DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, BALTIMORE DISTRICT
2 HOPKINS PLAZA
BALTIMORE, MD, 21201-2930

CENAB-PL-P

6 June 2025

MEMORANDUM FOR U.S. Army Corps of Engineers, North Atlantic Division (CENAD PD-X/R. Brian Paul), 301 John Warren Avenue, Fort Hamilton Community, Brooklyn, NY 11252-6700

SUBJECT: Submission of Review Plan for Washington D.C. Metropolitan Area Backup Water Supply Feasibility Study for North Atlantic Division Approval

1. Reference Engineer Regulation 1165-2-217 (Civil Works Review Policy), 2 September 2024.

2. Background: The Baltimore District developed the enclosed Review Plan (Enclosure 1) for the Washington D.C. Metropolitan Area Backup Water Supply Feasibility Study. The Review Plan, dated May 2025, has been reviewed for technical sufficiency and policy compliance by the Water Management and Reallocation Studies Planning Center of Expertise for Water Supply (WMRS PCX). The WMRS PCX endorsement (Enclosure 2) is dated 20 May 2025. The Review Plan includes a risk-informed decision to conduct Type I Independent External Peer Review.

3. Request: The Baltimore District requests that North Atlantic Division approve the Review Plan.

4. The point of contact for this action is Ms. Amy Guise, Chief, Planning Division, who can be reached at (410) 962-6138 or by email at amy.m.guise@usace.army.mil.

PERA.FRANCIS.BALAYE.1029339330

Digitally signed by PERA.FRANCIS.BALAYE.1029339330
Date: 2025.06.05 13:26:05 -04'00'

FRANCIS B. PERA
COL, EN
Commanding

DEPARTMENT OF THE ARMY
US ARMY ENGINEER DIVISION, SOUTHWESTERN
1100 COMMERCE STREET, SUITE 831
DALLAS TX 75242-1317

REPLY TO
ATTENTION OF

CESWD-PDP 20 May 2025

MEMORANDUM FOR Commander, North Atlantic Division, 302 John Warren Avenue
Brooklyn, NY 11252-6700

SUBJECT: Recommended Approval of the Review Plan for the Secondary Source Backup Water Supply for Washington DC Metropolitan Area Feasibility Study

1. The Water Management and Reallocation Studies Planning Center of Expertise (PCX) has reviewed the draft Review Plan (RP) for the subject study, provided October 2024, final version, dated May 2025 and recommends it for your approval. The PCX concurs that the RP satisfies the policy requirements for peer review outlined in Engineering Circular (ER) 1165-2-217, Civil Works Review Policy, dated 1 May 2021.

2. The RP includes a risk-informed decision to conduct Type I Independent External Peer Review (IEPR) based on potential project cost. The PCX concurs with this decision..

3. The District should post the approved RP and the MSC Commander's approval memorandum to its website, and provide links to the PCX and Headquarters for posting on their web pages. In addition, electronic copies of both documents should be provided to the PCX for our files.

4. If substantive revisions are made to the RP, due to changes in project scope or Corps policy, the revised RP should be provided again to this PCX for review. Non-substantive changes or updates do not require further PCX review.

5. As work on this study progresses, the District should ensure that the execution of peer reviews and quality assurance of planning models, as indicated in the RP, are managed through the PCX.

6. If you have any questions or concerns regarding this review, please contact Ms. Meredith LaDart, CESWD-PDP, at 251-463-8052.

LADART.MEREDITH.H.1292138853 Digitally signed by LADART.MEREDITH.H.1292138853 Date: 2025.05.20 12:05:32 -05'00'

Encl

MEREDITH LADART
Technical Director, WMRS PCX

CF: (w/encls)
CENAD-PD (Jadrosich)
CENAB-PD (Seiple)

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS NORTH ATLANTIC DIVISION
FORT HAMILTON MILITARY COMMUNITY
302 JOHN WARREN AVENUE
BROOKLYN NY 11252-6700

CENAD-PD-P (1105-2-10c)

MEMORANDUM FOR Commander, Baltimore District, U.S. Army Corps of Engineers, 2 Hopkins Plaza, Baltimore, MD, 21201-2930

SUBJECT: Approval of the Review Plan for Washington D.C. Metropolitan Area Backup Water Supply Feasibility Study for North Atlantic Division

1. References:

a. CENAB-PL-P, Transmittal Memorandum, (Request for Approval of the Washington D.C. Metropolitan Area Backup Water Supply Feasibility Study), dated 6 June 2025.

b. CESWD-PD-P, Water Management and Reallocation Studies (WMRS) Planning Center of Expertise (PCX), Dallas, TX, Memorandum, (Recommended Approval of this Review Plan), dated 20 May 2025.

2. The WMRS PCX has reviewed the draft Review Plan (RP) for the subject study, provided October 2024, and the version, dated May 2025 and recommends the final version for your approval. The RP received minor Major Subordinate Command and Review Manager edits on 13 August 2025 that separated out the Policy & Legal Compliance Review Team (P&LCRT). The Review Plan includes an Independent External Peer Review (IEPR).

3. The enclosed Review Plan is approved for execution and is subject to change as study circumstances require, consistent with study development under the Project Delivery Business Process. Subsequent revisions to this Review Plan or its execution require new written approval from NAD.

4. The point of contact is Mr. R. Brian Paul, NAD Planning Program Manager at 347-622-2878 or Robert.B.Paul@usace.army.mil.

CURRY.JESSE.THOMAS.1086509969
Digitally signed by CURRY.JESSE.THOMAS.1086509969
Date: 2025.09.08 18:53:29 -04'00'

JESSE T. CURRY
Colonel, EN
Commanding

3 Encls
1. CENAB Transmittal Memo
2. WMRS PCX Endorsement Memo
3. DC Metro Review Plan

Review Plan

May 2025
Revised August 2025

1. Project Summary

Project Name: Washington, D.C. Metropolitan Area Backup Water Supply Feasibility Study
Location: Metropolitan Washington Area, Washington DC, Maryland, and Virginia

P2 Number: 510691

Decision and Environmental Compliance Document Type: Feasibility Report

Congressional Authorization Required: Yes

Project Purpose(s): Water Supply

Non-Federal Sponsor: Metropolitan Washington Council of Governments

Points of Public Contact for Questions/Comments on Review Plan:

District: Baltimore District
District Contact: Study Manger, 410-962-4398

Major Subordinate Command (MSC): North Atlantic Division
MSC Contact: District Support Team – Civil Works Integration Division – 347-370-4608

Review Management Organization (RMO): Water Supply Planning Center of Expertise
RMO Contact: Technical Director, 251-463-8052

Key Review Plan Dates

Date of RMO Endorsement of Review Plan	20 May 2025
Date of MSC Approval of Review Plan	9 September 2025
Date of IEPR Exclusion Approval	N/A
Has the Review Plan changed since RMO Endorsement?	Updated schedule on 13 Aug 2025
Date of Last Review Plan Revision	13 August 2025
Date of Review Plan Web Posting	17 September 2025

Milestone Schedule and Other Dates*

	Scheduled	Actual
FCSA Execution	30 Sep 2024	30 Sep 2024
Alternatives Milestone	28 Apr 2025	12 June 2025
Tentatively Selected Plan Milestone	20 Apr 2028	
Release Draft Report to Public	20 Jun 2028	
Command Validation Milestone	25 Sep 2028	

Review Plan

May 2025
Revised August 2025

1. Project Summary

Project Name: Washington, D.C. Metropolitan Area Backup Water Supply Feasibility Study
Location: Metropolitan Washington Area, Washington DC, Maryland, and Virginia

P2 Number: 510691

Decision and Environmental Compliance Document Type: Feasibility Report

Congressional Authorization Required: Yes

Project Purpose(s): Water Supply

Non-Federal Sponsor: Metropolitan Washington Council of Governments

Points of Public Contact for Questions/Comments on Review Plan:

District: Baltimore District
District Contact: Study Manger, 410-962-4398

Major Subordinate Command (MSC): North Atlantic Division
MSC Contact: District Support Team – Civil Works Integration Division – 347-370-4608

Review Management Organization (RMO): Water Supply Planning Center of Expertise
RMO Contact: Technical Director, 251-463-8052

Key Review Plan Dates

Date of RMO Endorsement of Review Plan	20 May 2025
Date of MSC Approval of Review Plan	9 September 2025
Date of IEPR Exclusion Approval	N/A
Has the Review Plan changed since RMO Endorsement?	Updated schedule on 13 Aug 2025
Date of Last Review Plan Revision	13 August 2025
Date of Review Plan Web Posting	Pending

Milestone Schedule and Other Dates*

	Scheduled	Actual
FCSA Execution	30 Sep 2024	30 Sep 2024
Alternatives Milestone	28 Apr 2025	12 June 2025
Tentatively Selected Plan Milestone	20 Apr 2028	
Release Draft Report to Public	20 Jun 2028	
Command Validation Milestone	25 Sep 2028	

Final Report Transmittal	23 Jan 2031	
State & Agency Briefing	23 Mar 2031	
Chief's Report or Director's Report	30 Apr 2031	

*Scheduled dates are pending approval of Vertical Team Alignment Memo and Additional Resources Request.

2. References

Engineer Regulation 1165-2-217 – Water Resources Policies and Authorities – Civil Works Review Policy, 1 May 2021.

Engineer Circular 1105-2-412 – Planning – Assuring Quality of Planning Models, 31 March 2011.

Planning Bulletin 2013-02, Subject: Assuring Quality of Planning Models (EC 1105-2-412), 31 March 2013.

Office of Management and Budget, Final Information Quality Bulletin for Peer Review, Federal Register Vol. 70, No. 10, January 14, 2005, pp 2664-267

The online USACE Planning Community Toolbox provides more review reference information at: https://planning.erdc.dren.mil/toolbox/current.cfm?Title=Peer%20Review&ThisPage=Peer&Side=No.

3. Review Execution Plan

The general plan for executing all required independent reviews is outlined in the following two tables.

Table 1 lists each study product to be reviewed. The table provides the schedules and costs for the anticipated reviews. Teams also determine whether a site visit will be needed to support each review. The decisions about site visits are documented in the table. As the review plan is updated the team will note each review that has been completed.

Table 2 identifies the specific expertise and role required for the members of each review team. The table identifies the technical disciplines and expertise required for members of review teams. In most cases the team members will be senior professionals in their respective fields. In general, the technical disciplines identified for a District Quality Control (DQC) team will be needed for an Agency Technical Review (ATR) team. Each ATR team member will be certified to conduct ATR by their community of practice. IEPR panel membership will reflect disciplines representing the areas of expertise applicable to the review being conducted. The table is set up to concisely identify common types of expertise that may be applicable to one or more of the reviews needed for a study.

Table 1: Schedule and Costs of Reviews

Product to undergo Review	Review Level	Site Visit	Start Date	End Date	Cost	Complete
Decision Criteria and/or other Economic Modeling	District Quality Control (DQC)	No	08/01/2026	08/15/2026	$8,600[1]	No
Engineering Modeling	DQC	No	TBD	TBD	$8,600[1]	No
Decision Criteria and/or other Economic Modeling	Targeted Agency Technical Review (ATR)	No	09/01/2026	09/20/2026	$15,000[2]	No
Engineering Modeling	Targeted ATR	No	TBD	TBD	$15,000[2]	No
TBD – Independent expert input at key study points	Independent Expert Panel Input[3]	No	TBD	TBD	TBD	No
Draft Feasibility Report / Environmental Assessment (EA) or Environmental Impact Statement (EIS)	DQC	No	04/30/2028	05/30/2028	$51,100[1]	No
Draft IFR / EA or EIS	Public Comment under National Environmental Policy Act	No	06/20/2028	07/20/2028	N/A	No
Draft IFR / EA or EIS	Agency Technical Review (ATR)	No	06/20/2028	07/20/2028	$75,600[1]	No
Draft IFR / EA or EIS	Independent External Peer Review (IEPR)	No	06/20/2028	07/20/2028	$200,000[4]	No
Draft IFR / EA or EIS	Policy and Legal Compliance Review	No	06/20/2028	07/20/2028	N/A	No
Final IFR / EA or EIS	DQC	N/A	11/23/2030	12/05/2030	$31,680[1]	No
Final IFR / EA or EIS	ATR	N/A	12/23/2030	01/15/2031	$44,100[2]	No
Final IFR / EA or EIS	Policy and Legal Compliance Review	N/A	01/23/2031	02/23/2031	N/A	No

Final IFR / EA or EIS	Release Final Report under National Environmental Policy Act	No	TBD	TBD	N/A	No
In-kind Products from the sponsor – TBD[5]	TBD	N/A	TBD	TBD	$TBD	No
Review Management Organization – Coordination and Participation	An RMO will participate in most key meetings including In-Progress Reviews, Issue Resolution Meetings and SMART Milestone Meetings	Yes	N/A	N/A	$6,000[2]	No

[1]DQC budget assumes 8 disciplines at the following rates. These rates are subject to change based on the number and amount of review documents:

- Targeted DQC of Decision Criteria and Economics Evaluation – includes 2 disciplines (Plan Formulation and Economics) - $4,320 per discipline ($180 per hour for a total of 24 hours).
- Targeted DQC of Hydrology & Hydraulics Model - includes 2 disciplines (Hydrology and Hydraulics Engineering and Water Wastewater Engineering/Geotechnical Engineering) - $4,320 per discipline ($180 per hour for a total of 24 hours).
- Draft Integrated Feasibility Report/Environmental Assessment or Environmental Impact Statement (IFR/EA or EIS) – 11 disciplines at $4,320 per discipline ($180 per hour for a total of 24 hours); 2 disciplines with targeted DQC responsibilities funded at $1,800 per discipline ($180 per hour for a total of 10 hours).
- Final IFR/EA or EIS – 11 disciplines at $2,880 per discipline ($180 per hour for a total of 16 hours) – cost to be increased for Environmental Review if EIS.

[2]ATR budget assumes 11 disciplines, 1 ATR Lead (assumed to be a member of the ATR Team), and 1 PCX review manager at the following rates. These rates are subject to change based on the number and amount of review documents:

- PCX Review Manager - $6,000; split $3,500 during the Draft IFR/EA or EIS line item (which includes labor associated with review and endorsement of this review plan), and $2,500 in the Final Report line item (which incorporates the TSP). For the Secondary PCX Review Manager - $3,000; split $1,750 during the Draft Report Line Item and $1,250 during the Final Report Line Item.
- ATR Lead, funding for tasks as ATR Lead - $8,820/; split $1,800 in the Targeted ATR, $4,320 in the Draft Report line item and $2,700 in the Final Report line item.
- Targeted ATR/IEPR of Decision Criteria and Economics Evaluation - includes 2 disciplines (Plan Formulation and Economics) - $4,500 per discipline, $180 per hour for a total of 25 hours.
- Targeted ATR/IEPR of Hydrology & Hydraulics - includes 2 disciplines (Hydrology and Hydraulics Engineering and Water and Wastewater Engineering/Geotechnical Engineering) - $4,500 per discipline, $180 per hour for a total of 25 hours.

[3]Independent expert (water supply) peer review input will be solicited at key decision points, yet to be determined.
[4]IEPR contract costs estimated - to be determined.
[5]Reviews of existing products used for forecasts of hydrometeorological conditions, water demand, population, and river flow may require validation – TBD.

Table 2: Review Teams - Disciplines and Expertise

Discipline / Role	Expertise	DQC	ATR	IEPR
DQC Team Lead	Extensive experience preparing Civil Works decision documents and leading DQC. The lead may serve as a DQC reviewer for a specific discipline (planning, economics, environmental, etc.).	Yes	No	No
ATR Team Lead	Professional with extensive experience preparing Civil Works decision documents and conducting ATR. Skills to manage a virtual team through an ATR. The lead may serve on the ATR team for a specific discipline (such as planning, economics, or environmental work).	No	Yes	No
IEPR Manager	Planner with extensive knowledge of IEPR policy and procedures and contract management and oversight skills.	No	No	Yes
Planning	Skilled water resources planner knowledgeable in complex planning investigations and the application of SMART principle to problem solving. Planner will have specialized experience working with water supply issues.	Yes	Yes	Yes
Economics	Experience with applying theory, methods and tools used in the economic evaluation of water resources projects.	Yes	Yes	Yes
Environmental Resources	Experience with environmental evaluation and compliance requirements, national environmental laws and statutes, applicable Executive Orders, and other planning requirements.	Yes	Yes	Yes
Cultural Resources	Experience with cultural resource survey methods, area of potential effects, National Historic Preservation Act Section 106, and state and federal laws pertaining to American Indian Tribes.	Yes	Yes	No
Hydrology and Hydraulic Engineering	Engineer with experience applying hydrologic and hydraulic engineering principles and technical tools to project planning, design, construction, and operation, preferably with experience in water supply.	Yes*	Yes*	Yes*
Geotechnical Engineering	Experience in the field of geotechnical engineering, including analyses and design and construction of reservoirs, embankment/concrete dams, levees, seepage, piping, settlement, and slope stability.	Yes	Yes	Yes
Civil – Structural Engineering	Experience with structural engineering methods. Reviewer must be familiar with structural analysis of solutions for water supply engineering, including reservoirs, dams, pipelines, water storage, intake tunnels, pumps, etc.	Yes*	Yes*	No*
Civil Engineering	The Civil Engineering reviewer should be an expert in the field of civil engineering, especially in review of water supply engineering. Reviewer will have experience reviewing Life Safety Risks.	Yes	Yes	Yes
Cost Engineering	Experience using cost estimation software; working knowledge of water resource project construction; capable of making professional determinations using experience.	Yes	Yes	No

Discipline / Role	Expertise	DQC	ATR	IEPR
Real Estate	Experience developing Real Estate Plans and experience in real estate fee/easement acquisition and residential/business relocations for Federal and/or Federally Assisted Programs for implementation of Civil Works projects.	Yes	Yes	No
Infrastructure and Installation Resilience **	A member of the Infrastructure and Installation Resilience Community of Practice knowledgeable of inland / coastal hydrometeorological assessment policy and practice.	Yes	Yes	No

*As determined to be needed depending on alternatives.
**If a qualified individual is identified, this discipline may be combined with another relevant discipline.

4. Documentation of Reviews

Documentation of DQC. Quality Control will be performed continuously. A specific certification of DQC completion will be prepared at the base conditions (existing and future), draft and final report stages. Documentation of DQC will follow the District Quality Manual and the MSC Quality Management Plan. DrChecks will be used for documentation of DQC comments. An example DQC Certification statement is provided in ER 1165-2-217, Appendix D. Documentation of completed DQC, to include the DQC checklist, will be provided to the MSC, RMO and the ATR Team leader. The ATR team will examine DQC records and comment in the ATR report on the adequacy of the DQC effort.

Documentation of ATR. DrChecks will be used to document all ATR comments, responses, and resolutions. Comments should be limited to those needed to ensure product adequacy. All members of the ATR team will use the four-part comment structure (see ER 1165-2-217, Section 5). If a concern cannot be resolved by the ATR team and project delivery team (PDT), it will be elevated to the vertical team to resolve using the issue resolution process in ER 1165-2-217, Section 5.9. Unresolved concerns will be closed in DrChecks by noting the concern has been elevated. ATR documentation will include an assessment by the ATR team of the effectiveness of DQC. The ATR Lead will prepare a Statement of Technical Review (see ER 1165-2-217, Section 5.11, and Appendix D), for the draft and final reports, certifying that review issues have been resolved or elevated. ATR will be certified when all concerns are resolved or referred to the vertical team and the ATR documentation is complete.

Documentation of IEPR. The Outside Eligible Organization will submit a final Review Report no later than 60 days after the end of the draft report public comment period. USACE shall consider all recommendations in the final Review Report and prepare a written response for all recommendations. The final decision document will summarize the Review Report and USACE response and will be posted on the internet.

Documentation of Model Review. Planning models require compliance with EC 1105-2-412. Models developed by the Corps of Engineers are certified and models developed by others are approved. Certifications or approvals may be specific to a single study, a regional application or for nationwide application. Completion of a model review is documented in a memorandum from the Director of a Planning Center of Expertise and should accompany reporting packages for study decisions.

5. Supporting Information

Study or Project Background

Study Authority

This study is authorized by Congress in the Water Resources Development Act of 2022, dated 23 December 2022. Public Law 117-263, Division H, Section 8201 Authorization of Proposed Feasibility Studies, (a)(14) includes:

> "WASHINGTON METROPOLITAN AREA, WASHINGTON, DISTRICT OF COLUMBIA, MARYLAND, AND VIRGINIA.—Project for water supply, including the identification of a secondary water source and additional water

storage capability for the Washington Metropolitan Area, Washington, District of Columbia, Maryland, and Virginia."

Study or Project Area

The study authority supports evaluation of a secondary raw water source and additional storage for suppliers withdrawing water from the Potomac River in the Washington Metropolitan Area (WMA).

The USACE, Baltimore District Office of Counsel advised that the most appropriate definition for this area is for the Metropolitan Statistical Area (MSA) as defined by the Office of Budget and Management, for "47900 Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Statistical Area (MSA)", to exclude West Virginia. The MSA in DC-VA-MD includes the city of Washington DC, and in Northern Virginia, the counties of Arlington, Fairfax, Clarke, Culpepper, Fauquier, Loudoun, Prince William, Stafford, Spotsylvania, Warren and Rappahannock inclusive of the cities of Alexandria, Fairfax, Falls Church, Fredericksburg, Manassas, and Manassas Park and in Maryland the counties of Frederick, Montgomery, Charles County, and Prince George's County, inclusive of the cities of Rockville, North Bethesda, and Frederick.

The water suppliers included within this study area and scope include Washington Aqueduct, a wholesale supplier, and DC Water, Fairfax Water, Arlington County, Washington Sanitary Sewer Commission (WSSC), City of Rockville, Town of Leesburg, and Loudoun County, all of which rely at least partly on withdrawals from the Potomac, and some of which are supplied by Washington Aqueduct.

Study or Project Area Map

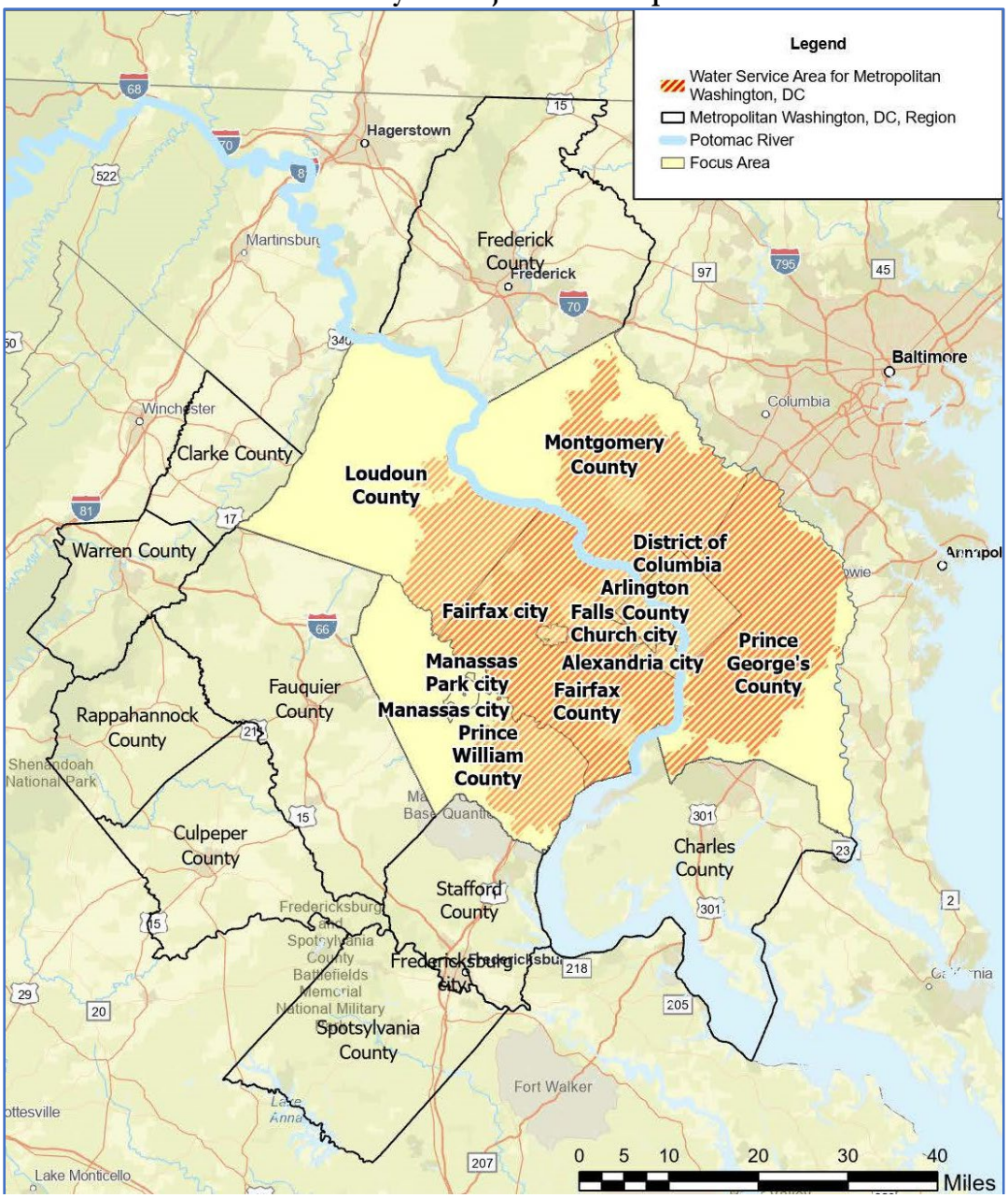

Figure 1 – Map of the study area showing MSA and water service areas.

Problem Statement

The Potomac River is the major source of raw water for the Washington Metropolitan Area's (WMA) drinking water and other uses that maintain public health and safety. Since the Potomac River is vulnerable to both contamination and severe drought incidents, the regional water supply is at risk.

The problems in the study area are:

- Natural (e.g., high turbidity, algal growth) and accidental or deliberate contamination of the Potomac River may cause water suppliers to reduce or cease withdrawals from the river

immediately, impacting drinking water and other critical water uses (fire protection, hospitals, national security, data centers, business viability, etc.).

- Depending on their reserve supplies, water suppliers only have approximately xx-xx (tbd) hours of water supply to support customer needs once withdrawals from the river stop.
- Travel-time for raw water from existing water storage reservoirs to reach the water treatment plant is too long to serve customers imminently if Potomac River withdrawals cease. Additionally, water released from storage flows into the Potomac River before it is withdrawn at intakes, which could not occur if the river were contaminated.
- Due to increased water supply demand, water supply forecasts indicate that beginning in 2040 (ICPRB, 2017) there will be insufficient water supply for the WMA during drought, even with existing reservoir storage and projected increases in river flow.

Goals and Objectives

The goal of this project is to enable water supply utilities in the WMA to supply enough water to their service areas to meet customer demand when water cannot be withdrawn from the Potomac River.

Planning objectives, to be achieved over a 50-year period of analysis from 2040 to 2089, are to enhance the water supply of the WMA to:

1. Reduce the vulnerability of the WMA's raw water supply during times when the Potomac River is contaminated.
2. Mitigate water supply dependence on the Potomac River in the event of a drought.

Future Without Project Conditions

A majority of the 4.6 million people residing in the WMA depend on the Potomac River for their potable water supply. The Potomac River is also the sole source of water supplied to many federal critical infrastructure assets within the Washington D.C. Metropolitan Area (WMA), including the Pentagon, which gets a majority of its potable water supply from the Potomac River through the Washington Aqueduct. If withdrawals from the Potomac River cease, resulting from river contamination or drought, most of the WMA would be without potable water within hours or days. In addition to drinking water, the lack of potable water will impact sanitation in hospitals, fire protection, air conditioning systems dependent on water-cooled heat exchange (e.g., data servers), and other critical water-dependent needs in the WMA.

Types of Measures/Alternatives Being Considered

This study will evaluate measures and alternatives for the provision of a secondary source of raw water and additional raw water storage for the Washington Metropolitan Area, in the event that the Potomac River should become unusable. In addition to the No Action Alternative, which serves as the baseline for evaluating alternatives, the study will consider at least the following measures and suites of measures:

- Increased raw water storage at water treatment plants or off-river (e.g. ,quarries)
- Alternate water source locations
- Direct or indirect water reuse
- Reclaimed wastewater (including through Blue Plains Advanced Waste Water Treatment Plant)
- Water treatment plant upgrades to treat most likely contaminants
- Interconnections to other water supply locations

- Groundwater extraction
- Desalination of water from estuary
- Addition of upstream intake tunnels along the Potomac River and Little Seneca Creek
- Floating pump stations for pumping during drought conditions
- Non-structural solutions such as consumption reduction programs, updated response plans, mandatory safeguards on railway bridges
- Pipeline protections (e.g., secondary containment) for pipelines along the Potomac

Estimated Cost/Range of Costs

Costs of alternatives are unknown at this time but given the size of the area and problem complexity, costs are expected to be well over $200 million for the project.

6. Models to be Used in the Study

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models are any models and analytical tools used to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making.

The following planning models may be used to develop the decision document:

Table 3: Planning Models.

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Certification / Approval
MOVES or PEAT	Calculation of Greenhouse Gas Emissions	MOVES is "defacto" approved and PEAT is Certified.
HEC-EFM Version 5	Tool to help analyze ecosystem response to changes in flow regime of rivers and connected wetlands – could be used if changes to flow regime of Potomac River or other water body is indicated.	Certified
TBD	*Environmental Model for mitigation or other*	*TBD*
Spreadsheet Model	Economic Model for calculation of losses/benefits	Will need one time use approval

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue. The professional practice of documenting the application of the software and modeling results will be followed. The USACE Scientific and Engineering Technology Initiative has identified many engineering models as preferred or acceptable for use in studies. These models should be used when

appropriate. For example, HH&C models need to comply with the requirements of HH&C CoP Enterprise Standard 08101.

These engineering models may be used to develop the decision document:

Table 4: Engineering Models.

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Approval Status
Geostudio	Geotechnical model used to perform analysis of bearing, settlement, seepage analysis, and stability for slopes, walls, and foundations.	Certified
HEC-ResSIM	Tool to model water supply volumes and flow from reservoirs/waterbody across watershed, capturing flow, elevation, withdrawals.	Certified
TBD – Possibly OASIS	Water Supply Model/Hydraulic Engineering	Allowed for Use*

*Per HH&C Software List, OASIS model is Allowed for Use with caveat: "Given that these pieces of software can be used to create any type of model, it is impossible to pre-certify that you know what the model does or how it does it. Therefore, while the HH&C CoP believes these tools are fine for building models and we "certify" them as "Allowed for Use" we caution the user that the ATR and the IEPR must include a much more thorough review of the inner workings of the model as the basic assumptions, equations and output used or created by the model have **NOT** been pre-certified."

7. Factors Affecting Level and Scope of Review

All planning products are subject to the conduct and completion of District Quality Control. Most planning products are subject to Agency Technical Review and a smaller sub-set of products may be subject to Independent External Peer Review and/or Safety Assurance Review. Information in this section helps in the scoping of reviews through the considerations of various potential risks.

Objectives of the Reviews

DISTRICT QUALITY CONTROL (DQC)
The home district will manage DQC and will appoint a DQC Lead to manage the local review (see ER 1165-2-217, Chapter 4). The DQC Team members should not be involved in the production of any of the products reviewed.

AGENCY TECHNICAL REVIEW (ATR)
The ATR will assess whether the analyses are technically correct and comply with guidance, and that documents explain the analyses and results in a clear manner. The RMO will manage the ATR. The ATR will be performed by a team whose members are certified to perform reviews. Lists of certified reviewers are maintained by the various technical Communities of Practice (see ER 1165-2-217, Chapter 5.5.3).

POLICY AND LEGAL COMPLIANCE REVIEW

The objective of this review is to ensure the supporting analyses and coordination comply with law and policy and warrant approval or further recommendation to higher authority by the home MSC Commander.

INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

IEPR is managed outside of the USACE and conducted on studies. The IEPR panel will assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study.

Assessing the Need for IEPR

An IEPR is required for this Study, based on the estimated cost of the project.

Mandatory IEPR Triggers

- Has the Chief of Engineers determined the project is controversial? ***No***
- Has the Governor of an affected state requested an IEPR? ***No***
- Is the cost of the project more than $200 million? ***Yes***

Discretionary IEPR

- Has the head of another Federal agency requested an IEPR? ***No***

Potential IEPR Exclusion

- Is the project cost greater than $200 million? ***Yes***
- Does the project have an Environmental Impact Statement (EIS)? ***It is possible that an EIS is will be required given the large scope and complexity of this project.***

Assessing Other Risk Considerations

- **Will the study likely be challenging? If so, describe how?**
  This study will be extremely challenging because while Water Supply is a USACE mission area, the enterprise seldom has projects that include all aspects of providing a water supply to a large metropolitan area. Engineering, cost engineering, and real estate are all areas that may be the most challenging in terms of technical knowledge/expertise and limited guidance applicable to this project or mission area.

- **Provide a preliminary assessment of where the project risks are likely to occur and assess the magnitude of those risks.**
  At this preliminary stage of the study, the greatest project risks stem from the uncertainties related to project scoping (budget and schedule). Because the study is unlike other USACE projects in the agency, USACE lacks a complete understanding of how the study may evolve. However, a project to address this vulnerability has been considered for many years and resources exist to support scoping. The team will use all existing resources, including the Water Supply PCX and Water and Wastewater TCX, experts from water utilities and other stakeholder groups, existing studies (including many studies on water supply alternatives by the Interstate Commission on the

Potomac River Basin and the USACE Value Planning Study done on this topic in 2020) to anticipate and mitigate the risks and uncertainties.

In addition to the above, the PDT is pursuing contracting mechanisms to assist the PDT with: 1) Facilitation of workshops with water utilities and/or other stakeholders. Utilities come to the study with individual biases and desires to enact certain measures/alternatives that may not entirely serve project objectives. It will be challenging to cut through these biases in order to enact a regionally beneficial alternative.
2) Subject matter expertise on water supply engineering. The study topic is very specific to a narrow field of expertise. It is necessary to supplement the PDT with experts with significant experience working on water supply planning and engineering. The team is also soliciting assistance from USACE experts.

- **Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues? Briefly describe the life risk, including the District Chief of Engineering's assessment as to whether there is a significant threat to human life associated with aspects of the study or failure of the project or proposed projects.**

The purpose of the project is to provide a water source to the Washington Metropolitan Area in cases where the Potomac River cannot be used. There is significant vulnerability to human health and life safety if a secondary source is not implemented. Similarly, should the study or project fail, life safety could be compromised if there is an inadequate water supply for drinking and other essential purposes. Existing USACE tools and models related to life safety are primarily focused on flood and coastal storm risk management and the characterization of risk associated with water supply vulnerability is less clear. Regardless, given the complexity of the engineering and potential threat to human life and per the criteria in ER 1165-2-217, the Baltimore District Chief of Engineering has recommended SAR for this project, to be performed during PED.

- **Is the information in the decision document or anticipated project design likely to be based on novel methods, involve innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices? If so, how?**

At this point it is anticipated that the recommended plan will incorporate standard design components (storage, transmission, interconnections, pump stations, etc.) for water supply projects, which will be complex. However, it is possible that project alternatives could incorporate innovative/emerging technologies, such as wastewater reuse or desalination. For this reason, USACE believes the expertise of a Contractor specializing in water supply alternatives using innovative and emerging technologies is necessary to assist the USACE PDT.

- **Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule? If so, how?**

Since the project will require providing a water supply to millions of people, the project must be designed to include redundance, resiliency, and robustness. Construction scheduling will be key,

but it is unknown at this time how that will progress. The project will necessarily include transmission and interconnections to existing parts of the water supply system.

- **Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources? If so, what are the anticipated impacts?**

  Specific project impacts are unknown at this time. The study area is large and includes substantial historic resources, however, impacts will depend on the exact siting of water supply components.

- **Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures? If so, describe the impacts?**

  Specific project impacts are unknown at this time. Impacts on wildlife and habitat will largely depend on the alternative selected and on the exact siting of water supply components.

- **Is the project expected to have, before mitigation measures, more than a negligible adverse impact on an endangered or threatened species or their designated critical habitat? If so, what are the anticipated impacts?**

  Specific project impacts are unknown at this time. Impacts to threatened and endangered species or critical habitat will depend on the exact siting of water supply components; however, the Potomac River is designated as critical habitat for Atlantic Sturgeon. The PDT will coordinate with NOAA NMFS on impacts to Atlantic Sturgeon.

8. Risk Informed Decisions on Level and Scope of Review

Targeted ATR. Will a targeted ATR be conducted for the study? Targeted ATR reviews will be conducted. Products that may receive undergo a targeted ATR are:

- Decision Criteria and/or other Economic Modeling
- Engineering Modeling (TBD)

IEPR Decision. IEPR is required for this study and will be conducted as required for the Draft Report and NEPA documentation following the TSP milestone. In addition, because this study is complex and specific to a topic that is somewhat outside of USACE's normal scope, the PDT is considering obtaining independent expert peer input (through existing IEPR contract mechanisms) to utilize subject matter experts in the field of water supply planning, engineering, and construction. This study is highly visible given the project and location, so the use of qualified experts for peer review is important to validate key decisions and increase stakeholder confidence in the study. IEPR experts may provide expert opinions and could review key study products, including:

- Prior to TSP, for evaluation of functional requirements, decision criteria, and feasibility of alternatives as well as H&H Modeling
- Post TSP/CVM, for review of engineering design and design optimization

In addition, peer review experts could serve on the vertical review team as engineering reviewers (civil, geotechnical, H&H) to incorporate external water supply expertise that complements the knowledge of the review team.

Costs for additional IEPR contracting beyond the typical review role will be funded by project funds.

Safety Assurance Review. Safety Assurance Reviews are managed outside of the USACE and are conducted on design and construction products for hurricane, storm and flood risk management projects, or other projects where existing and potential hazards pose a significant threat to human life. In some cases, significant life safety considerations may be relevant to planning decisions. These cases may warrant the development of relevant charge questions for consideration during reviews such as ATR or IEPR. In addition, if the characteristics of the recommended plan warrant a Safety Assurance Review, a panel will be convened to review the design and construction activities on a regular schedule before construction begins and until construction activities are completed.

Decision on Safety Assurance Review. Safety Assurance Review is typically required for design and construction activities for hurricane and storm damage reduction and flood damage reduction projects. Failure of the design for this project would not result in loss of life in the same way as failure of flood/storm damage reduction features, however, would cause a risk to human health from failure or improper design. The need for Safety Assurance Review has been recommended by the District Chief of Engineering (memo dated 20 March 2025) based on the criteria in ER 1165-2-217 and will be completed during the PED phase.

9. Policy and Legal Compliance Review

Policy and legal compliance review of draft and final planning decision documents is delegated to the MSC (see Director's Policy Memorandum 2019-01).

(i) Policy Review.

The policy review team is identified through the collaboration of the MSC Chief of Planning and Policy and the HQUSACE Chief of the Office of Water Project Review. The makeup of the Policy Review team will be drawn from Headquarters (HQUSACE), the MSC, the Planning Centers of Expertise, and other review resources as needed.

- The Policy Review Team will be invited to participate in key meetings during the development of decision documents as well as SMART Planning Milestone meetings. These engagements may include In-Progress Reviews, Issue Resolution Conferences or other vertical team meetings plus the milestone events.

- The input from the Policy Review team should be documented in a Memorandum for the Record (MFR) produced for each engagement with the team. The MFR should be distributed to all meeting participants.

- Teams may choose to capture some of the policy review input in a risk register if appropriate. These items should be highlighted at future meetings until the issues are resolved. Any key decisions on how to address risk or other considerations should be documented in an MFR.

(ii) Legal Review.

Representatives from the Office of Counsel will be assigned to participate in reviews. Members may participate from the District, MSC and HQUSACE. The MSC Chief of Planning and Policy will coordinate membership and participation with the office chiefs.

- In some cases, legal review input may be captured in the MFR for the particular meeting or milestone. In other cases, a separate legal memorandum may be used to document the input from the Office of Counsel.

Each participating Office of Counsel will determine how to document legal review input.

10. Public Comment

This Review Plan will be posted on the District's website. Public comments on the scope of reviews, technical disciplines involved, schedules and other considerations may be submitted to the District for consideration. If the comments result in a change to the Review Plan, an updated plan will be posted on the District's website.

11. Documents Distributed Outside the Government

For information distributed for review to non-governmental organizations, the following disclaimer shall be placed on documents:

"This information is distributed solely for the purpose of pre-dissemination review under applicable information quality guidelines. It has not been formally disseminated by USACE. It does not represent and should not be construed to represent any agency determination or policy."

Appendix A - Brief Description of Each Type of Review

This section describes each level of review to be conducted. Based upon the factors discussed in Section 1, this study will undergo the following types of reviews:

District Quality Control. All decision documents and accompanying components will undergo DQC. This internal review covers basic science and engineering work products. It fulfils the project quality requirements of the Project Management Plan. The DQC team will read all reports and appendices. The review must evaluate the correct application of methods, validity of assumptions, adequacy of basic data, correctness of calculations (error-free), completeness of documentation, and compliance with guidance and standards. Districts are required to check all computations and graphics by having the reviewer place a highlight (e.g., place a "red dot") on each annotation and/or number indicating concurrence with the correctness of the information shown.

CENAB shall manage DQC and, at this time, all reviewers are planned to be internal to NAB. Documentation of DQC activities is required and will be in accordance with the Quality Manual of the District and the home MSC.

- Documentation of DQC. DQC will be documented using Dr Checks and a DQC report, which will be signed by all reviewers.

- Products to Undergo DQC. Products that will undergo DQC include all interim products/milestone reports, as well as major technical components to the integrated feasibility study.

- Required DQC Expertise. DQC will be performed by Senior Level staff or Subject Matter Experts within CENAB.

Agency Technical Review. ATR will be performed by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. These teams will be comprised of certified USACE personnel. The ATR team lead will be from outside the home MSC.

The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with published USACE guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers. ATR is managed within USACE by the designated Review Management Organization (RMO) and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR team lead will be from outside the home MSC.

- Products to Undergo ATR. The products that will undergo ATR include the Draft IFR and NEPA document and report appendices, and the Final Report and NEPA document and appendices. Either a targeted ATR or targeted IEPR will be performed for certain study products (see Section 8).

Independent External Peer Review. IEPR is required for this decision document. This is the most independent level of review and is applied in cases that meet criteria where the risk and magnitude of the project are such that a critical examination by a qualified team outside of USACE is warranted. Certain criteria dictate mandatory performance of IEPR and other considerations may lead to a discretionary decision to perform IEPR. For this study, a risk-informed decision has been made that IEPR is appropriate. The information in Section 1 – Factors Affecting the Scope of Review – informed the decision to conduct IEPR. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. See also Section 8 for discussion of targeted IEPR.

Cost Engineering Review. All decision documents will be coordinated with the Cost Engineering Mandatory Center of Expertise (MCX). The MCX assisted in determining the expertise needed on the ATR and IEPR teams. The MCX will provide the Cost Engineering certification. The RMO is responsible for coordinating with the MCX for the reviews. These reviews occur as part of ATR.

Model Review and Approval/Certification. The use of certified or approved planning models for all planning work is required to ensure the models are technically and theoretically sound, compliant with policy, computationally accurate, and based on reasonable assumptions. Engineering models must comply with standards set by the appropriate Engineering Community of Practice. It is possible that some models used in this study may required validation or certification. Validation may be required for models developed by others to forecast future conditions such as hydrometeorological conditions, water demand, population, river flow, etc. The PDT will work with the Water Supply PCX to identify which existing model data require validation.

Policy and Legal Compliance Review. These reviews culminate in determinations that report recommendations and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander.

Public Review. The District will post the Review Plan and approval memo on the District's internet site. Public comment on the adequacy of the Review Plans will be accepted and considered. Additional public review will occur when the report and environmental compliance document(s) are released for public and agency comment.