



DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:

CECW-PE (10-1-7a)

13 August 1999

SUBJECT: Howard A. Hanson Dam, Green River, Washington

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report for additional water storage for municipal and industrial (M&I) water supply and ecosystem restoration for the existing Howard A. Hanson Dam project, Green River, Washington. It is accompanied by the reports of the district and division engineers. These reports are produced under authority provided in Section 216 of the Rivers and Harbors and Flood Control Act of 1970 (Public Law 91-611). Section 216 authorized the Secretary of the Army, acting through the Chief of Engineers to review the operation of completed projects constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes; when found advisable due to significantly changed physical or economic conditions, and to report to Congress on the advisability of modifying the structures or their operation, and for improving the quality of the environment in the overall public interest.
2. The U.S. Army Corps of Engineers constructed the existing project, which is entirely within the City of Tacoma's municipal watershed, in the early 1960's. It was authorized to provide flood control, downstream low-flow augmentation, irrigation, and M&I water supply. The irrigation and water supply portions of the authorization were not implemented.
3. A study of potential modifications to the existing project to improve fish and wildlife habitat within the reservoir and restore natural river functions for fish habitat improvement was completed by the Corps of Engineers in 1996, under the authority of Section 1135 of the Water Resources Development Act of 1986, (PL 99-662), as amended. This study culminated in the authorization of an ecosystem restoration project in May 1997, under PL 99-662, as amended. The restoration project modifies the existing project to provide additional summer conservation pool storage; changes in operation for fish flow augmentation; physical habitat improvements in the reservoir area; and minor modifications to the intake tower. It changes the water control operating plan of the existing project to allow for the raising of the summer conservation pool by six feet, from elevation 1,141 feet to 1,147 feet Mean Sea Level (MSL) to provide an additional 5,000 acre-feet of summer storage. The Section 1135 project modifications, which would be constructed prior to the implementation of the recommended plan, are considered a part of the "without project" condition.

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4. The City of Tacoma constructed a water transport pipeline and a 17-foot high diversion dam, downstream of the existing project, at river mile (RM) 61, in 1913, to facilitate the use of its first diversion water right claim of 400 cubic feet per second (cfs). This claim has currently been developed to 113 cfs. The diversion dam blocked the upstream migration of anadromous fish; it effectively removed approximately one half of the river basin as spawning and rearing habitat for the coho, and chinook salmon and the steelhead in the Green River. When the Howard A. Hanson Dam was constructed at RM 64, four miles upstream of the diversion dam, there were no runs of anadromous fish above the diversion dam; no provisions for fish passage were built into the dam. The Howard A. Hanson Dam isolated over 106 miles of good river and stream habitat. Juvenile hatchery winter steelhead, coho, and fall salmon have been planted in the Upper Green River watershed, above the dam, since 1982, 1983, and 1987 respectively. Outmigrating juvenile fish resulting from these watershed plantings have had to traverse the slack water reservoir and locate the deep-water outlets to exit the project. Survival of these juvenile fish has been poor.

5. The city has a second water right that it intends to exercise. The city will be raising its diversion dam eight feet and will provide upstream and downstream fish passage at the diversion dam, in conjunction with the implementation of their second diversion water right. The City of Tacoma has also agreed to provide upstream fish passage around the Howard A. Hanson Dam. The Corps dam would be left as the sole impediment to fish passage on the Green River. The city has requested that additional water storage be provided at the dam to facilitate the implementation of its second water right. The Corps has investigated the potential for additional storage at the project to help meet M&I water supply needs of the city and the Puget Sound area. The scope of the study was expanded in 1994 to include ecosystem restoration.

6. The reporting officers evaluated various alternative plans for providing M&I water supply for the Tacoma area and ecosystem improvements on the Green River. Single-purpose water supply, and dual-purpose water supply and ecosystem restoration alternatives, including provisions for immediate full, as well as phased implementation were considered. They recommend authorization of a dual-purpose phased plan, which would modify the Howard A. Hanson Dam by changing the reservoir operation to allow for raising the level of the existing reservoir conservation pool by 30 feet for additional water storage and ecosystem restoration. The pool would be raised from elevation 1,147 feet to elevation 1,177 feet MSL, in two phases to store 32,000 acre-feet of water, including 22,400 acre-feet for M&I water supply, and 9,600 acre-feet for ecosystem restoration, in the spring for release during the summer and fall. All structural and mitigation features associated with raising the level of the conservation pool from elevation 1,147 MSL (includes six-foot height established by the Section 1135 project) to elevation 1,167 feet MSL and all ecosystem restoration features, except low-flow augmentation, would be constructed during the initial phase of the project. Phase II would

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provide for the construction of the remaining additional water storage mitigation features required to raise the pool level to elevation 1,177 MSL and low-flow augmentation. The plan includes the following features:

a. Storage of up to 20,000 acre-feet of M&I water, in the raise of the existing authorized reservoir conservation pool elevation of 1,147 feet to elevation 1,167 feet MSL, during Phase I;

b. Additional storage of 12,000 acre-feet of water, including 2,400 acre-feet for M&I water and 9,600 acre-feet of water for low-flow augmentation, in the raise of the reservoir conservation pool from elevation 1,167 feet to the higher elevation of 1,177 feet MSL, during Phase II. The implementation of Phase II would be dependent on an evaluation of Phase I success and consensus of the State and Federal resources agencies, the Muckleshoot Indian Tribe, City of Tacoma, and the Corps of Engineers;

c. New intake tower with new fish collection and transport facility including a wet well, stoplogs, floating fish collector, fish lock, discharge conduit, fish transport pipeline, monitoring equipment, and new access bridge and road. The downstream fish passage provided by the additional water storage features, along with the upstream fish passage facilities that would be constructed by the City of Tacoma at its diversion dam, will open 106 miles of high quality river and stream habitat in the Green River watershed above the Corps dam.

d. Right abutment drainage remediation for the operational storage changes;

e. New support buildings, or additions to existing buildings, including:

(1) An expanded administration building to allow for the new fish passage monitoring equipment and additional personnel necessitated by the new fish passage;

(2) A maintenance building required to provide a ventilated, heated and secure workspace for routine maintenance and repair work; and

(3) A generator building to house the generator which will be used to power the crane to be used to place stoplogs; available power in the area is not sufficient to power the large crane required to place the stoplogs;

f. Ecosystem restoration features, other than fish passage, including gravel nourishment for the improvement of nine acres of spawning habitat and the reconnection of 3.5 acres of side channel habitat, downstream of the Howard A. Hanson Dam, and 64 miles of river and tributary stream habitat improvements throughout the lower Green River, including the area

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adjacent to the dam reservoir. The restoration features would restore and maintain naturally reproducing and self-sustaining, harvestable runs of historical species of anadromous fish in the Green River;

g. Mitigation features at the project, including management of upland forest and forage areas, wetland and riparian habitat, and maintenance of in-stream habitat in Phase I and Phase II. The required mitigation is 121.6 acres of riparian habitat and 17.4 acres of in-stream habitat area inundated by the pool raise, upstream of the dam, and 8.75 acres of in-stream habitat below the dam; and

h. Environmental monitoring conducted during a period of five to eight years for Phase I and an additional period of five years for Phase II to insure the optimal operation of the new downstream fish passage facility, non-fish passage restoration and mitigation features.

7. The recommended project would inundate approximately 442 acres of terrestrial habitats, including 121 acres of riparian habitat, as well as 17.4 acres of tributary stream habitats. Most of the habitat mitigation/restoration features would be on land controlled by the Corps of Engineers or City of Tacoma, the non-Federal sponsor. Approximately 2,132.4 acres of land, including 1,482.34 acres for Phase I and 648.06 for Phase II would be involved in the initial construction of the project. The non-Federal sponsor can currently demonstrate fee ownership for 1,153.27 acres of land for fish and wildlife mitigation and restoration sites, and the pool raise area. It will need to acquire and or make available 1,607.73 acres of land for fish and wildlife mitigation and restoration. Approximately 34.21 acres of land would be needed for permanent access to the fish and wildlife mitigation and restoration sites. The delivery rate of the stored M&I water would be established by the City of Tacoma, and the delivery rate of the low-flow augmentation water would be adaptively managed by the Corps, resources agencies, Indian Tribe and City of Tacoma.

8. The recommended project plan would not provide for any additional storage above the 106,000 acre-feet of storage allocated for flood control, but would take advantage of storage available during the summer and fall months to provide M&I water supply and low-flow augmentation. Flooding in the Pacific Northwest is a problem from late fall to early spring, approximately mid-October to mid-February; during those months plenty of water is available for M&I water and there is no need for flow augmentation on the river. During the spring and fall the storage allocation gradually shifts from flood control to M&I water and low-flow augmentation, as the potential for flooding disappears. The plan would provide up to an additional 48 million gallons per day (mgd) of M&I water supply to help meet the increasing needs of Pierce and South King Counties, as well as the city of Seattle. Juvenile outmigration survival through the dam would be improved from the present 25 percent to as high as 95 percent. The combined effect of the recommended restoration actions is projected to support

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the minimum number of returning adult coho and chinook salmon and steelhead trout required to restore naturally reproducing runs of anadromous fish. The project will make a major cumulative contribution to restoration activity in the Green River watershed being carried out by a host of local, state, and Federal agencies and Indian Tribes.

9. The total estimated first cost of the recommended plan, based on October 1998 price levels, is \$74,865,000, which includes \$68,153,000 for Phase I and \$6,712,000 for Phase II. The Federal share of the total estimated cost of \$74,865,000 would be \$36,098,000 and the non-Federal share would be \$38,767,000. The total cost includes \$19,330,000 for water supply, and \$55,535,000 for ecosystem restoration, including \$4,383,000 for environmental monitoring and adaptive management measures which would be conducted up to eight years for Phase I and an additional five years for Phase II to insure the optimal operation of the new fish passage and non-fish passage restoration, and mitigation facilities. The cost of real estate is estimated at \$4,086,000 of the total project cost, which includes \$1,715,000 and 2,371,000 for Phases I and II, respectively. The non-Federal sponsor would be responsible for 100 percent of the cost allocated to water supply and 35 percent of the cost allocated to ecosystem restoration, with the Federal Government paying the remaining 65 percent of the cost allocated to ecosystem restoration. The cost of water supply is justified with average annual benefits and costs of \$1,477,000 and \$1,343,000. The resulting benefit-to-cost ratio is 1.1, based on a Federal discount rate of 6 7/8 percent, and a 50-year period for economic analysis. Restoration features are justified based on environmental outputs from the restoration of salmon habit along with 106 miles of habitat that would be opened above the dam and are not included in the benefit-to-cost ratio. The recommended plan is the National Economic Development (NED) plan.

10. The average annual operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) cost for the existing authorized project is about \$1,260,000. The non-Federal sponsor will be responsible for 7.9 percent (phase I) and 8.8 percent (Phase II) of the existing OMRR&R allocated to water supply, or about \$96,000 and \$107,000, respectively. The non-Federal sponsor will be required to pay 100 percent of the increased OMRR&R cost for the recommended modifications for water supply and ecosystem restoration, including fish and wildlife mitigation. The average annual cost of the increased OMRR&R would be about \$721,000, including \$621,000 associated with Phase I and \$100,000 associated with Phase II; but may range from \$700,000 to \$1,000,000 in any one year. In lieu of the non-Federal sponsor performing all OMRR&R associated with the modifications to this project, it is anticipated that the Corps may undertake a substantial amount of the OMRR&R using funds provided by the non-Federal sponsor for this purpose. Although the Corps policy generally is to require non-Federal OMRR&R of completed work, OMRR&R by the Corps of the modifications is appropriate in this case to ensure that such OMRR&R is integrated with the Corps operation of the existing dam and project facilities. This approach is consistent with

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Section 103 of the Water Resources Development Act of 1986, which requires that the non-Federal sponsor agree to pay 100 percent of the covered OMRR&R costs.

11. Washington level review indicates that the proposed plan is technically sound, economically justified, and environmentally and socially acceptable. The proposed project complies with applicable U.S. Army Corps of Engineers planning procedures and regulations. Also, the views of interested parties, including Federal, State, and local agencies, have been considered. National Marine Fisheries Service, U.S. Fish and Wildlife Service and Washington State Fish and Wildlife have provided letters supporting the recommended project. The City of Seattle, King County, and the Lake Haven, Covington, and Kent water districts support and will benefit from this project.

12. The Puget Sound chinook salmon was listed as threatened on 17 March 1999, under the Endangered Species Act (ESA). As a result of the listing, the City of Tacoma has asked the Corps to revisit the cost sharing for the project to determine if an adjustment should be made to reflect obligations that the Corps might have in order to respond to the recent listing. Accordingly, we will review this issue during preconstruction engineering, and design (PED) and make any appropriate adjustments to design, cost allocation, and cost sharing.

13. The Corps prepared a Biological Assessment during the feasibility phase of the additional water storage study. The proposed Phase I operation of the additional water storage component of the recommended plan and its effects on the listed Puget Sound chinook salmon were addressed in the Biological Assessment. The Corps expects to receive a letter of concurrence from the National Marine Fisheries Service (NMFS), in response to the Biological Assessment, early in the PED phase of the project. The recommended action is not expected to have any adverse effect on the Puget Sound chinook salmon. The overall effect of the modified project would be to improve conditions for chinook salmon in the Green River Basin, as concluded in the Biological Assessment. However, the Corps will engage in informal consultation with NMFS regarding the current operations of the dam associated with reservoir refill, low flow augmentation, and flood protection, as well as activities associated with the actual construction of the Phase I component for additional water storage, during PED. The Corps will prepare and submit a Programmatic Biological Assessment to NMFS and expects to receive a letter of concurrence, as part of the informal consultation process, prior to initiating the construction of major additional water storage features. However, should NMFS suggest formal consultation, the Corps will expect to receive a Biological Opinion as part of the formal consultation process. Consultation with the U.S. Fish and Wildlife Service (USFWS) on listed species, bald eagle and bull trout was completed in 1998. The Corps would once again engage in consultation with NMFS and USFWS regarding listed species and prepare the necessary Biological Assessments, once a decision is made to implement Phase II of the modified project.

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14. I concur in the findings, conclusions and recommendations of the reporting officers. Accordingly, I recommend that the Howard A. Hanson Dam be modified to provide additional water storage and ecosystem restoration generally in accordance with the reporting officers' recommended plan with such modifications, including possible changes to accommodate cost allocation concerns, as the Chief of Engineers deems advisable within his discretionary authority. My recommendations are subject to the non-Federal sponsor, the City of Tacoma, agreeing to comply with applicable Federal laws and policies, including the following requirements:

a. Provide 100 percent of the project costs allocated to water supply and 35 percent of project costs allocated to environmental restoration as further specified below:

(1) Enter into an agreement, which provides, prior to execution of the project cooperation agreement, 25 percent of design costs;

(2) Provide, during construction, any additional funds needed to cover the non-Federal share of design costs;

(3) Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Federal Government to be necessary for the construction, operation, and maintenance of the project;

(4) Provide or pay to the Federal Government the cost of providing all retaining dikes, wasteweirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation and maintenance of the project; and

(5) Provide, during construction, any additional cash as necessary to make its total contribution equal to 100 percent of the project costs allocated to water supply and 35 percent of the separable project costs allocated to environmental restoration,

b. Obtain at no cost to the Government, all water rights necessary for construction, operation, maintenance, repair, replacement, and rehabilitation of the project;

c. Pay 100 percent of the costs to operate, maintain, repair, replace, and rehabilitate (OMRR&R) the completed project, or functional portion of the project, in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and State laws and regulations and any specific directions prescribed by the Federal Government in the OMRR&R manual and any subsequent amendments thereto. The sponsor

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shall also pay for 7.8 percent (Phase I) and 8.8 percent (Phase II) of ongoing OMRR&R costs at the Howard A. Hanson Dam, allocated to water supply;

d. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor, now or hereafter, owns or controls for access to the project for the purpose of completing, inspecting, operating, maintaining, repairing, replacing, or rehabilitating the project; however, no completion, operation, maintenance, repair, replacement, or rehabilitation by the Federal Government shall relieve the non-Federal sponsor of responsibility to meet the non-Federal sponsor's obligations, or to preclude the Federal Government from pursuing any other remedy at law or equity to ensure faithful performance;

e. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the United States or its contractors;

f. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 Code of Federal Regulations (CFR), Section 33.20;

g. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C., 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for the construction, operation, maintenance, repair, replacement, and rehabilitation of the project. However, for lands that the Federal Government determines to be subject to navigation servitude, only the Federal Government shall perform such investigations unless the Federal Government provides the non-Federal sponsor with prior specific written direction, in which case the non-Federal sponsor shall perform such investigations in accordance with such written direction;

h. Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the construction, operation, maintenance, repair, replacement, and rehabilitation of the project;

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i. Agree that the non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA;

j. If applicable, comply with the provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR, Part 24, in acquiring lands, easements, and rights-of-way, required for the construction, operation, maintenance, repair, replacement, and rehabilitation of the project, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;

k. Comply with all applicable Federal and State laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C., 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army," and Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C., 701 b-12);

l. Provide 100 percent of that portion of total cultural resources preservation, mitigation, and data recovery costs assigned to construction of water supply and 35 percent of that portion of total cultural resource preservation, mitigation and data recovery costs assigned to construction of environmental restoration, that are in excess of one percent of the Federal share of the total first cost of the project authorized to be appropriated for water supply and environmental restoration and protection;

m. Recognize and support the requirements of Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resource project or separable element thereof, until the non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element;

n. Prescribe and enforce regulations to prevent obstruction of or encroachment on the project by structures or persons that would reduce the level of environmental restoration and protection it affords or that would hinder operation or maintenance of the project;

o. Do not use Federal funds to meet the non-Federal sponsor's share of total project


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costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized; and

p. Participate in and comply with applicable Federal floodplain management and flood insurance programs.

15. The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program nor the perspective of higher review levels within the executive branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to the Congress, the non-Federal sponsor, the City of Tacoma; the State of Washington; interested Federal agencies; the Muckleshoot Indian Tribe, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.



JOE N. BALLARD
Lieutenant General, U.S. Army
Chief of Engineers