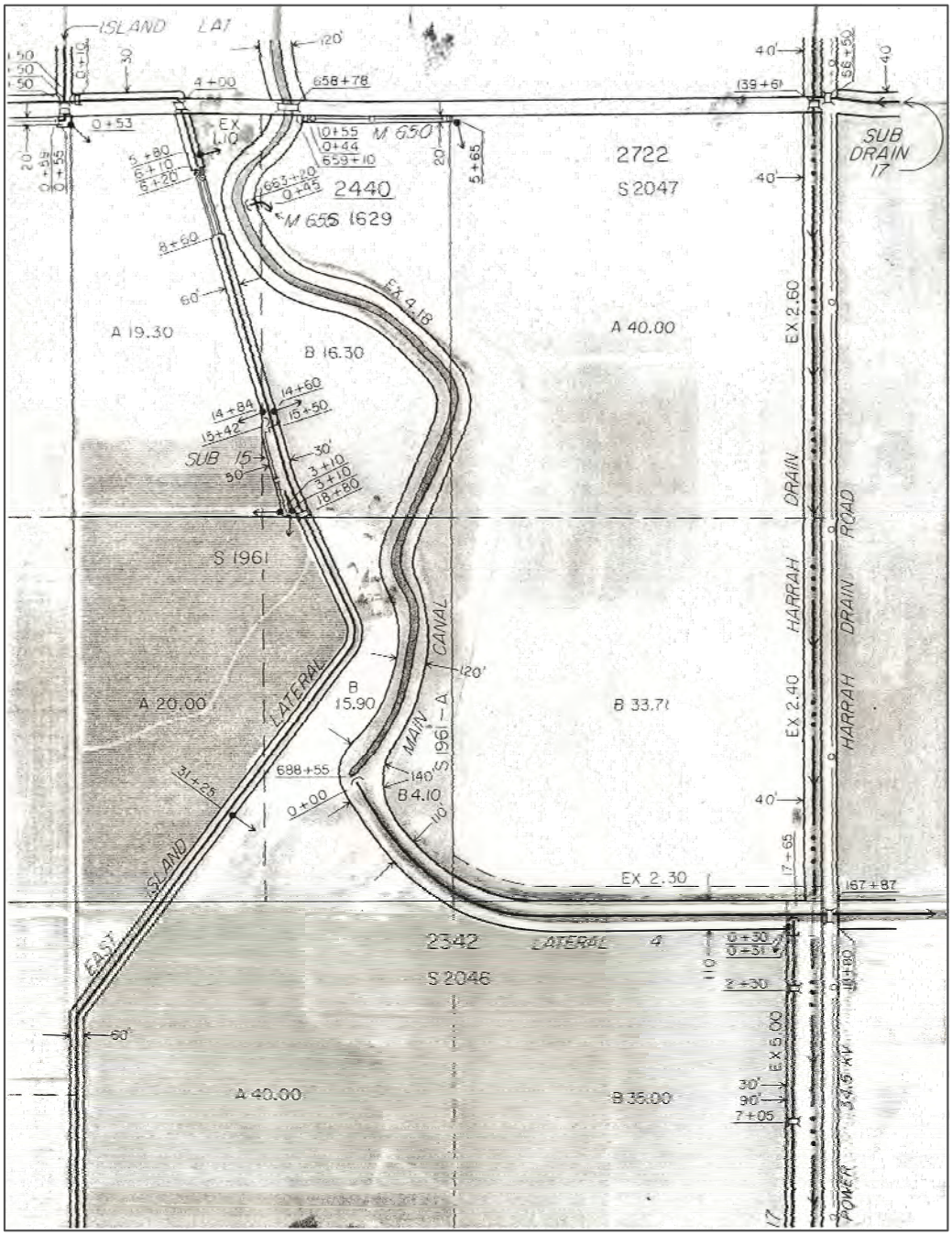
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S 2047
SUB DRAIN 17
8+60
60'
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SUB 15
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ISLAND
EAST
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167+87
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LATERAL 4
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POWER
17

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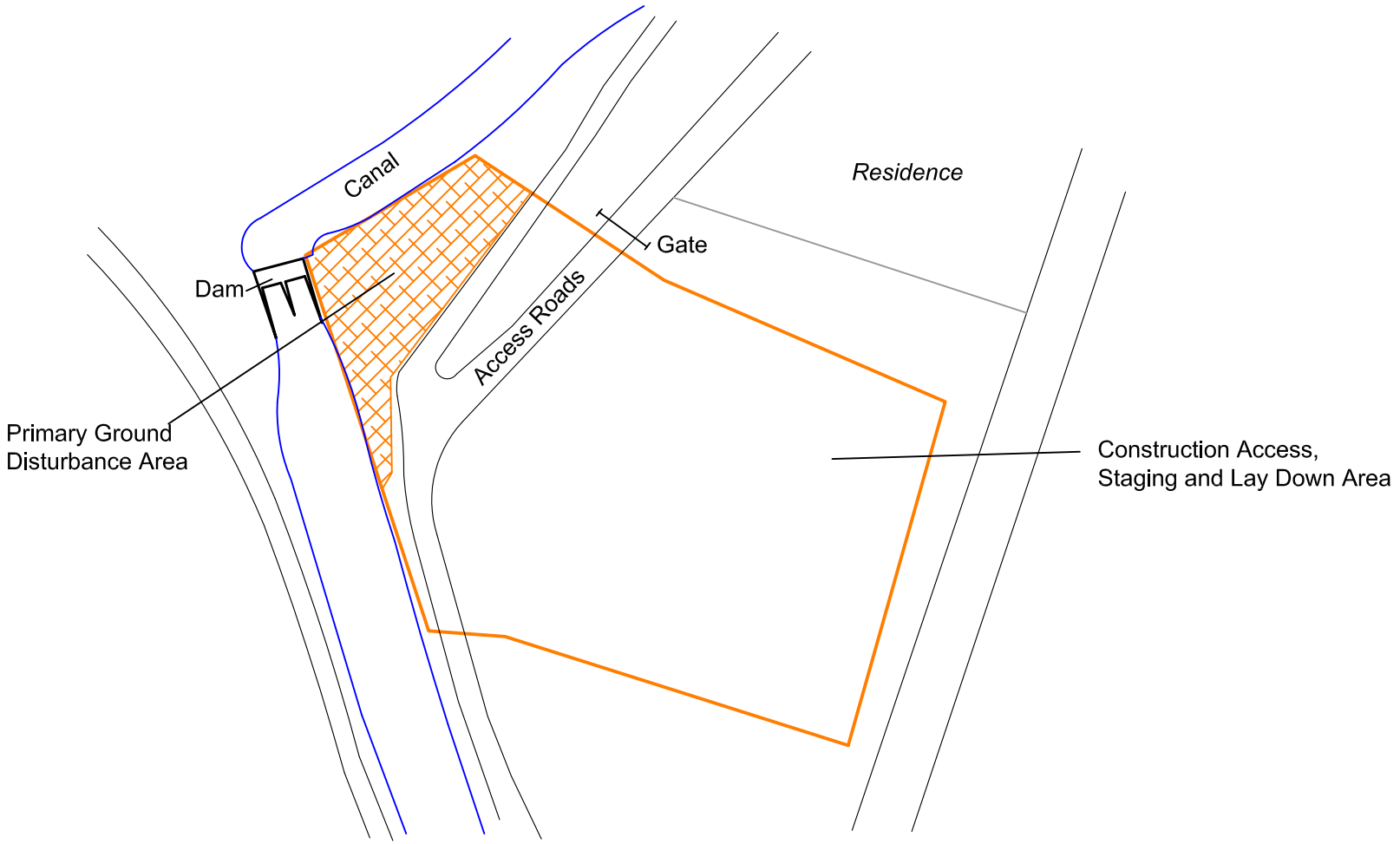

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YNHA Drop 4. 09033. SPB. 061112

Drop 4 Proposed Project
Harrah, Washington

Drop 4 Project Area

FIGURE
3

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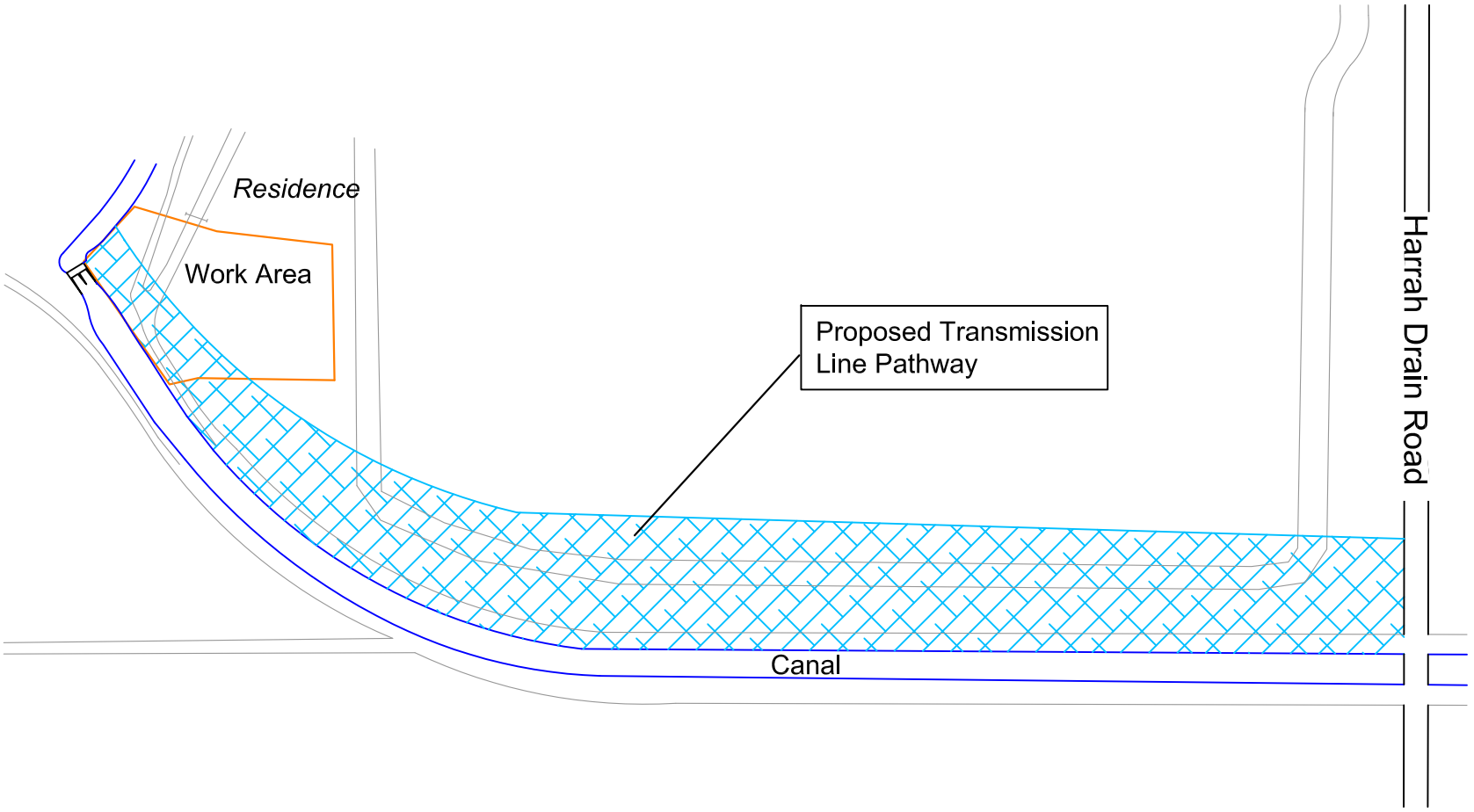

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Drop 4 Proposed Project
Harrah, Washington

Proposed Transmission
Line Pathway

FIGURE
4