FINAL Supplemental Watershed Plan No. 2 and Environmental Assessment

for the

Rehabilitation of Floodwater Retarding Structure No. 1 (McDaniel's Lake) of the Johns Creek Watershed

Craig County, Virginia

PREPARED BY

USDA Natural Resources Conservation Service

IN COOPERATION WITH

Mountain Castles Soil and Water Conservation District
Craig County Board of Supervisors

August 2019

Non-Discrimination Statement

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at How to File a Program Discrimination Complaint and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender.

FINAL
Supplemental Watershed Plan No. 2 & Environmental Assessment
for the
Rehabilitation of Floodwater Retarding Structure No. 1
of the Johns Creek Watershed
Craig County, Virginia

Prepared By:
USDA – Natural Resources Conservation Service

In Cooperation With:
Mountain Castles Soil and Water Conservation District
Craig County Board of Supervisors

Authority

The original watershed work plan was prepared, and the works of improvement were installed, under the authority of the Watershed Protection and Flood Prevention Act of 1954. The rehabilitation of Johns Creek Dam No. 1 is authorized by Section 14 of the Watershed Protection and Flood Prevention Act (Public Law 83-566) as enacted by Section 313 of Public Law 106-472, otherwise known as "The Small Watershed Rehabilitation Amendments of 2000."

Abstract

Johns Creek Dam No. 1, McDaniel's Lake, does not presently meet Virginia Division of Dam Safety or Natural Resources Conservation Service (NRCS) standards for the capacity, stability, or integrity of a vegetated earth auxiliary spillway. In addition, the footer of the principal spillway riser does not meet NRCS seismic stability criteria. The preferred plan is to rehabilitate Johns Creek Dam No. 1 to meet current NRCS and Virginia Division of Dam Safety criteria. The plan is to construct a 270-foot-wide, roller-compacted concrete chute spillway over the top of the dam and raise the top of dam by 4 feet; close the existing vegetated earth auxiliary spillway with an earthen berm; replace the riser and footer; flatten the downstream slope of the embankment to 3:1 and install a chimney drain; replace the toe drains; and move the riprap-lined plunge pool downstream about 32 feet. For events equal to or smaller than the 200-year, 24-hour flood event, there will be no change in the current levels of flood protection downstream because of project activity. Project installation cost is estimated to be $9,930,000 of which $6,727,700 will be paid from the Small Watershed Rehabilitation funds and $3,202,300 from local funds.

Comments and Inquiries

For further information, please contact: John A. Bricker, State Conservationist, USDA - Natural Resources Conservation Service, 1606 Santa Rosa Road, Suite 209, Richmond, Virginia 23229, Phone: (804) 287-1691.

(This page intentionally left blank)

JOHNS CREEK WATERSHED AGREEMENT

Supplemental Watershed Plan Agreement
(Supplement No. 2)

between the

Mountain Castles Soil and Water Conservation District
Craig County Board of Supervisors
(herein referred to collectively as "Sponsors")
Commonwealth of Virginia

and the

Natural Resources Conservation Service
United States Department of Agriculture
(herein referred to as "NRCS")

Whereas, the Watershed Work Plan Agreement for the Johns Creek Watershed, Commonwealth of Virginia, authorized under the Watershed Protection and Flood Prevention Act (Public Law 83-566, as amended) and executed by the Sponsors named therein and the Soil Conservation Service (which is now NRCS, pursuant to section 246 of the Department of Agriculture Reorganization Act of 1994, 7 U.S.C. 6862), became effective the 5th day of June 1963; and

Whereas, Supplement No. 1, which modified the Watershed Plan Agreement, was developed through cooperative efforts of the Sponsors and the Soil Conservation Service and became effective on the 6th day of April 1977; and

Whereas, the Mountain Castles Soil and Water Conservation District was formed through a "Certification of Organization" on the 1st day of July 1987, thereby changing the boundaries of the Natural Bridge Soil and Water Conservation District; and

Whereas, the Mountain Castles Soil and Water Conservation District hereby agreed to become one of the local organizations sponsoring said watershed project and agreed to assume all responsibilities with respect to said watershed project previously assumed by the Natural Bridge Soil and Water Conservation District; and

Whereas, the Natural Bridge Soil and Water Conservation District was hereby deleted from the watershed agreement as a sponsor; and

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsors for assistance in preparing a plan for the works of improvement for the Johns Creek Dam No. 1 located in Craig County, Commonwealth of Virginia, under the authority of the Watershed Protection and Flood Prevention Act, as amended (16 U.S.C. Section 1001 to 1008, 1010, and 1012); and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, has been assigned by the Secretary of Agriculture to NRCS; and

Whereas, there has been developed through the cooperative efforts of the Sponsors and NRCS a Watershed Work Plan No. 2 - Environmental Assessment for works of improvement for the rehabilitation of Johns Creek Dam No. 1, Commonwealth of Virginia, hereinafter referred to as the Plan-EA or plan, which plan is annexed to and made a part of this agreement; and

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through NRCS and the Sponsors, hereby agree on this Supplemental Watershed Plan and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this Supplemental Watershed Agreement and including the following:

1. **Term.** The term of this agreement is for 50 years after construction is completed and does not commit the NRCS to assistance of any kind beyond the end of the agreement.
2. **Costs.** The costs shown in this plan are preliminary estimates. Final costs to be borne by the parties hereto will be the actual costs incurred in the installation of works of improvement.
3. **Real property.** The Sponsors will acquire such real property as will be needed in connection with the works of improvement. The amounts and percentages of the real property acquisition costs to be borne by the Sponsors and NRCS are as shown in the Cost-Share table in Section 5 hereof. The sponsors agree that all land acquired for measures, other than land treatment practices, with financial or credit assistance under this agreement will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency which will continue to maintain and operate the development in accordance with the Operation and Maintenance Agreement.

   The Craig County Board of Supervisors will obtain a waiver of the flood pool risks from the landowners upstream of the dam; enact a zoning ordinance to prevent future development below the new top of dam elevation; and revise the existing USFS Special Use Permit to allow additional flooding of Forest Service land.
4. **Uniform Relocation Assistance and Real Property Acquisition Policies Act.** The Sponsors hereby agree to comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. 4601 et. seq. as further implemented through regulations in 49 C.F.R. Part 24 and 7 C.F.R. Part 21) when acquiring real property interests for this federally assisted project. If the Sponsor are legally unable to comply with the real property acquisition requirements, they agree that, before any Federal financial assistance is furnished; they will provide a statement to that effect, supported by an opinion of the chief legal officer of the state containing a full discussion of the facts and law involved. This statement may be accepted as constituting compliance.
5. **Cost-share for Rehabilitation Project.** The following table will be used to show cost-share percentages and amounts for Watershed Project Plan implementation.

Works of Improvement	NRCS		Sponsors		Total
Cost-Sharable Items	**Percent**	**Cost**	**Percent**	**Cost**	**Cost**
Rehabilitation of the dam (construction costs):	65.5%	$5,988,000	34.5%	$3,150,800	$9,138,800
Relocation, Replacement in-kind:	0%	$0	0%	$0	$0
Relocation, Required Decent, Safe, Sanitary:	0%	$0	0%	$0	$0
Sponsors' Planning Costs:	n/a	n/a	100%	$25,000	$25,000
Sponsors' Engineering Costs:	n/a	n/a	100%	$13,500	$13,500
Sponsors' Project Administration Costs:	n/a	n/a	100%	$35,000	$35,000
Land Rights Acquisition Costs:	n/a	n/a	100%	$0	$0
Subtotals: Cost-Sharable Costs: Cost-Share Percentages:[a/]	(65%)	**$5,988,000**	(35%)	**$3,224,300**	**$9,212,300** (100%)
Non Cost-Sharable Items (per PL-83-566 and NRCS policy)[b/]	---	---	---	---	---
NRCS Engineering and Project Administration Costs:	100%	$739,700	n/a	n/a	$739,700
Natural Resource Rights:	n/a	n/a	0%	$0	$0
Federal, State and Local Permits:	n/a	n/a	100%	$3,000	$3,000
Relocation, Beyond Required Decent, Safe, Sanitary	n/a	n/a	0%	$0	$0
Subtotals: Non-Cost-Sharable Costs:	**100%**	**$739,700**	**100%**	**$3,000**	**$742,700**
Total Cost-Sharable Cost:	**n/a**	**$5,988,000**	**n/a**	**$3,224,300**	**$9,212,300**
Total Installation Cost:	**n/a**	**$6,727,700**	**n/a**	**$3,227,300**	**$9,955,000**

a/ The maximum NRCS cost-share is 65% of the cost-sharable items not to exceed 100% of the construction cost. Total eligible project costs include construction, land rights, relocation, project administration, and planning services provided by the Sponsors.

b/ If actual non-cost-sharable item expenditures vary from these estimates, the responsible party will bear the change in costs.

6. **Land treatment agreements.** The sponsors will obtain agreements from owners of not less than 50 percent of the land above each multiple-purpose and floodwater-retarding structure. These agreements must provide that the owners will carry out farm or ranch conservation plans on their land. The sponsors will ensure that 50 percent of the land upstream of any retention reservoir site is adequately protected before construction of the dam. The sponsors will provide assistance to landowners and operators to ensure the installation of the land treatment measures shown in the watershed project plan. The sponsors will encourage landowners and operators to continue to operate and maintain the land treatment measures after the long-term contracts expire, for the protection and improvement of the watershed.

7. **Floodplain Management.** Before construction of any project for flood prevention, the Sponsors must agree to participate in and comply with applicable Federal floodplain management and flood insurance programs.

8. **Water and mineral rights.** The Sponsors will acquire or provide assurance that landowners or resource users have acquired such water, mineral, or other natural resources rights pursuant to State law as may be needed in the installation and operation of the works of improvement. Any costs incurred must be borne by the Sponsors and these costs are not eligible as part of the Sponsors' cost-share.

9. **Permits.** The Sponsors will obtain and bear the cost for all necessary Federal, State, and local permits required by law, ordinance, or regulation for installation of the works of improvement. These costs are not eligible as part of the Sponsors' cost-share.

10. **NRCS assistance.** This agreement is not a fund-obligating document. Financial and other assistance to be furnished by NRCS in carrying out the rehabilitation plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.

11. **Additional agreements.** A separate agreement will be entered into between NRCS and the Sponsors before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

12. **Amendments.** This plan may be amended or revised only by mutual agreement of the parties hereto, except that NRCS may de-authorize or terminate funding at any time it determines that the Sponsors have failed to comply with the conditions of this agreement or when the program funding or authority expires. In this case, NRCS must promptly notify the Sponsors in writing of the determination and the reasons for de-authorization of project funding, together with the effective date. Payments made to the Sponsors or recoveries by NRCS must be in accordance with the legal rights and liabilities of the parties when project funding has been de-authorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between NRCS and the Sponsors having specific responsibilities for the measure involved.

13. **Prohibitions.** No member of or delegate to Congress, or resident commissioner, may be admitted to any share or part of this plan, or to any benefit that may arise therefrom; but this provision may not be construed to extend to this agreement if made with a corporation for its general benefit.

14. **Operation and Maintenance (O&M).** The Mountain Castles Soil and Water Conservation District will be responsible for the operation, maintenance, and any needed replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with an O&M agreement. An O&M agreement will be entered into before Federal funds are obligated and continue for the project life (50 years after construction). Although the Sponsors' responsibility to the Federal Government for O&M ends when the O&M agreement expires upon completion of the evaluated life of measures covered by the agreement, the Sponsors acknowledge that continued liabilities and responsibilities associated with works of improvement may exist beyond the evaluated life.

15. **Emergency Action Plan.** Prior to construction, the Sponsors must prepare an Emergency Action Plan (EAP) for this dam where failure may cause loss of life, as required by state and local regulations. The EAP must meet the minimum content specified in NRCS Title 180, National Operation and Maintenance Manual (NOMM), Part 500, Subpart F, Section 500.52, and meet applicable State agency dam safety requirements. An EAP is required prior to the execution of fund obligating documents for rehabilitation of the structure. The EAP must be reviewed and updated by the Sponsors annually.

16. **Nondiscrimination provisions.** In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

    Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

    To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at How to File a Program Discrimination Complaint and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov. USDA is an equal opportunity provider, employer, and lender.

    By signing this agreement, the recipient assures the U.S. Department of Agriculture that the program or activities provided for under this agreement will be conducted in compliance with all applicable Federal civil rights laws, rules, regulations, and policies.

17. **Certification Regarding Drug-Free Workplace Requirements** (7 CFR Part 3021). By signing this watershed agreement, the Sponsors are providing the certification set out below. If it is later determined that the Sponsors knowingly rendered a false certification, or otherwise violated the requirements of the Drug Free Workplace Act, the NRCS, in addition to any other remedies available to the Federal Government, may take action authorized under the Drug-Free Workplace Act.

    Controlled Substance means a controlled substance in Schedules I through V of the Controlled Substances Act (21 U.S.C. Section 812) and as further defined by regulation (21 CFR Sections 1308.11 through 1308.15);

Conviction means a finding of guilt (including a plea of *nolo contendere*) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes;

Criminal drug statute means a Federal or non-Federal criminal statute involving the manufacturing, distribution, dispensing, use, or possession of any controlled substance;

Employee means the employee of a grantee directly engaged in the performance of work under a grant, including: (i) all direct charge employees; (ii) all indirect charge employees unless their impact or involvement is insignificant to the performance of the grant; and, (iii) temporary personnel and consultants who are directly engaged in the performance of work under the grant and who are on the grantee's payroll. This definition does not include workers not on the payroll of the grantee (e.g., volunteers, even if used to meet a matching requirement; consultants or independent contractors not on the grantees' payroll, or employees of sub-recipients or subcontractors in covered workplaces).

Certification:

A. The Sponsors certify that they will or will continue to provide a drug-free workplace by:

(1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition.

(2) Establishing an ongoing drug-free awareness program to inform employees about—

(a) The danger of drug abuse in the workplace;

(b) The grantee's policy of maintaining a drug-free workplace;

(c) Any available drug counseling, rehabilitation, and employee assistance programs; and

(d) The penalties that may be imposed upon employees for drug abuse violation occurring in the workplace.

(3) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (1);

(4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee must --

(a) Abide by the terms of the statement; and

(b) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction.

(5) Notifying the NRCS in writing, within ten calendar days after receiving notice under paragraph (4) (b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has

designated a central point for the receipt of such notices. Notice must include the identification number(s) of each affected grant.

(6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4) (b), with respect to any employees who is so convicted--

(a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or

(b) Requiring such employee to participate satisfactorily in drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.

(7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (1), (2), (3), (4), (5), and (6).

B. The Sponsors may provide a list of the site(s) for the performance of work done in connection with a specific project or other agreement.

C. Agencies will keep the original of all disclosure reports in the official files of the agency.

18. Certification Regarding Lobbying (7 CFR Part 3018) (for projects > $100,000)

A. The Sponsors certify to the best of their knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the Sponsors, to any person for influencing or attempting to influence an officer or employee of an agency, Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned must complete and submit Standard Form – LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The Sponsors must require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients must certify and disclose accordingly.

B. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for

making or entering into this transaction imposed by Section 1352, Title 31, of the U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

19. Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions (7 CFR Part 3017).

A. The Sponsors certify to the best of their knowledge and belief, that they and their principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (A)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

B. Where the primary Sponsor is unable to certify to any of the statements in this certification, such prospective participant must attach an explanation to this agreement.

20. Clean Air and Water Certification

A. The project Sponsoring organizations signatory to this agreement certify as follows:

(1) Any facility to be utilized in the performance of this proposed agreement is (__), is not (_X_) listed on the Environmental Protection Agency List of Violating Facilities.

(2) To promptly notify the NRCS Assistant State Conservationist for Management and Strategy prior to the signing of this agreement by NRCS, of the receipt of any communication from the Director, Office of Federal Activities, U.S. Environmental Protection Agency, indicating that any facility which is proposed for use under this agreement is under consideration to be listed on the Environmental Protection Agency List of Violating Facilities.

(3) To include substantially this certification, including this subparagraph, in every nonexempt subagreement.

B. The project Sponsoring organizations signatory to this agreement agree as follows:

(1) To comply with all the requirements of section 114 of the Clean Air Act as amended (42 U.S.C. Section 7414) and section 308 of the Federal Water Pollution Control Act (33 U.S.C. Section 1318), respectively, relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, issued there under before the signing of this agreement by NRCS.

(2) That no portion of the work required by this agreement will be performed in facilities listed on the EPA List of Violating Facilities on the date when this agreement was signed by NRCS unless and until the EPA eliminates the name of such facility or facilities from such listing.

(3) To use their best efforts to comply with clean air standards and clean water standards at the facilities in which the agreement is being performed.

(4) To insert the substance of the provisions of this clause in any nonexempt subagreement.

C. The terms used in this clause have the following meanings:

(1) The term "Air Act" means the Clean Air Act, as amended (42 U.S.C. Section 7401 et seq.).

(2) The term "Water Act" means Federal Water Pollution Control Act, as amended (33 U.S.C. Section 1251 et seq.).

(3) The term "clean air standards" means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in section 110 of the Air Act (42 U.S.C. Section 7414) or an approved implementation procedure under section 112 of the Air Act (42 U.S.C. Section 7412).

(4) The term "clean water standards" means any enforceable limitation, control, condition, prohibition, standards, or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. Section 1342), or by a local government to assure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. Section 1317).

(5) The term "facility" means any building, plant, installation, structure, mine, vessel, or other floating craft, location or site of operations, owned, leased, or supervised by a Sponsor, to be utilized in the performance of an agreement or subagreement. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location will be deemed to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are collocated in one geographical area.

21. Assurances and Compliance. As a condition of the grant or cooperative agreement, the Sponsors assure and certify that they are in compliance with and will comply in the course of the agreement with all applicable laws, regulations, Executive orders and other generally applicable requirements, including those set out below which are hereby incorporated in this agreement by reference, and such other statutory provisions as specifically set forth herein.

State, Local, and Indian Tribal Governments: OMB Circular A-87, A-102, A-129, and A-133; 7 CFR Parts 3015, 3016, 3017, 3018, 3021, and 3052.

Nonprofit Organizations, Hospitals, Institutions of Higher Learning: OMB Circular A-110, A-122, A-129, and A-133; and 7 CFR Parts 3015, 3017, 3018, 3019, 3021, and 3052.

22. Examination of Records. The Sponsors must give the NRCS or the Comptroller General, through any authorized representative, access to, and the right to, examine all records, books, papers, or documents related to this agreement, and retain all records related to this agreement for a period of three years after completion of the terms of this agreement in accordance with the applicable OMB Circular.

23. Signatures

Mountain Castles Soil and Water Conservation District
36 Executive Circle, Suite 1
Roanoke, Virginia 24012

By: /S/ Jeffrey W. Henderson

Title: Chairman

Date: August 14, 2019

The signing of this supplemental watershed agreement was authorized by the governing body of the Mountain Castles Soil and Water Conservation District at a meeting held on August 14, 2019.

/S/ Mary G. Harwin
Administrative Secretary

Mountain Castles SWCD
36 Executive Circle, Suite 1
Roanoke, Virginia 24012

Date: 8/14/19

Craig County Board of Supervisors
P. O. Box 308
New Castle, Virginia 24127

By: /S/ Jesse Spence

Title: Chairperson

Date: August 1, 2019

The signing of this supplemental watershed agreement was authorized by the governing body of the Craig County Board of Supervisors at a meeting held on August 1, 2019.

/S/ Suzanne Abbott Holth
Administrative Secretary

Craig County Board of Supervisors
P. O. Box 308
New Castle, Virginia 24127

Date: August 1, 2019

Natural Resources Conservation Service
United States Department of Agriculture

Approved by:

/S/ John A. Bricker
State Conservationist

Date: August 26, 2019

(This page intentionally left blank)

TABLE OF CONTENTS

TABLE OF CONTENTS (cont.) Page

LIST OF FIGURES

LIST OF TABLES

APPENDICES

SUMMARY OF SUPPLEMENTAL WATERSHED PLAN NO. 2 AND ENVIRONMENTAL ASSESSMENT
for the
Rehabilitation of Johns Creek Watershed Dam No. 1
Craig County, Virginia
9th Congressional District

Prepared by: United States Department of Agriculture, Natural Resources Conservation Service (NRCS).

Authorization: The original work plan was prepared, and the works of improvement were installed, under the authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566, as amended (16 U.S.C. Section 1001 et. seq.), 1954. The rehabilitation of Johns Creek Dam No. 1 is authorized under Public Law 83-566 (as amended), and as further amended by Section 313 of Public Law 106-472.

Sponsors: Mountain Castles Soil and Water Conservation District
Craig County Board of Supervisors

Proposed Action: Rehabilitate Johns Creek Watershed Dam No. 1, McDaniel's Lake, to meet current NRCS safety and performance standards for a high hazard dam.

Purpose and Need for Action: Johns Creek Dam No. 1, McDaniel's Lake, does not presently meet NRCS or Virginia Division of Dam Safety standards for integrity, stability and capacity of a vegetated earth auxiliary spillway. The auxiliary spillway is currently set at an elevation that allows detention storage of the 200-year, 24-hour storm event. There are 43 homes within the 200-year floodplain of this dam with the dam in place. The purposes for federal action are to comply with current NRCS and Virginia dam design and safety standards for a dam; reduce risks to life and property that could result from a potential catastrophic dam failure; and maintain the existing 200-year level of flood protection, that is currently provided by the dam's ability to attenuate floods, to life and property upstream and downstream of the dam.

Description of Preferred Alternative: The preferred alternative is to structurally rehabilitate Johns Creek Dam No. 1 to meet current safety and performance standards and maintain the current level of flood protection downstream. The plan is to construct a 270-foot-wide, roller-compacted concrete chute spillway over the top of the dam and raise the top of dam by 4 feet; close the existing vegetated earth auxiliary spillway with an earthen berm; replace the riser and footer; flatten the downstream slope of the embankment to 3:1 and install a chimney drain; replace the toe drains; and move the riprap-lined plunge pool downstream about 32 feet. For events equal to or smaller than the 500-year flood event, there will be no change in the current levels of flood protection downstream. Although the lake will be drained during construction, there will be no permanent change in the recreational uses of the lake once construction is complete. Up to 1.7 acres of Forested Freshwater/Shrub wetland downstream of the dam will be permanently modified.

Resource Information:

Location: Latitude: 37.40075108 Longitude: -80.43019338

8-Digit Hydrologic Unit Number: 02080201

Climate: Craig County is in the Ridge and Valley Subprovince of the Valley and Ridge Physiographic Province. The annual average temperature is 51.6° F with an annual summer average of 69.7° F and an annual winter average of 33.1° F. The mean date for the last frost of spring is April 30 with the latest date being June 11. In the fall, the mean date for the first frost is October 10 with the latest frost occurring on November 9. This provides a mean growing season of approximately 162 days. The average annual precipitation in inches is 40.89. This precipitation is fairly well distributed through the year with slightly larger amounts (a little over 4 inches) occurring in the months of May, June, and July. The average annual total snowfall is 25.4 inches.

Watershed Size: Johns Creek Watershed = 65,000 acres

Drainage Area of McDaniel's Lake = 12,209 acres

Land Use:
Woodland: 11,886 acres, 97.3%
Cropland: 8 acres, 0.1%
Developed: 85 acres, 0.7%
Hay/Pasture: 179 acres, 1.5%
Water: 51 acres, 0.4%

Land Ownership: Upstream of dam: 15% private and 85% public
Downstream of dam: 99.9% private, 0.1% public

Population and Demographics: According to the U.S. Census Bureau, the population of the Town of New Castle was 149 (2013-2017 American Community Survey (ACS) 5-Year Estimate). The total population of 149 represents a 1.3% decline from the 2010 Census number of 151. The population of Craig County was 5,131 for the same survey. Of the total population in the ACS, 100.0% were White (99.4% for Craig County and 68.4% for the entire state).

The median age of the population of the Town of New Castle is 46.9 while the same number for Craig County is 47.5 and this number for the entire state of Virginia was 38. Residents in the Town of New Castle that were 65 years old or older totaled 20.8% (31). Of the Town population, 79.2% was over the age of 18. There are 123 Town of New Castle residents who are 16 years of age or older according to the 2013-2017 ACS.

Approximately 83.6% of the residents in the Town had a high school education (includes equivalency) or higher (41.4% for Craig County and 30.9% for the state). Of the residents in the Town that are 25 years of age or older, 16.4% do not have a high school diploma (5.6% for Craig County and 9.7% for the state). About 50.1% of the Town residents have some education beyond high school, including 29.1% with a bachelor's degree or higher (19.2% for Craig County and 38.7% for the state).

Resource Concerns Identified Through Scoping:

Item/Concern	Rationale
SOILS	
Prime and Unique Farmland and Farmland of Statewide Importance	There are 20.9 acres of designated Prime and Unique Farmland and 6.6 acres of designated Farmland of State-wide importance located within the maximum potential limits of disturbance for all action alternatives.
WATER	
Floodplain Management	Craig County participates in the National Flood Insurance Program. Maintain current 200-year level of flood protection. Flooding concerns for downtown areas. Concern for impacts to downstream roads and crossings.
Waters of the U.S./Wetlands	There are wetlands upstream and downstream of the dam that will be affected by construction activities.
ANIMALS	
Endangered and Threatened Species	Endangered or threatened species have been identified in the watershed. Coordination with VDGIF and USFWS is on-going. Recommended conservation measures will be incorporated.
HUMANS	
Land Use	Landrights of adjacent property owners and the US Forest Service may be affected.
Public Health and Safety	Dam rehabilitation is needed to maintain flood protection for downstream benefitted areas. The dam does not meet current safety standards. Downstream properties that could be flooded have private wells and septic fields.
Social/Cultural Issues	Concerns about flooding if the dam was decommissioned.

Alternative Plans Considered: There are five plans that were considered and evaluated in detail.

1) *No Federal Action (Sponsors' Rehabilitation)* - The Sponsors have indicated that they will use the plan developed by NRCS to complete the rehabilitation of the dam if Federal funding is not available. The *No Federal Action (Sponsors' Rehabilitation)* alternative would be the same or involve the same components as the preferred alternative: *Structural Rehabilitation with Federal Assistance – 270-foot-wide Roller-Compacted Concrete (RCC) Spillway on the Embankment.*

2) *Structural Rehabilitation with Federal Assistance – Labyrinth Spillway on Embankment.* Construct a 200-foot-wide, six-cycle labyrinth spillway on the dam embankment; close the existing auxiliary spillway with an earthen berm; replace the riser and footer; flatten the downstream embankment to 3:1 and install a chimney drain and new toe drains; and move the riprap-lined plunge pool downstream 32 feet.

3) *Structural Rehabilitation with Federal Assistance – 550-foot-wide Roller-Compacted Concrete (RCC) Spillway on the Embankment.* Construct a 550-foot-wide, RCC chute spillway on the dam embankment; close the existing auxiliary spillway with an earthen berm; replace the riser and footer; flatten the downstream embankment to 3:1 and install a chimney drain and new toe drains; and move the riprap-lined plunge pool downstream 32 feet.

4) *Structural Rehabilitation with Federal Assistance – 370-foot-wide Roller-Compacted Concrete (RCC) Spillway on the Embankment.* Construct a 370-foot-wide, RCC chute spillway on the dam embankment; raise the top of the dam by 2 feet; close the existing auxiliary

spillway with an earthen berm; replace the riser and footer; flatten the downstream embankment to 3:1 and install a chimney drain and new toe drains; and move the riprap-lined plunge pool downstream 32 feet.

5) *Structural Rehabilitation with Federal Assistance – 270-foot-wide Roller-Compacted Concrete (RCC) Spillway on the Embankment.* Construct a 270-foot-wide, RCC chute spillway on the dam embankment; raise the top of the dam by 4 feet; close the existing auxiliary spillway with an earthen berm; replace the riser and footer; flatten the downstream embankment to 3:1 and install a chimney drain and new toe drains; and move the riprap-lined plunge pool downstream 32 feet.

For events equal to or smaller than the 200-year flood event, there will be no change in the current levels of flood protection downstream as a result of project activity.

The preferred alternative maximizes net benefits with a benefit/cost ratio of 1:1 and is the rehabilitation alternative preferred by the Sponsors.

Project Costs (Dollars)

	PL-83-566 Funds		Other Funds		Total	
Category	**Dollars**	**%**	**Dollars**	**%**	**Dollars**	**%**
Construction	$5,988,800	65.5%	$3,150,800	34.5%	$9,138,800	100%
Engineering	$714,700	98.1%	$13,500	1.9%	$728,200	100%
Relocation	n/a	n/a	n/a	n/a	n/a	n/a
Real Property Rights	n/a	n/a	$0	100%	$0	100%
Project Administration	$25,000	41.7%	$35,000	58.3%	$60,000	100%
Other (permits)	$0	0%	$3,000	100%	$3,000	100%
TOTAL COSTS	**$6,727,700**	**67.8%**	**$3,202,300**	**32.2%**	**$9,930,000**	**100%**
Annual O&M (non-Federal)	n/a	n/a	$5,000	100%	$5,000	100%

Project Benefits: Rehabilitation with the 270-foot-wide RCC chute will allow the sponsors to meet the requirements for a high hazard potential dam, reduce the potential for loss of life, and continue protection of existing infrastructure downstream of the dam for events up to the 200-year, 24-hour flood (0.5% annual chance of occurrence). Net average annual equivalent benefits between the Future with Federal Project and the Future without Federal Project = $0 because the candidate plans to rehabilitate Johns Creek Dam No. 1 are identical in scope, substantially equivalent costs, and equal effects.

Number of Direct Beneficiaries/Population at Risk: 66 (for Sunny Day breach)

Other beneficial effects:

- Reduces the threat of loss of life for approximately 66 people that live and/or work in the breach zone.
- Reduces the risk to the 40 structures within the breach inundation zone.
- Reduces the risk for a significant number of vehicle occupants who utilize five county roads in the breach inundation zone with a cumulative total average daily traffic count of 490.

- Reduces the threat of loss of access and loss of emergency services for 40 structures (22 residences, 15 agricultural buildings, two religious buildings and a fire/EMS building) for the Sunny Day Breach event.
- Continues to provide downstream flood protection up to the 200-year, 24-hour storm event for the people living, working, recreating, or travelling in the 24 miles of downstream floodplain influenced by the dam.
- Reduces the liability associated with continuing to operate an unsafe dam.
- Maintains existing stream habitat downstream of the dam for the endangered mussel species.
- Retains the existing aquatic and terrestrial habitat in and around the reservoir.
- Meets current Virginia Division of Dam Safety and NRCS safety and performance standards.

Benefit to Cost Ratio (current rate): 1.0 to 1.0

Net beneficial effects (National Economic Development or "NED" effects): $0

Funding Schedule: The most likely scenario is for the project to be implemented over two years including the design and construction.

Federal funds: Year 1 - $652,220 for engineering and project administration; **Year 2** - $87,500 for construction supervision and project administration and $5,988,000 for construction;

Non-Federal funds: Year 1 - $7,000 for engineering and administration and $3,000 for permitting costs; **Year 2** - $41,500 for engineering and project administration and $3,150,800 for construction;

Period of Analysis: 52 years (includes 1 year for design and 1 year for construction)

Project Life: 50 years

Environmental Effects/Impacts:

Resource	Impact
Air Quality	Temporary increase in particulate matter on site during construction.
Land Use Changes	Up to 1.7 acres of trees will be converted to grass due to the new location of the auxiliary spillway outlet and flattening the downstream slope.
Floodplains	Current floodplain will be maintained.
Wetlands	Though the lake will be drained during construction, the stream will continue at normal flow. As the stream channel "re-forms" in the lake bed, there may be a temporary increase in turbidity until the channel naturally stabilizes. During construction, there will be temporary effects on 58.3 acres of open-water wetland due to the lake draw-down. Additionally, up to 1.7 acres of Forested Freshwater/Shrub wetlands below the embankment will be permanently lost due to construction.
Prime Farmland	Up to 20.9 acres of designated Prime and Unique Farmland and 6.6 acres of designated Farmland of Statewide Importance could be affected by the preferred alternative.

Resource	Impact
Cultural Resources	A VDHR database search identified no recorded resources in the project area. NRCS conducted a cultural resources survey of the project area in October 2018. No archaeological sites were identified. Johns Creek Dam No. 1, built in 1967, was recommended not eligible for the National Historic Register of Historic Places due to a lack of historic or architectural significance. The State Historic Preservation Office concurred on 03/19/2019.
Threatened and Endangered Species	Pending consultation. Mitigation measures to be determined.
Mitigation	Mitigation may be required for up to 1.7 acres of Forested Freshwater/Shrub wetlands. Possible mitigation measures include conversion to Wet Meadow, off-site mitigation, or purchase of wetland mitigation credits.

Major Conclusions: The most cost-effective and efficient alternative to bring this dam into compliance with NRCS safety and performance standards and State safety criteria is to rehabilitate the dam by replacing the existing vegetated earth auxiliary spillway with a 270-foot-wide roller-compacted concrete spillway over the top of the dam; raising the top of the dam by four feet; closing the vegetated earth spillway with a berm; installing a chimney drain on the downstream slope of the embankment; replacing the riser; installing toe drains; and relocating the plunge pool.

For flood events equal to or smaller than the 500-year storm event, there will be no change in the current levels of flood protection downstream. There will be no permanent change in the lake after project activity is complete. There will be a permanent conversion of up to 1.7 acres of wetland downstream of the dam. Most of the environmental impacts are short-term (only during construction) and existing conditions will be restored upon completion of construction.

Areas of Controversy: None

Issues to be Resolved: None

Evidence of Unusual Congressional or Local Interest: No

Is this report in compliance with executive orders, public laws, and other statutes governing the formulation of water resource projects? Yes _X_ No ___

CHANGES REQUIRING PREPARATION OF A SUPPLEMENT

This supplement only addresses Johns Creek Dam No. 1, known locally as McDaniel's Lake. This dam was built in 1967 as a significant hazard potential dam. Due to changes in the downstream watershed, the Virginia Department of Conservation and Recreation, Division of Dam Safety and Floodplain Management (referred to herein as the Virginia Division of Dam Safety) changed the hazard potential of the dam to high in 2004. The first conditional certificate for Operation and Maintenance of the structure was issued by the Virginia Division of Dam Safety in 2004 because the vegetated earthen auxiliary spillway could not pass the Probable Maximum Flood (PMF) in effect at that time without overtopping the dam. This dam does not meet current USDA Natural Resources Conservation Service (NRCS) safety and performance standards for the capacity, integrity, or stability of a high hazard potential dam. For this reason, the dam does not meet the objectives of the Mountain Castles Soil and Water Conservation District (Mountain Castles SWCD) or the Craig County Board of Supervisors (herein referred to as Sponsors), which are to continue to provide flood protection for downstream properties and to reduce the risk of loss of human life.

This supplemental Plan-EA documents the planning process by which NRCS provided technical assistance to the Sponsors and the public in addressing resource issues and concerns within the Johns Creek Watershed and complied with the requirements of the National Environmental Policy Act (NEPA).

In accordance with NRCS NEPA policy, an Environmental Evaluation Worksheet (NRCS-CPA-52) was completed for the Johns Creek Dam No. 1 rehabilitation project to determine the requisite level of NEPA documentation to support the proposed action. Based upon the results of this analysis, an Environmental Assessment (EA) was required.

PURPOSE AND NEED FOR ACTION

Johns Creek Dam No. 1, McDaniel's Lake, was constructed as a significant hazard potential dam and is currently classified as a high hazard potential dam. The vegetated earth auxiliary spillway does not presently meet Natural Resources Conservation Service (NRCS) standards for the capacity, integrity, or stability of a high hazard dam. The crest of the existing auxiliary spillway (el. 1960.0 feet, NGVD 88 here and throughout) is at an elevation that contains slightly more than the 200-year, 24-hour storm event (0.5% annual chance of occurrence). The dam controls the uppermost 20% of the watershed above the Town of New Castle, which is approximately 24 miles downstream. There are 43 homes within the 200-year floodplain of this dam with the dam in place. The purposes of this supplement are to comply with current NRCS and Virginia dam design and safety standards; reduce risk to life and property that could result from a potential catastrophic dam failure; maintain the existing 200-year level of flood protection, which is currently provided by the dam's ability to attenuate floods, to life and property downstream of the dam; and address the concerns of the residents.

There is a need to comply with current state and federal safety and performance standards to prevent overtopping the dam during the Probable Maximum Flood event. With the dam in place, there are 18 habitable structures within the modelled 100-year floodplain (1.0% annual chance of occurrence, 43 homes within the 200-year (0.5% annual chance of occurrence), and 44 homes within the 500-year floodplain (0.2% annual chance of occurrence) downstream of the dam. The

purposes of this federal action are to meet current safety and performance standards and continue to provide the current 200-year level of flood protection in a manner that reduces risk of loss of human life and is cost-effective and environmentally acceptable.

ORIGINAL PROJECT

In 1962, the original watershed work plan for flood prevention and watershed protection was prepared under the authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566). The works of improvement were subsequently installed under the same authority. Craig County and the Natural Bridge Soil and Water Conservation District were the original sponsors. The Mountain Castles SWCD was formed out of the Natural Bridge SWCD by the Virginia Soil and Water Conservation Board on July 1, 1987 and became a sponsor at that time.

The original watershed work plan included the construction of four significant hazard potential, single-purpose flood control dams and 17.8 miles of channel improvement. The four flood control dams were constructed but the channel work was deleted from the planned works of improvement in a supplemental watershed plan that closed out the original project on April 6, 1977.

The Mountain Castle SWCD owns and operates Johns Creek Dam No. 1. The Sponsors applied for NRCS assistance with dam rehabilitation in January 2005. The rehabilitation of Johns Creek Dam No. 1 is authorized by the Public Law 83-566, (as amended), and as further amended by the Small Watershed Rehabilitation Amendments of 2000 (Section 313 of Public Law 106-472).

WATERSHED PROBLEMS

The Sponsors were aware of potential problems with the McDaniel's Lake dam in 2004 when the Virginia Division of Dam Safety changed the hazard class of the dam to high potential and issued the first Conditional O&M Certificate to the Mountain Castles SWCD. The conditional certificate for Johns Creek Dam No. 1 was issued because the auxiliary spillway did not have sufficient capacity to pass the Probable Maximum Flood (PMF) in effect at that time without overtopping the dam embankment.

Sponsor Concerns: A conditional certificate serves as notification to the Sponsors that the dam no longer meets State requirements and must be modified to meet State law. In January 2005, the Sponsors requested NRCS assistance to prepare a watershed plan that would identify the improvements necessary to obtain full dam safety certification.

Auxiliary Spillway Issues: The vegetated earth auxiliary spillway does not meet the current NRCS criteria for capacity. Further analysis indicated that the soil materials in the auxiliary spillway do not meet the NRCS criteria for integrity in the PMF event and a breach could occur. Smaller flow events could cause erosion on the floor of the auxiliary spillway, which would require frequent maintenance. Therefore, the vegetated earth auxiliary spillway also does not meet NRCS criteria for stability.

Floodplain Management: The Sponsors have identified flooded roads in the floodplain downstream as a primary concern. Craig County has participated in the National Flood Insurance Program since 1990. They realize the value that Johns Creek Dam No. 1 provides in flood protection benefits, particularly for the roads. The dam controls 19.1 square miles (12,209 acres)

of the watershed above the affected properties and benefitted area for events up to and including the 200-year, 24-hour event.

Erosion and Sedimentation: As of 2016, when the sediment survey was completed, McDaniel's Lake had reached 49 years (49%) of its planned 100-year service life. The designed submerged sediment capacity was 149 acre-feet, but the as-built volume was 209.8 acre-feet due to the removal of extra borrow from the pool area. As of 2016, it is estimated that there were 37.4 acre-feet of submerged sediment in the pool area which is about 18% of the as-built sediment storage volume. This material is primarily deposited sediments plus leaf and other organic debris. The actual sediment delivery was less than anticipated during the original design. There is sufficient sediment storage for about 276 years at the current rate of sediment deposition.

Local Concerns: The four Johns Creek Watershed dams were planned and constructed in response to the concerns of the residents after extensive flooding that occurred in the 1940's and 1950's. The possibility of decommissioning the dam at McDaniel's Lake was mentioned at the first public meeting in October 2017 since decommissioning must be considered under NRCS rehabilitation policy. Although the discussion of decommissioning addressed the mitigation of induced damages, during the initial watershed meetings, the residents indicated that they were opposed to decommissioning because of their concern that flooding would increase in the absence of the dam. At a subsequent meeting, one long-time resident described the consequences of the flooding that occurred before the dams were built. For the past 50 years, the dam has performed as designed and constructed.

WATERSHED OPPORTUNITIES

The following is a general list of opportunities that will be recognized through the implementation of this dam rehabilitation plan. Some quantification of these opportunities will be provided in other sections of the report, as appropriate.

- Comply with high hazard potential dam safety and performance standards established by NRCS and the Virginia Division of Dam Safety.
- Reduce the potential for loss of life associated with a failure of this dam.
- Reduce the sponsor liability associated with operation of an unsafe dam.
- Maintain the existing 200-year level of flood protection for downstream homes and infrastructure that is currently provided by the dam's ability to attenuate floods.
- Prohibit future construction of inhabitable dwellings upstream of the dam below the top of the dam.
- Maintain aquatic and terrestrial habitats around the lake.
- Continue to protect the habitat of the endangered mussel species downstream of the dam.
- Preserve existing recreation opportunities.

SCOPE OF THE ENVIRONMENTAL ASSESSMENT

A scoping process was used to identify issues of economic, environmental, cultural, and social importance in the watershed. Watershed concerns of Sponsors, technical agencies, and local citizens were expressed in the scoping meeting and in other planning and public meetings. Factors that would affect soil, water, air, plant, animals, and human resources were identified by an interdisciplinary planning team composed of the following areas of expertise: engineering, biology, economics, resource conservation, water quality, soils, archaeology, and geology.

On October 17, 2017, a Scoping Meeting was held in the Craig County Courthouse in New Castle, Virginia with 13 people attending. Additional written comments were received from the Virginia Marine Resources Commission, the Virginia Department of Game and Inland Fisheries, the Virginia Department of Conservation and Recreation, Division of Natural Heritage and the U.S. Fish and Wildlife Service. Table A lists the specific concerns and their relevance to the proposed action to the decision-making process.

The citizens at the first Public Meeting, also held on October 17, 2017, expressed concerns like those at the Scoping Meeting.

Table A – Summary of Scoping for Rehabilitation of Johns Creek Dam No. 1

Item/Concern	Relevant to the Proposed Action		Rationale
	Yes	No	
SOILS			
Prime and Unique Farmland and Farmland of Statewide Importance	X		There are designated Prime and Unique Farmland (20.9 acres)and designated Farmland of State-wide (6.6 acres) importance located within the maximum potential limits of disturbance for all action alternatives.
WATER			
Floodplain Management	X		Maintain current flood protection. Flooding concerns for downtown areas. Concern for impacts to downstream roads and crossings.
Sole Source Aquifers		X	None present.
Waters of the U.S./Wetlands (Clean Water Act – 401 and 404)	X		There are 58.3 acres of wetlands upstream and 1.7 acres downstream of the dam that will be affected by construction activities.
Water Quality (Clean Water Act-303(d)/305(b))		X	There are no impaired segments of any type identified in Upper Johns Creek. Ensure erosion and sediment controls during construction.
Coastal Zone Management Act		X	Craig County is not among the 88 Coastal Zone Management Areas designated by the state.
National Wild and Scenic Rivers Act		X	Not applicable to Virginia – None Present.
Virginia Scenic Rivers Act		X	None present.
AIR			
Clean Air Act (Criteria Pollutants)		X	Ensure air quality controls are used during construction.
Clean Air Act (Regional Visibility Degradation)		X	Not applicable: No designated Class I areas are located within Craig County or any adjoining counties.
ANIMALS			
Coral Reefs		X	None present in Virginia
Endangered and Threatened Species	X		Endangered or threatened species have been identified in the watershed. Coordination with VDGIF & USFWS is on-going. Recommended conservation measures will be incorporated.
Essential Fish Habitat		X	None present.
Invasive Species		X	No invasive animal species were observed.
Migratory Birds/Bald Eagles/Golden Eagles		X	Bald /Golden eagle habitat is present, but no eagles or nests were observed onsite.

Item/Concern	Relevant to the Proposed Action		Rationale
	Yes	No	
PLANTS			
Endangered and Threatened Species		X	There are no threatened or endangered plant species within the proposed limits of disturbance.
Invasive Species		X	Various common invasive plant species were observed within the maximum potential limits of disturbance for all action alternatives. Best management practices will be employed to prevent the spread of existing invasive species and the introduction of new invasive species.
Riparian Areas		X	There would be temporary impacts due to lake draw-down during construction. Minimize impacts during construction.
HUMANS			
Environmental Justice and Civil Rights		X	All residents of the watershed benefit equally.
Historic Properties		X	None present in the area.
Land Use	X		Landrights of adjacent property owners and the US Forest Service may be affected.
Local and Regional Economy		X	Temporary benefit during construction.
Natural Areas		X	None located in proximity to project area.
Park Lands		X	None present.
Potable Water Supply/Regional Water Management Plans		X	The dam is not used for water supply.
Public Health and Safety	X		The dam does not meet current safety standards. Continued flood protection for downstream benefitted areas is needed . Flooding of downstream properties that have private wells and septic fields.
Recreation		X	No public recreation.
Scenic Beauty		X	There are no designated State or National Natural and Scenic Area Preserves or river segments located within the project area.
Scientific Resources		X	No research sites identified.
Social/Cultural Issues	X		Concerns about flooding if the dam was decommissioned.

AFFECTED ENVIRONMENT

PLANNING ACTIVITIES

Geologic and engineering investigations and analyses were conducted by the engineering firm Gannett Fleming with oversight from the Virginia NRCS engineering staff. This work included the hydrologic and hydraulic analysis, and the Water Resources Site Analysis Program (SITES) assessment of the dam characteristics. Both the existing conditions and proposed rehabilitation alternatives were evaluated with these tools. The sediment survey was conducted by NRCS engineering and geology staff from Virginia, North Carolina, and West Virginia.

Other planning activities included a topographic survey, land use inventory, natural resources inventories, wetland assessments, and the identification of cultural resources, invasive plants and threatened and endangered species. Potential alternatives were evaluated for cost-effectiveness and for local acceptability. Both the benefits and the costs of the alternatives were computed and analyzed.

PHYSICAL FEATURES

Project Location: The watershed for McDaniel's Lake is in Giles and Craig Counties, Virginia. The total McDaniel's Lake watershed is 12,209 acres (19.1 square miles). Appendix B shows the location map for this watershed. Johns Creek Dam No. 1 controls the uppermost 20% of the watershed. Figures C-1 and C-2 show the topographic maps watershed for all of Johns Creek and for Johns Creek Dam No. 1.

Topography: McDaniel's Lake is in the Ridge and Valley Physiographic Province. The topography of the Ridge and Valley is characterized by larger streams generally confined to northeast-southwest trending valleys with smaller tributaries coming in at approximately right angles. The slopes of the mountains are very steep. The elevation in the watershed ranges from about 1,907.6 feet at the dam to about 4,361 on Bald Knob right above Mountain Lake in Giles County, Virginia.

Soils: The watershed includes the major soil groups of Berks-Weikert complex, 1,682 acres (13.7%); Lily gravelly sandy loam, 1,167.4 acres, (9.5%); Oriskany very cobbly sandy loam, 935 acres (7.6%); Nolichucky very stony sandy loam, 657 acres (5.4%); Laidig cobbly fine sandy loam, 587.8 acres (4.8%). Other smaller soil map units make up the remainder of the acreage in the watershed. Approximately 76 % of the soils are on slopes greater than 15% and 46 % of the soils are on slopes greater than 30%. Figure C-3 shows the soils in the watershed.

Geology: The digital representation of the 1993 Geologic Map of Virginia indicates that Johns Creek Dam No. 1 is underlain by the Brallier Formation of the Devonian Period. The formation with the largest area in the watershed is the map unit for the Millboro Shale and Needmore Formation which are also Devonian in age. The largest mapped unit in the Johns Creek Dam No. 1 drainage area is what the 1993 Geologic Map of Virginia has labelled "landslides with intact stratigraphic units – undivided". It is made up of all the strata between the lower Devonian Needmore Formation (a shale) and the Silurian Age Juniata Formation, which covers a half dozen or more rock units. It is not felt that any of the rock units within that area would cover more acreage than the Millboro Shale/Needmore Formation unit. The floodplains of the valleys are

composed of layers of sandy and silty alluvial deposits. These Quaternary-aged deposits are underlain by weathered rock of the formations described above.

LAND USE

The total drainage area upstream of McDaniel's Lake is 12,209 acres (19.1 mi^2). Table B lists the land use upstream of the dam. This table also lists the land use in the Sunny Day Breach inundation zone below the dam. The land uses were derived from the NLCD 2011 dataset. Figure C-4 shows the land use map of the watershed. There are no anticipated land use changes.

Table B - Land Use

Land Cover Type	Drainage Area of McDaniel's Lake (ac.)	Percent of Total	Sunny Day Breach Inundation Zone (ac.)	Percent of Total
Developed	85	0.7	20	1.1
Developed Open Space	-	-	63	3.6
Cropland	8	0.1	116	6.5
Woodland	11,886	97.3	821	46.1
Hay/Pasture	179	1.5	681	38.3
Water	51	0.4	79	4.4
Total	**12,209**	**100.0**	**1780**	**100.0**

SOCIAL AND ECONOMIC CONDITIONS

The entire population at risk from a possible breach event live within Craig County. There are 22 homes, 15 agricultural buildings, two religious buildings and a fire/EMS building that lie within the breach inundation zone. Without the dam in place, 46 residences, ten agricultural buildings, three commercial structures, and one religious building are impacted during the 200-year, 24-hour event. The fire/EMS building is not impacted by the 500-year, without-dam event or smaller. However, some of the roads to the fire/EMS building will be overtopped at events greater than the 100-year flood and access will be restricted due to water depths up to 1.25 feet.

Population and Demographics: According to the U.S. Census Bureau, the population of the Town of New Castle was 149 (2013-2017 American Community Survey (ACS) 5-Year Estimate). The total population of 149 represents a 1.3% decline from the 2010 Census number of 151. The population of Craig County was 5,131 for the same survey. Of the total population in the ACS, 100.0% were White (99.4% for Craig County and 68.4% for the entire state).

The median age of the population of the Town of New Castle is 46.9 while the same number for Craig County is 47.5 and this number for the entire state of Virginia was 38. Residents in the Town of New Castle that were 65 years old or older totaled 20.8% (31). Of the Town population, 79.2% was over the age of 18. There are 123 Town of New Castle residents who are 16 years of age or older according to the 2013-2017 ACS.

Approximately 83.6% of the residents in the Town had a high school education (includes equivalency) or higher (41.4% for Craig County and 30.9% for the state). Of the residents in the Town that are 25 years of age or older, 16.4% do not have a high school diploma (5.6% for Craig

County and 9.7% for the state). About 50.1% of the Town residents have some education beyond high school, including 29.1% with a bachelor's degree or higher (19.2% for Craig County and 38.7% for the state).

According to the 2013-2017 ACS, five sub-sectors employ most of New Castle's population: management, professional and related (30.4%), service (14.3%), sales and office (23.2%), construction, extraction, maintenance and repair (7.1%), and production, transportation and material moving (25.0%). Private wage and salary employment constitute 92.9% of all New Castle residents who are employed while public sector jobs (primarily in education) make up 7.1%. Of residents who are employed, 54.5% work in Craig County and 45.5% work outside of Craig County.

Median household income estimated for the Town for the 2013-2017 period was $30,625. This compares to $53,526 for Craig County and $68,766 for the median household income calculated for Virginia. The national figure for median household income per year estimated for the same period was $57,652.

With respect to per capita incomes, New Castle residents are estimated to have had per capita income of $22,144 for the 2013-2017 period. Craig County residents for the same time period earned an estimated $26,753 for per capita income. Virginians reported per capita income of $36,268 for the 2013-2017 period, while the same figure for the entire United States was $31,177 for same period. That makes the Town per capita income figure for 2013-2017 82.7% of the County's and 61.1% of the state's level and 71.0% of the national figure.

According to the 2013-2017 ACS estimates, the Town of New Castle had one family living below the poverty level (2.9% of 34 families in total) and a total of 27 people living below the poverty level (18.1% of 149 in total). That compares to 9.3% for of all individuals for Craig County and 11.2% of all individuals in the state and 14.6% of all individuals in the nation; 2.2% of all families in Craig County, 7.8% of all families for the State and 10.5% for all families in the Nation lived below the poverty level.

The 2013-2017 Census estimates indicate that 72.6% (77) of the 106 housing units within the Town of New Castle were occupied. The median year that New Castle homes were built is 1946 and about 27.4% of all homes were vacant.

A majority of the 150 people at risk from a breach event live within the Town of New Castle. There are 40 structures within the breach inundation zone: twenty-two homes, 15 agricultural buildings, two religious structures and one fire/EMS building. Most of the residential property downstream of the dam ranges between $50,000 and $500,000 in total value with an average of about $85,000 which is well below the median value for Craig County ($164,800). The total value of residential property (structures and contents only, excluding land values) at risk below the dam is an estimated $2,686,000.

Johns Creek Dam No. 1 provides incidental recreation for one household adjacent to the reservoir.

SPECIAL ENVIRONMENTAL CONCERNS

SOILS

Prime and Unique Farmlands, and Farmland of Statewide Importance:

There are up to 20.9 acres of designated Prime and Unique Farmland protected under the Farmland Protection Policy Act (FPPA) located within the maximum extent of possible ground disturbance for the proposed action. Additionally, there are up to 6.6 acres of soils designated as Farmland of Statewide importance that may also be disturbed by the proposed action. Figure C-5 shows the map of these soils.

WATER

Clean Water Act

Clean Water Act (CWA) – Sections 303(d) and 305(b) (Water Quality) overview:

> The two separate sections of the CWA, sections 303(d) and 305(b), are discussed together because they both pertain to water quality. Section 303(d) requires States, territories, and Tribes to identify "impaired waters" and to establish total maximum daily loads (TMDLs). A TMDL is a plan regulatory term in the CWA, describing a plan for restoring impaired waters that identifies the maximum amount of a pollutant that a body of water can receive while still meeting water quality standards.

The Final 2016 305(b)/303(d) Water Quality Assessment Integrated Report, was released in April 2018, https://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/WaterQualityAssessments/2016305b303dIntegratedReport.aspx. It summarizes the water quality conditions in Virginia from January 1, 2009 through December 31, 2014. The Report lists no impairments of any type for Johns Creek within Subwatershed JU44 – (Upper) Johns Creek-Dicks Creek 020802011101.

The Permits and Compliance section of the EA will identify any state or local permitting that may be required based upon the alternative carried forward for impacts analysis.

Waters of the U.S.

Clean Water Act – Sections 401 (State Administered) and 404 (Federally Administered) overview:

> As above, because of their relationship to one another, both Sections 401 and 404 are discussed together. Section 404 established a permit program to regulate the discharge of dredged and fill material into waters of the U.S. Discharge of dredged or fill material into waters of the U.S. is prohibited unless the action is exempted or is authorized by a permit issued by the U.S. Army Corps of Engineers or by the State.
>
> If a CWA Section 404 permit is required, first the State (or Tribe) in which the activity will occur must certify that the activity will not violate State water quality standards by issuing a Section 401 State Water Quality Certification.

Clean Water Act – Section 402 (State Administered) overview:

> Section 402 establishes the National Pollutant Discharge Elimination System (NPDES) Program, also administered by the States. Section 402 requires a permit for sewer discharges and storm water discharges from developments, construction sites, or other areas of soil disturbance.
>
> The Virginia Department of Environmental Quality (DEQ) administers the program as the Virginia Pollutant Discharge Elimination System (VPDES), http://www.deq.virginia.gov/Programs/Water/PermittingCompliance/PollutionDischargeElimination.aspx. The DEQ issues VPDES permits for all point source discharges to surface waters, to dischargers of stormwater from Municipal Separate Storm Sewer Systems (MS4s), and to dischargers of stormwater from Industrial Activities, and Virginia Stormwater Management Program (VSMP) permits to dischargers of stormwater from Construction Activities, http://www.deq.virginia.gov/Programs/Water/StormwaterManagement/VSMPPermits.aspx.

Johns Creek is a tributary to Craig Creek that flows from Montgomery County through Craig and Botetourt Counties to join the James River near the Community of Eagle Rock, Virginia. The James River flows generally east through Virginia to join the Chesapeake Bay near Virginia Beach. From there, the water flows through the Chesapeake Bay and out to the Atlantic Ocean off the Virginia coast.

Johns Creek is considered a water of the U.S. The Permits and Compliance section of the EA will identify any state or local permitting that may be required based upon the alternatives carried forward for impacts analysis.

Code of Virginia, Title 62.1. Waters of the State Ports and Harbors, Chapter 3.1 State Water Control Law, Article 2.5 – Chesapeake Bay Preservation Act overview:

> The Chesapeake Bay Preservation Act (Bay Act), enacted by the Virginia General Assembly in 1988, is designed to improve water quality in the Chesapeake Bay and other waters of the State by requiring the use of effective land management and land use planning. The Bay Act balances state and local economic interests and water quality improvement by creating a unique cooperative partnership between state and Tidewater local governments to reduce and prevent nonpoint source pollution. The Bay Act recognizes that local governments have the primary responsibility for land use decisions, expanding local government authority to manage water quality, and establishing a more specific relationship between water quality protection and local land use decision-making. A list of the applicable 84 localities is available at http://www.deq.virginia.gov/Programs/Water/ChesapeakeBay/ChesapeakeBayPreservationAct/LocalProgramTechnicalAssistance.aspx.

While the Johns Creek watershed drains to the Chesapeake Bay, Craig County is not among the 84 Bay Act localities subject to regulation under the Act. Accordingly, the Bay Act is not applicable to the project's affected environment and will not be carried forward for impacts analysis in the Environmental Consequences section.

Wetlands

Executive Order 11990 – Protection of Wetlands overview:

> Executive Order (E.O.) 11990 requires that Federal Agencies act to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the beneficial functions of wetlands when "providing federally undertaken, financed or assisted construction and improvements." Wetlands are defined differently within various Federal and State programs and for identification, delineation, and classification purposes. The NRCS wetland protection policy defines wetlands as areas, natural or artificial, that have hydric soil, hydrophytic vegetation, and indicators of wetland hydrology.

Wetland locations and boundaries were determined by reviewing the USFWS wetland mapper website, www.fws.gov/wetlands/Data/Mapper.html, in conjunction with a field survey performed in October 2018. The McDaniel's Lake shoreline, inflows, and outflow and all areas within the maximum potential limits of disturbance were visually surveyed for wetlands. There is a total of 60.8 acres of wetlands within the maximum potential limits of disturbance that include 32.1 acres of Lake, 24.2 acres of upstream freshwater forested/shrub wetlands, 2.0 acres of freshwater emergent wetlands, and 2.5 acres of downstream freshwater forested/shrub wetlands (fig. C-6).

Appendix D contains additional documentation regarding the field investigation methodology.

The Permits and Compliance section of the EA will identify any state or local permitting that may be required based upon the alternative carried forward for impacts analysis.

Coastal Zone Management Areas

Coastal Zone Management Act – Section 307 overview:

> Section 307 of the Coastal Zone Management Act specifies that actions or activities within the coastal zone implemented by a Federal agency or on the behalf of or through a Federal agency must be consistent with the State's coastal plan, if they have one, and be in concert with the goals, tenets, and objectives of that plan.
>
> Federal Agency Coastal Zone Management Areas (CZMAs) are areas located within or near the officially designated "coastal zone" of a State. The National Oceanic and Atmospheric Administration's (NOAA's) Office of Coastal Zone Management approves coastal programs. The list of Virginia's dedicated CZMAs is available on-line at http://deq.state.va.us/Programs/EnvironmentalImpactReview/FederalConsistencyReviews.aspx#cma.

Craig County is not located in or near a designated CZMA. Accordingly, the CZMA is not applicable to the project's affected and will not be carried forward for impacts analysis in the Environmental Consequences section.

Floodplain Management

Executive Order 11988 – Floodplain Management Overview:

> The NRCS policy on floodplains (190-GM, Part 410, Subpart B, Section 410.25) reflects the requirement of the E.O. that decisions by Federal agencies must recognize that floodplains

have unique and significant public values. The objectives of E.O. 11988 are to avoid, to the extent possible, the long- and short-term adverse impacts associated with occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development where there is a practical alternative.

The Johns Creek floodplain is managed by Craig County. They have a local floodplain ordinance, which imposes zoning restrictions within the flood zones that is consistent with the Federal Emergency Management Agency (FEMA) and state regulations (figs C-27 through C-32). Craig County is in good standing with the National Flood Insurance Program and has participated since February 1990.

Wild and Scenic Rivers

The National Wild and Scenic Rivers Act (Public Law 90-542) overview:

The National Wild and Scenic Rivers Act was created by Congress to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.

According to the National Wild and Scenic Rivers System website, https://www.rivers.gov, while Virginia has approximately 49,350 miles of river, there are currently no federally designated wild and scenic rivers in the state. Therefore, the National Wild and Scenic Rivers Act is not applicable to the project's affected environment and will not be carried forward for impacts analysis in the Environmental Consequences section.

Virginia Scenic Rivers Act of 1970 (Code of VA, Title 10.1-400) overview:

Virginia Scenic Rivers Program's intent is to identify, designate and help protect rivers and streams that possess outstanding scenic, recreational, historic and natural characteristics of statewide significance for future generations. In addition to existing designated state scenic rivers, other river segments have been deemed worthy of further study.

According to the Virginia Department of Conservation and Recreation's Scenic Rivers Program website, http://www.dcr.virginia.gov/recreational-planning/srmain, while Virginia has approximately 49,350 miles of river, there are currently no State designated river segments in the affected environment of the project. In addition, there are no recommended river study segments within the project affected environment per the Virginia Outdoors Plan Mapper of Recommended River Study Segments website, http://dswcapps.dcr.virginia.gov/dnh/vop/vopmapper.htm. Therefore, the Virginia Scenic Rivers Act of 1970 is not applicable to the project's affected environment and will not be carried forward for impacts analysis in the Environmental Consequences section.

AIR

Clean Air Act – General Conformity Rule (Criteria Pollutants) overview:

The U.S. EPA's "Green Book," available online, indicates Craig County to be in attainment for all criteria pollutants. Therefore, the General Conformity Rule is not applicable to the

project's affected environment will not be carried forward for impacts analysis in the consequences section.

Clean Air Act – Regional Haze Regulations overview:

Nationwide there are 156 designated Class I areas across the country, including many well-known national parks and wilderness areas that are given special protection under the Clean Air Act.

Per the EPA's online list of areas protected by the Regional Haze Program, https://www.epa.gov/visibility/list-areas-protected-regional-haze-program, there are two designated Class I areas located in Virginia, neither of which are in proximity to Craig County. Accordingly, the Regional Haze Regulations are not applicable to the project's affected environment and will not be carried forward for impacts analysis in the Environmental Consequences section.

Applicable State and Local Air Quality Regulations

Air quality permits are issued to industries and facilities that emit regulated pollutants to ensure that these emissions do not cause harm to the public or the environment. Federal and state regulations to control air pollution are implemented through the air permitting process. Permit applicability determinations and the issuance of permits are performed in the DEQ regional offices, http://www.deq.virginia.gov/Programs/Air/PermittingCompliance.aspx.

The Permits and Compliance section of the EA will identify any state or local air permitting requirements for the Preferred Alternative.

ANIMALS AND PLANTS

Coral Reefs

Executive Order 13089, Coral Reef Protection:

Executive Order (E.O.) 13089, was issued in 1998 in recognition of the importance of conserving coral reef ecosystems. The E.O. created a coral Reef Task Force membership includes 11 Federal agencies, including the Secretary of agriculture. The E.O. states that agencies will utilize their programs and authorities to protect and enhance the conditions of such ecosystem and, to the extent permitted by law, ensure that any actions authorized, funded, or carried out by the agency will not degrade these ecosystems.

Virginia is in the New/England/Mid-Atlantic Region in which there are no coral reefs present. Therefore, the E.O. 13089, Coral Reef Protection is not applicable to the project's affected environment and will not be carried forward for impacts analysis in the Environmental Consequences section.

Endangered and Threatened Species and Natural Areas

Endangered Species Act (Federal) Overview:

Section 7(a) of the Endangered Species Act (ESA) requires the NRCS, in consultation with and with the assistance of the Secretary of the Interior [U.S. Fish and Wildlife Service (USFWS) and/or National Oceanic and Atmospheric Administration, National Marine

Fisheries Service (NMFS)], to advance the purposes of the Act by implementing programs for the conservation of endangered and threatened species, and to ensure that NRCS actions and activities do not jeopardize the continued existence of threatened and endangered species or result in the destruction or adverse modification of the species' critical habitat.

NRCS obtained the Official Species List from the USFWS in April 2019 via the online Information, Planning and Conservation (IPaC) system, https://ecos.fws.gov/ipac/. Two Federally endangered species, the Indiana bat (*Myotis Sodalis*), and the James spinymussel (*Pleurobema collina*) as well as two Federally threatened species, the northern long-eared bat (*Myotis septentrionalis*), and the yellow lance (*Elliptio lanceolate*) were identified as potentially present.

Based upon the IPaC results, the NRCS followed up with a search of the Virginia Department of Game and Inland Fisheries' (VDGIF) on-line Northern Long-eared Bat (NLEB) Winter Habitat and Roost Tree ARC GIS System, http://dgif-virginia.maps.arcgis.com/apps/webappviewer/index.html?id=32ea4ee4935942c092e41ddcd19e5ec5. Using the search tool, NRCS found the proposed action's affected environment to be outside of the half-mile buffer of recorded NLEB winter hibernaculum but within the 5.5-mile buffer, approximately 3.23 miles away.

Virginia State Listed Threatened and Endangered Species and Natural Areas

The NRCS must also consult with State entities when considering impacts to species of concern protected by State laws or regulations.

Virginia Department of Game and Inland Fisheries (VDGIF) State Listed Threatened and Endangered Species (All animals excluding insects)

The Virginia Department of Game and Inland Fisheries (VDGIF) retains legal authority for the protection of all State Listed animal species except insects.

Early scoping with the USFWS and the VDGIF indicated the potential presence of the federally and state endangered James spinymussel (*Parvaspina collina*). Subsequently NRCS contracted Three Oaks Engineering to complete a freshwater mussel survey. The survey of the 800-meter reach below Johns Creek Dam #1 was completed during April 2016. No mussels were found within the first 200 meters immediately downstream of the dam outlet. The survey confirmed the presence of the endangered James Spinymussel and two other non-listed mussel species, the triangle floater (*Alasmadonta undulata*), and creeper (*Strophitus undulatas*).

In February 2019, the NRCS performed a search of the VDGIF's Virginia Fish and Wildlife Information Service (VAFWIS) database, http://vafwis.org/fwis/, to identify species that may be present in the affected environment for the proposed action. The VaFWIS database uses a minimum 2-mile habitat search radius from the location of the proposed action.

The results of the VaFWIS database search indicated the potential presence of the VDGIF State listed animal species in Table C.

Upon completion of the draft environmental assessment (EA), the document will be submitted to the Virginia State Agency Review Clearinghouse for regulatory review. Feedback will be incorporated in the Final EA, including assessment of habitat presence for each species,

documented presence within the affected environment, specific species best management practice recommendations, and any time of year restrictions applicable to specific construction activities.

Virginia Department of Agriculture and Consumer Services (VDACS) Resources

Although the VDACS retains legal authority for the protection of all State Listed plants and insects, http://www.vdacs.virginia.gov/plant-industry-services-endangered-species.shtml, they maintain a memorandum of agreement (MOA) in place with the Virginia Department of Conservation and Recreation stipulating that coordination regarding these resources should be initiated through the Virginia Department of Conservation and Recreation, Division of Natural Heritage Resources, http://www.dcr.virginia.gov/natural-heritage/.

Virginia Department of Conservation and Recreation (VDCR), Division of Natural Heritage (DNH) - Virginia Natural Heritage Program Resources

In addition to providing official State consultation feedback for all State Listed plants and insects per the MOA with the VDACS, the Virginia Natural Area Preserves Act (10.1-209 to 217 of the *Code of Virginia)*, passed in 1989 codified VDCR's powers and duties related to statewide biological inventory: maintaining a statewide database for conservation planning and project review, land protection for the conservation of biodiversity, and the protection and ecological management of natural heritage resources (the habitats of rare, threatened, and endangered species, significant natural communities, geologic sites, and other natural features). The VDCR-DNH represents the first comprehensive attempt to identify the most significant natural areas in the Commonwealth through an intensive statewide inventory of plants, animals, natural communities, and other features that are exemplary, rare, or endangered on a global or statewide basis.

Virginia Natural Area Preserves System

The Virginia Natural Area Preserves System was established in the late 1980's to protect some of the most significant natural areas in the Commonwealth. A site becomes a component of the preserve system once dedicated as a natural area preserve by the Director of the DCR. Natural area dedication works in much the same way as a conservation easement by placing legally binding restrictions on future activities on a property. The Natural Area Preserve System includes examples of some of the rarest natural communities and rare species habitats in Virginia.

In January 2019, the NRCS accessed the Virginia Division of Natural Heritage Program's Virginia Natural Area Preserves website, http://www.dcr.virginia.gov/natural-heritage/natural-area-preserves/, and learned there are currently no designated Virginia Natural Area Preserves located in Craig County. Therefore, the Virginia Natural Area Preserves program is not applicable to the project's affected environment and will not be carried forward for impacts analysis in the Environmental Consequences section.

Virginia Rare Species and Natural Communities

In January 2019, the NRCS completed a search of the Virginia Division of Natural Heritage Program's Rare Species and Natural Community database, http://www.dcr.virginia.gov/natural-heritage/dbsearchtool. The search parameters included only plants and insects for all State Legal Status species located in Craig County, for the twelve-digit HUC for (Upper) Johns Creek-Dicks Creek, 020802011101. The search results returned no insects and one vascular plant (table C).

Table C - State Listed Threatened and Endangered Species

Status (Regulatory Purview)	Common Name	Scientific Name	Findings	Not Present nor Carried Forward for Analysis
State Endangered	James spinymussel	*Parvaspina collina*	2016 NRCS survey confirmed presence downstream of Dam	
State Threatened (VDGIF)	Atlantic pigtoe	*Fusconaia masoni*	Per Biota of Virginia (BOVA) report, one specimen observed in Upper Johns Creek (JU44). 2016 NRCS survey did not indicate presence downstream of Dam.	
State Threatened (VDGIF)	green floater	*Lasmigona subviridis*	Per BOVA report, not indicated as known or likely to occur within JU44 or Craig County. 2016 NRCS survey did not indicate presence downstream of Dam.	**X**
State Threatened (VDGIF)	pistolgrip	*Tritogonia verrucosa*	Per BOVA report, not indicated as known or likely to occur within JU44 or Craig County. 2016 NRCS survey did not indicate presence downstream of Dam.	**X**
State Threatened (VDGIF)	orangefin madtom	*Noturus gilberti*	Per BOVA report, 999 specimens observed beyond the 1-mile project position ring, upstream of the dam impoundment in 2014. No confirmed observations downstream of the dam or anywhere else within Upper Johns Creek (JU44).	**X**
State Endangered (VDGIF)	Indiana bat	*Myotis sodalis*	Per BOVA report, known or likely within JU44 in Craig County with one known general occurrence and one known resident occurrence.	
State Endangered (VDGIF)	little brown bat	*Myotis lucifugus lucifugus*	No known occupied maternity roost, but within hibernaculum 5.5-mile buffer-VaFWIS	
State Endangered (VDGIF)	tri-colored bat	*Perimyotis subflavus*	No known occupied maternity roost, but within hibernaculum 5.5-mile buffer-VaFWIS	

Status (Regulatory Purview)	Common Name	Scientific Name	Findings	Not Present nor Carried Forward for Analysis
State Threatened (VDGIF)	northern long-eared bat	*Myotis septentrionalis*	No known occupied maternity roost, but within hibernaculum 5.5-mile buffer-VaFWIS	
State Endangered (VDGIF)	Bewick's wren	*Thryomanes bewickii*	Presumed Extirpated-Per Mr. Sergio Harding, VDGIF	**X**
State Threatened (VDGIF)	peregrine falcon	*Falco peregrinus*	Per BOVA report, not indicated as known or likely to occur within Craig County.	**X**
State Threatened (VDGIF)	Loggerhead shrike	*Lanius ludovicianus*	Per BOVA report, indicated as known or likely to occur within Craig County with only one confirmed observation	**X**
State Threatened (VDGIF)	migrant loggerhead shrike	*Lanius ludovicianus migrans*	Per BOVA report, indicated as known or likely to occur within Craig County with only one confirmed observation	
State Threatened (VDGIF)	Henslow's sparrow	*Ammodramus henslowii*	Per BOVA report, indicated as known or likely to occur within Craig County with two likely observations (Breed Spring/Summer)	
State Endangered (VDACS-VDCR-NHR)	small whorled pogonia	*Isotria medeoloides*	Per phone conversation with Nancy Vanalstine, VDCR-VDNH Botanist, provided project information on 02/20/19 via email. No Response received.	**X**

Essential Fish Habitat

Magnusson-Stevens Fishery Conservation and Management Act overview:

The Magnuson-Stevens Act is the primary law governing marine fisheries management in the U.S. In 1996, the Act was amended to incorporate essential fish habitat (EFH) and rules were published in the Federal Register. It calls for heightened consideration of fish habitat in resource management decisions and direct action to stop or reverse the continued loss of fish habitats. The National Marine Fisheries Service (NMFS) implements and enforces the management measures through fisheries management plans.

Since the affected environment is inland, and does not include saltwater tributaries or marine fisheries, there is no potential essential fish habitat protected under the Magnusson-Stevens Fishery Conservation and Management Act present according to https://www.fisheries.noaa.gov/resource/map/essential-fish-habitat-mapper. Therefore, essential fish habitat is not applicable to the project's affected environment and will not be carried forward for impacts analysis in the Environmental Consequences section.

Migratory Birds

Migratory Bird Treaty Act

> The Migratory Bird Treaty Act is the domestic law that affirms or implements the United States' commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. It protects all migratory birds and their parts, including eggs, nests, and feathers. Thus, the law makes it unlawful, unless permitted by regulation, for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. Migratory birds are essentially all wild birds found in the United States, except the house sparrow, starling, feral pigeon, and resident game birds, such as pheasant, grouse, quail, and wild turkeys.

The affected environment for Johns Creek Dam No. 1 is located within the Atlantic Flyway, the migratory path of waterfowl, shorebirds, pelagic birds, and song birds of the North American East Coast. Each fall the Atlantic Flyway is filled with ducks, geese, brant, swans, hawks, eagles, and other migratory birds. Waterfowl and other birds make several stops on the flyway to rest, feed, and drink before continuing their southern migration. In early spring, birds follow this path northward to their traditional nesting grounds.

Executive Order 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds (Migratory Birds) overview:

> Executive Order 13186 requires the NRCS to consider the impacts of planned actions on migratory bird populations and habitats for all planning activities. The USFWS IPaC System identified the birds in table D as birds of particular concern because they occur on the USFWS Birds of Conservation Concern (BCC) list in accordance with the Fish and Wildlife Conservation Act, or because they warrant special attention in the particular project area. In this case, all the IPaC System identified species are listed on the BCC, not because they warrant special attention in the specific project area.

Bald and Golden Eagle Protection Act

In addition to the Migratory Bird Treaty Act and Executive Order 13186, all bald and golden eagles are further protected under the Bald and Golden Eagle Protection Act. The Bald and Golden Eagle Protection Act prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.

Table D – USFWS Migratory Birds of Conservation Concern

Common Name	**Scientific Name**	**Breeding Season**
bald eagle	*Haliaeetus leucocephalus*	Sep 1- Aug 31
black-billed cuckoo	*Coccyzus erythropthalmus*	May 15 – Oct 10
black-capped chickadee	*Poecile atricapillus practicus*	Apr 10 – Jul 31
Canada warbler	*Cardellina canadensis*	May 20 – Aug 10
cerulean carbler	*Dendroica cerulea*	Apr 27 – July 20
eastern whip-poor-will	*Anstrostomus vociferus*	May 1 – Aug 20
golden eagle	*Aquila chrysaetos*	Breeds elsewhere
golden-winged warbler	*Vermivora chrysaetos*	Breeds elsewhere
northern saw-whet owl	*Aeoolius acadicus acadicus*	Mar 1 – Jul 31
prairie warbler	*Dendroica Discolor*	May 1 – Jul 31
red-headed woodpecker	*Melanerpes erythrocephalus*	May 10 – Sep 10
wood thrush	*Hylocichla mustelina*	May 10 – Aug 31
yellow-bellied sapsucker	*Sphyraicus varius*	May 10 – Jul 15

Bald Eagles: Although bald eagle habitat is present, the NRCS performed a site visit survey in October of 2018. No bald eagle nests were identified within the affected environment. Additionally, according to the Center for Conservation Biology's Bald Eagle Nest Locator, http://www.ccbbirds.org/maps/#eagles, the closest recorded bald eagle nest is 3.89 miles away from Johns Creek Dam No. 1.

Golden Eagles: Eastern golden eagle migration is strongly associated with the Appalachian ridgelines. In Virginia, the birds migrate southward between October and early December, and then back northward during April and May. Wintering eagles spend the months of December through March in the Commonwealth. Within Virginia and the broader Appalachian range,

wintering golden eagles are primarily associated with small forest openings along ridgelines, although they may also be seen soaring over the valleys between ridges. Although golden eagles do not nest in Virginia, the affected environment does include the habitat requirements of the golden eagle.

Invasive Species

Executive Order 13112 – Invasive Species

> Executive Order 13112 directs Federal agencies to "prevent the introduction of invasive species, provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species cause." The NRCS policy, 190-GM, Part 414, is consistent with this E.O. and also requires that no actions be authorized, funded or carried out that is believed to or is likely to cause or promote the introduction or spread of invasive species in the U.S. or elsewhere. As defined in the E.O., invasive species are species not native to a particular ecosystem, whose introduction does or is likely to cause economic or environmental harm or harm to human health. Invasive species may include all terrestrial and aquatic life forms, including plants, animals, fungi, and microbial organisms.

In October 2018, NRCS conducted a site visit to identify invasive species located within the maximum extent of potential ground disturbance for this type of project. While no invasive animal species were observed, several common invasive plant species were found. Fescue is dominant in all fields, the dam embankment, and beyond the toe of the embankment on the downstream side. Other prevalent invasive species downstream of the embankment included multiflora rose and Chinese lespedeza.

Riparian Areas

Natural Resources Conservation Service Policy (GM 190, Part 411 (Amendment 23 – September 2010))

> The NRCS policy (GM 190, Part 411 (Amendment 23 – September 2010)) requires the NRCS to integrate riparian area management into all plans and alternatives. Although Federal law does not specifically regulate riparian areas, portions of riparian areas such as wetlands and other waters of the U.S. may be subject to Federal regulation under provisions of the Food Security Act, Clean Water Act, and State, Tribal, and local legislation.
>
> Riparian areas are ecotones that occur along watercourses and waterbodies. They are distinctly different from the surrounding lands because of unique soil and vegetation characteristics that are strongly influenced by free or unbound water in the soil. Riparian ecotones occupy the transitional area between the terrestrial and aquatic ecosystems. Typical examples include perennial and intermittent streambanks, floodplains, and lake shores.

Riparian areas are present within the project area. These riparian areas are located along the banks of the inflows and perimeter of McDaniel's Lake. Additional riparian areas are located along the banks of Johns Creek downstream of the dam. Most of the riparian areas along the inflows and perimeter of McDaniel's Lake are forested. The riparian area along Johns Creek downstream of the dam is also forested.

HUMANS

Scenic Beauty

NRCS General Manual, Title 190, Part 410.24

> Scenic beauty can be defined as the viewer's positive perceived value of special, unique and memorable physical elements of a landscape.

Although there would be temporary visual impacts to McDaniel's Lake during the construction period, there are no designated State or National Natural and Scenic Area Preserves or river segments located within the project area, therefore, Scenic Beauty is not applicable to the project's affected environment and will not be carried forward for impacts analysis in the consequences section.

Cultural Resources

National Historic Preservation Act

> In 1966, Congress passed the National Historic Preservation Act (NHPA) which directed all Federal Agencies to establish a preservation program based on a framework outlined in the NHPA, as amended. It also required Federal Agencies to consider the effects of their undertakings on historic properties.
>
> The term "cultural resources" as used by NRCS is broader than those resources encompassed by the term "historic properties" as defined by the NHPA (16 U.S.C. Section 470 et seq.) and regulations for compliance with section 106 of the NHPA (36 CFR Part 800). Under NHPA, historic properties include any prehistoric or historic district, site, building, structure, or object listed in or eligible for listing in the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior. They also include all records, artifacts, and physical remains associated with the NRHP-eligible historic properties. They may consist of the traces of the past activities and accomplishments of people. The term "historic property" also includes properties of religious and cultural importance to an Indian Tribe (including Native Alaskan Villages) or Native Hawaiian organization that meet NRHP criteria. As more broadly used, the term "cultural resources," covers a wider range of resources than "historic properties," such as sacred sites, archaeological sites not eligible for the NRHP, and archaeological collections.
>
> Per the Advisory Council on Historic Preservation (ACHP), the Area of Potential Effects (APE) is defined as the geographic area or areas within which a project may directly or indirectly cause changes in the character or use of historic properties, if they exist.

The NRCS determined that the direct impacts APE for this undertaking is confined to the areas of potential ground disturbance (using the maximum possible extent of ground disturbance) that extend beyond the bounds of areas that were previously disturbed during the construction of the original dam. The in-direct APE for this undertaking is the viewshed from any identified historic resource to the proposed undertaking (using the maximum possible extent of ground disturbance).

Figure C-7 depicts both the extent of ground disturbance during original dam construction in 1967 as well as the maximum possible extent of the APE.

Section 106 of the National Historic Preservation Act requires that Federal Agencies consult with the applicable State Historic Preservation Officer, Federally recognized Native American Tribes, and other interested parties regarding cultural resources.

The NRCS searched the Virginia Department of Historic Resources (VDHR), Virginia Cultural Resource Information System (V-CRIS), https://vcris.dhr.virginia.gov/vcris/Account/Login?ReturnUrl=%252fvcris, to identify recorded historic properties. The V-CRIS search results did not identify any recorded archaeological or architectural historic resources within the defined direct or indirect APE.

Following the V-CRIS search, the NRCS conducted a cultural resources survey of the project area in October 2018. Background research included examination of historic maps and aerial imagery. Field testing included the excavation of 45 shovel test pits at 50- and 25-ft intervals in areas of moderate to high probability located within the maximum potential limits of disturbance for all action alternatives. One isolated chert flake was recovered. No archaeological sites were identified.
One potentially eligible historic resource, Johns Creek Dam No. 1, built in 1967, is located within the direct APE. The NRCS recommended Johns Creek Dam No. 1 as not eligible for the National Historic Register of Historic Places due to a lack of historic or architectural significance and the SHPO concurred on 03/19/19.

To identify Native American tribes, including those no longer resident to Virginia, that might attach religious or cultural significance to historic properties located in the project area, the NRCS searched the Housing and Urban Development Agency's Tribal Directory Assessment Tool (TDAT), https://egis.hud.gov/tdat/. This was done in accordance with 36 CFR 800.2(c)(i) of the ACHP Regulations. The TDAT search identified only the "Delaware Nation, Oklahoma" as having a claimed interest or consultation contact in Craig County, Virginia. Tribal Consultation was completed on 02/28/19.

National Historic Landmarks Program

The National Parks Services National Historic Landmarks Program are nationally significant historic places designated by the Secretary of the Interior and listed in the National Register of Historic Places because they possess exceptional value or quality in illustrating or interpreting the heritage of the United States.

Per the National Park Service's National Historic Landmarks Program website, https://www.nps.gov/nhl/find/statelists.htm, there are no National Historic Landmarks listed in Craig County. Therefore, the National Historic Landmarks Program is not applicable to the project's affected environment and will not be carried forward for impacts analysis in the Environmental Consequences section.

Environmental Justice

Executive Order 12898 – Environmental Justice overview:

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires each Federal agency to make environmental justice a part of its mission. Agencies must identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on

minority populations, low-income populations and Indian Tribes. The primary means to attain compliance with environmental justice considerations is: 1) Assessing the presence of environmental justice communities in a project area that may experience disproportionately high and adverse human health or environmental effects, and 2) The inclusion of low-income minority, Tribal, or other specified populations in the planning process. Additionally, E.O. 12898, established an Interagency Working Group (IWG) on environmental justice chaired by the EPA Administrator and comprised of the heads of 11 departments or agencies, including the U.S. Department of Agriculture.

United States Department of Agriculture Departmental Regulation 5600-002 – Environmental Justice overview:

> The USDA Departmental Regulation (DR) 5600-002 provides detailed determination procedures for NEPA and non-NEPA activities and suggests social and economic effects to consider when assessing whether there are disproportionately high and adverse human health or environmental effects to environmental justice communities in a project area.

An environmental justice and civil rights analyses was conducted using EPA's "EJSCREEN" online tool to identify environmental justice groups within the benefited area downstream of the dam. The assessed area included the general drainage-way from immediately below the dam to downstream of the Town of New Castle (fig. 1). This includes the breach inundation zone and associated nearby areas below the dam. The estimated population of the delineated area is 1,821 according to Census projections for 2011-2015. Three percent of the benefitted downstream population are minorities and 97% are white. Fourteen percent of the population have less than a high school education. Forty percent of the population are considered low income. Twenty-two percent of the population are over 64 years of age (table E).

With respect to the assessed environmental indicators, the EJSCREEN tool provided quantitative estimates for all environmental stressor variables that were below the state, region and national averages excepting lead paint due to the large percentage of local homes built before 1960.

These statistics indicate the likely presence of individuals with environmental justice concerns, but fortunately rehabilitation of a dam provides benefits to all socioeconomic groups below and above the dam without disparate treatment to any individuals or social groups.

Figure 1. Area evaluated for environmental justice effects.

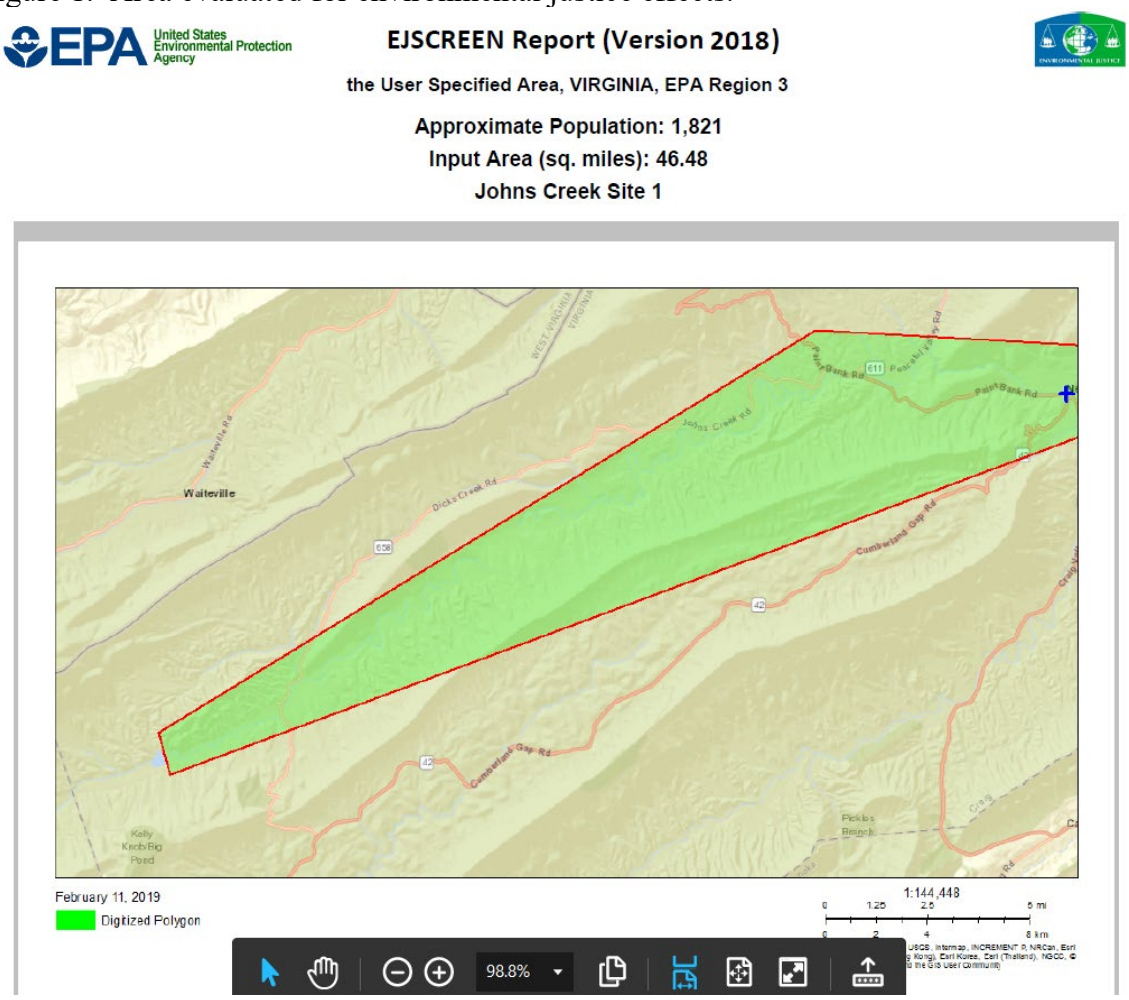


Table E - Indicators and Groups from EPA's Environmental Justice Tool

EJSCREEN Report (Version 2018)

the User Specified Area, VIRGINIA, EPA Region 3

Approximate Population: 1,821

Input Area (sq. miles): 46.48

Johns Creek Site 1

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	8.4	8.92	5	9.97	2	9.53	27
Ozone (ppb)	42.2	43.6	22	44.3	15	42.5	47
NATA* Diesel PM (µg/m³)	0.156	0.77	0	0.921	<50th	0.938	<50th
NATA* Cancer Risk (lifetime risk per million)	25	42	0	42	<50th	40	<50th
NATA* Respiratory Hazard Index	0.6	1.8	0	1.8	<50th	1.8	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	21	430	27	360	27	600	26
Lead Paint Indicator (% Pre-1960 Housing)	0.33	0.21	77	0.36	55	0.29	64
Superfund Proximity (site count/km distance)	0.019	0.1	12	0.14	11	0.12	22
RMP Proximity (facility count/km distance)	0.037	0.37	5	0.6	6	0.72	6
Hazardous Waste Proximity (facility count/km distance)	0.056	0.67	22	1.3	10	4.3	14
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	2.7E-10	2.7	49	100	29	30	40
Demographic Indicators							
Demographic Index	22%	32%	34	30%	45	36%	34
Minority Population	3%	37%	4	32%	12	38%	7
Low Income Population	40%	27%	76	28%	75	34%	65
Linguistically Isolated Population	0%	3%	52	2%	54	4%	44
Population With Less Than High School Education	14%	11%	66	11%	69	13%	62
Population Under 5 years of age	3%	6%	23	6%	25	6%	23
Population over 64 years of age	22%	14%	84	15%	81	14%	83

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

DESCRIPTION OF EXISTING DAM

Current Condition of the Dam: The dam and auxiliary spillway have been well maintained with a good stand of grass in most areas and no significant woody vegetation on the embankment and auxiliary spillway. No erosion was observed on the auxiliary spillway. The upstream embankment has an area with sparse vegetation and some surface erosion. This area extends from the normal pool elevation to a point approximately 10 to 15 feet above the normal pool and is about 800 feet long. Wave action and debris accumulations have contributed to both the sparse vegetation and the erosion. A restoration plan has been developed and will be implemented by the Sponsors. No significant seepage or evidence of stability issues have been observed. A damp area was observed on the downstream embankment, but no flow was seen. The camera survey of the principal spillway pipe was completed on June 6, 2018 and showed no material deterioration. The structural components of the dam were inspected by underwater divers and professional engineers on the same date. They were found to be in good condition with only minor issues to be addressed during construction.

As-Built Dam Specifications: The dam was constructed in 1967 and "As-Built" drawings are available in the NRCS State Office in Richmond, Virginia. The earthen embankment is about 58.9 feet high, 1,478 feet long, and is built with about 382,245 cubic yards of excavated earth and rock. The upstream slope has one 10-foot-wide berm located approximately 6 inches above the normal pool elevation. The embankment slope above the berm is 2.5:1 and the embankment slope below the berm is 3:1. There are no berms on the downstream embankment, which has a slope of 2.5:1. The top of the dam is 19 feet wide. As-built drawings show a cutoff trench located upstream from the centerline of the dam, extending into firm rock. The upstream third of the embankment, including the cutoff trench, is constructed of impermeable material with the classification of CL and SC-SM. The center and downstream portions of the embankment were constructed of coarser-grained materials classified as SC, SC-SM, GC, or GM.

The site was surveyed in 2012. All elevations are given in feet using NAVD88 vertical datum. The top of dam elevations varied from 1966.5 to 1968.2; the normal pool is at elevation 1923.4 and the auxiliary spillway crest is at elevation 1960.0.

Principal Spillway: The principal spillway consists of a 36-foot-high (weir crest elevation to riser invert elevation), two-stage drop inlet riser structure with a 42-inch-diameter reinforced concrete outlet pipe (RCP) and a rock-lined stilling basin (i.e., plunge pool) to dissipate energy at the outlet end of the conduit. The elevation of the normal pool is controlled by a rectangular orifice (48 inches wide by 12 inches high) located in the left side of the riser structure and a concrete sill which discharges through a second rectangular orifice (29 inches wide by 17 inches high) on the upstream face of the riser. The original riser structure design only contained the rectangular orifice on the upstream face of the riser. This orifice was not large enough to pass base flows while maintaining the normal pool at elevation 1923.4. Consequently, a second rectangular orifice was added to the left side of the riser. The concrete sill on the upstream face of the riser is equipped with a cold-water release system (i.e., a 12-inch-diameter corrugated metal pipe) which draws and discharges water from lower elevations within the reservoir pool. The riser interior is a standard Dx3D structure (3'-6" wide by 10'-6" long) and the upper weir crest (El. 1945.7) is protected by a standard NRCS trash rack. The riser structure is equipped with a low-level dewatering system consisting of a 30-inch-diameter sluice gate located on the right side of the riser structure. The operator for this sluice gate is mounted on the top of the riser deck.

The principal spillway conduit is a 42-inch-diameter prestressed concrete pipe. Most of the conduit is laid on a partial concrete cradle which supports the bottom third of the pipe. The downstream 27 feet of the conduit is set in a concrete cradle which extends to the spring line of the pipe. Ten reinforced concrete anti-seep collars are spaced along the principal spillway conduit at 24-foot centers.

Auxiliary Spillway: A grass-lined auxiliary spillway with a bottom width of 200 feet is located at the right abutment of the dam. An earth training dike separates the auxiliary spillway from the right abutment of the dam embankment. According to as-built drawings, an approach channel, sloped at 2-percent into the reservoir, was excavated into the hillside. The constructed outlet channel downstream of 30-foot-wide level control section (El. 1960.0) has a 3.8 percent slope. The original location of Johns Creek Road passed through the right side of the auxiliary spillway. As part of the construction of the dam, Johns Creek Road was relocated to its current location. The original road was backfilled with compacted fill to establish the final auxiliary spillway grades. As-built drawings indicate that portions of the auxiliary spillway crest and constructed outlet channel are constructed in fill. The exit channel downstream of the constructed outlet slopes downward to the valley floor at slopes exceeding 10 percent in some areas. The exit channel is not uniformly graded, creating areas where flow may concentrate and channelize. The auxiliary spillway will have flow in storm events greater than the 200-year, 24-hour storm.

Internal Drain System: Left and right variable depth foundation drains are shown under the downstream third of the embankment. The left foundation drain is approximately 657 feet long and the right foundation drain is approximately 158 feet long. Each foundation drain is shown to be three feet wide, keyed six inches into bedrock, and contain an 8-inch-diameter perforated bituminous coated corrugated metal (BCCM) drain pipe. Both BCCM drain pipes discharge into the rock-lined plunge pool at the downstream embankment toe.

Sedimentation: As of 2016, when the sediment survey was completed, McDaniel's Lake had reached 49 years (49%) of its planned 100-year service life. The designed submerged sediment capacity was 149 acre-feet, but the as-built volume was 247.2 acre-feet due to the removal of extra borrow from the pool area. As of 2016, it is estimated that there were 37.4 acre-feet of submerged sediment in the pool area, which is about 15% of the as-built sediment storage volume. This material is primarily deposited sediments plus leaf and other organic debris. The actual sediment delivery was less than anticipated during the original design.

The designed submerged sediment accumulation rate was estimated at 1.49 acre-feet per year for the sediment pool of the reservoir. The calculated historic sedimentation rate from the 2016 survey was 0.76 acre-feet per year. Using the historic rate of sediment deposition, the submerged sediment may impact the flood storage in 276 years.

The designed aerated sediment storage for the structure is 147 acre-feet. The aerated sediment is material deposited above the normal pool during high flows. The designed deposition rate for the aerated sediment was 1.47 acre-feet per year. The aerated sediment deposition rate is estimated at 0.3 acre-feet per year. The aerated sediment accumulation for the 49 years prior to 2016 is estimated at 3.1 acre-feet. As of 2016, there is approximately 143.9 acre-feet of capacity for aerated sediment remaining. At a deposition rate of 0.3 acre-feet of aerated sediment per year, there is room for over 480 more years of aerated sediment deposition.

The watershed has not changed much since the reservoir was constructed. The George Washington and Jefferson National Forests are approximately 85% of the watershed. Adding the private

wooded area, forest land accounts for over 97% of the land use. Most of the open land is in the valley bottoms. There are no anticipated changes to the land use or the sediment deposition rate.

Identified Deficiencies: There are six engineering issues associated with the dam.

Hydraulic Capacity - The existing auxiliary spillway passes approximately 38 percent of the discharge for the 6-hour PMF for the Virginia PMP values established in 2015.

Auxiliary Spillway Integrity - A SITES analysis indicates that headcut erosion during the 6-hour PMF can advance upstream beyond the auxiliary spillway control section, resulting in a breach of the spillway.

Embankment Drainage - The existing toe drain system has deficient drain pipe perforations and visible portions of the CMP toe drain are corroded. One damp spot on the downstream side of the embankment was identified during the investigation. A second area was noted as being under observation due to historic evidence of dampness.

Riser Structure Stability - The principal spillway riser structure is unstable for seismic loads associated with the maximum credible earthquake, which has a return period of 9,950 years.

Upstream Flooding - Portions of Johns Creek Road located upstream of the dam as well as the residential structure (point of entry surveyed at El. 1965.5 feet) located immediately upstream of the auxiliary spillway are located below the top of dam elevation (El. 1966.5 feet), placing these structures at risk of flooding from the reservoir pool.

In addition, Gannett Fleming found that the dam does not meet the 10-day drawdown requirement during the Principal Spillway Hydrograph event for a vegetated earth auxiliary spillway. This issue can be addressed by analyzing and evaluating a structural nonerodible spillway.

GENERAL DESCRIPTION OF HOW A DAM FUNCTIONS

The main components of a flood control dam are the earthen embankment; the normal or sediment pool; the floodpool; the principal spillway; and the auxiliary spillway. The embankment is typically a vegetated earth structure that impounds the water.

Sediment pool. The reservoir is designed to store submerged sediment in the area below the elevation of the lowest principal spillway inlet and to detain floodwater in the area between the lowest principal spillway inlet and the crest of the auxiliary spillway. After the dam is completed, water accumulates below the lowest principal spillway inlet to create a lake. As the lake fills with submerged sediment, the amount of water in the lake decreases. When the sediment pool has filled to the elevation of the lowest principal spillway inlet, the pool no longer has permanent water storage, but the designed floodwater detention storage is still intact. The additional sediment would begin to fill the floodwater detention volume above the lowest principal spillway inlet and reduce the available flood storage. Initially, sediment delivered to the reservoir would pass directly through the lowest principal spillway inlet. Eventually, this inlet would be blocked by debris and sediment and the level of the water would rise to the crest of the auxiliary spillway. If the actual sedimentation rate is greater than the designed sedimentation rate, the sediment storage volume will be filled before the design life of the structure has been reached.

As the floodpool loses storage due to submerged sediment deposition, the auxiliary spillway operates, or has flowage, more often. For a vegetated earthen auxiliary spillway, repeated flows

could erode the soil material and eventually cause the spillway to breach. Repeated flows increase the operation and maintenance costs for the Sponsor.

Floodpool: The floodpool, which is the water storage area between the principal spillway crest and the auxiliary spillway crest, is designed to detain the water that would accumulate behind the dam in events equal to or smaller than an event with a specific annual recurrence interval. For a typical dam, the auxiliary spillway crest is designed to be at the elevation needed to detain the 100-year event. This storm is the event that has a one percent chance of occurring in any given year. In a bigger flood event, the water level will be higher than the crest of the auxiliary spillway and the excess water will pass around the dam embankment through the auxiliary spillway.

Principal spillway: A principal spillway has three main parts: the riser, the pipe, and the outlet. The riser is typically a concrete tower that controls the level of water in the lake. The principal spillway pipe conveys water through the dam safely. The principal spillway riser and pipe control the day-to-day elevation of the water in the lake and the two components together provide a way to control release of the water in the floodpool. For a two-stage riser, the water flows through the first-stage inlet in the riser until the water rises to the elevation of the second-stage inlet. Then, it flows through both inlets. The water falls to the bottom of the riser before exiting through the principal spillway pipe. The water exits into an outlet structure, typically some sort of stilling basin. Its purpose is to slow the velocity of the water leaving the pipe so it doesn't cause erosion in the stream channel. Most risers have a drain gate at the bottom of the riser that allows the lake to be completely drained.

Auxiliary spillway: There are four parts of an auxiliary spillway. The inlet section is on the side closest to the lake. It has a gentle upward slope toward the middle of the auxiliary spillway. The water that reaches the inlet section has little or no velocity and, therefore, does not cause erosion to occur. The level center section is called the control section. The control section is usually located where the auxiliary spillway crosses the centerline of the top of the dam. The purpose of the control section is to make the water in the auxiliary spillway spread out evenly rather than concentrate into little channels. The third section is called the constructed outlet. Its purpose is to keep the water flowing out of the auxiliary spillway in a controlled manner until the water gets far enough away that it will not cause erosion on the earthen embankment. Once this point is reached, the water is free to go on downstream. The fourth component of an auxiliary spillway is the training dikes. Training dikes are used in conjunction with the outlet section to direct the flow of the water away from the downstream side of the dam embankment. Training dikes can also be used in the inlet section to direct water into the auxiliary spillway.

STATUS OF OPERATION AND MAINTENANCE

Operation and maintenance of the structure is the responsibility of the Mountain Castles SWCD and they have done an excellent job of operating and maintaining this structure in accordance with the operation and maintenance agreement. This has been verified through site assessments. The most recent inspection was conducted July 12, 2018. The principal spillway (riser, outlet pipe, and stilling basin) is in good condition and should remain structurally serviceable for 50 more years.

STRUCTURAL DATA

The structural data for the as-built condition of the dam and watershed is described in Table F. The sediment data is based upon the 2016 sediment survey.

Table F – As-Built and Existing Structural Data for Johns Creek Dam No. 1

	As-Built	Existing
Local Name	McDaniel's Lake	
Site Number	1	
Year Completed	1967	
Hazard Class	Significant	High
Cost	$284,246	
Purpose	Flood control	
Drainage Area, mi^2	18.0	19.1
Dam Height, feet	57.3	58.9
Dam Type	Earthen	
Dam Volume, yds^3	382,245	
Dam Crest Length, feet	1,478	
Storage Capacity, acre-feet [1/]	3,070	2,925
Submerged Sediment, acre-feet	247	210
Aerated Sediment, acre-feet	147	144
Flood Storage, acre-feet	2,676	2,571
Surface Area, acre	27.5	29.9
Principal Spillway		
Type	Reinforced Concrete	Reinforced Concrete
Riser Height, feet [2/]	36.0	36.0
Conduit Size, inches (I.D.)	42	42
Stages, number	2	2
Orifice Elevation	1923.4	1923.4
Riser Crest Elevation	1945.7	1945.7
Capacity, cubic feet per second	285	
Energy Dissipater	Riprap stilling basin	
Auxiliary Spillway		
Type	Vegetated Earth	
Width, feet	200	
Capacity, % of PMF	12	38
Sediment Pool Elevation	1923.4	1923.4
Auxiliary Spillway Crest Elevation	1960.1	1960.0
Top of Dam Elevation	1966.6	1966.5
Datum	NAVD88	NAVD88

[1/] As-built flood storage volume based on original design and as-built information. Existing volumes calculated from 2016 sediment survey.
[2/] Measured from the weir to the invert of the principal spillway pipe invert.

BREACH ANALYSIS AND HAZARD CLASSIFICATION

Breach Analysis: To determine the downstream inundation zone due to a dam breach, a breach analysis was performed for a Sunny Day breach with the water level at the existing auxiliary

spillway crest. The peak breach discharge criteria in TR-60 was used. A "Sunny Day Breach" is a dam failure that occurs unexpectedly.

In 2018, Gannett Fleming, Inc. determined the inundation zones that would result from a Sunny Day Breach of the dam and the breach that would occur in the PMF event. The Sunny Day Breach zone is shown in Appendix C. The PMF breach analysis terminated 56.2 miles downstream of the dam.

The Sponsors have current breach inundation zone maps for the dam that comply with the Virginia Impounding Structures Law and Regulations for high hazard potential dams. These maps show the breach inundation zone that would occur if the dam failed when the water level was at the top of the dam. The Virginia Impounding Structures Regulations requires owners of high hazard potential dams to provide a dam breach inundation zone map to determine hazard classification and develop the Emergency Action Plan (EAP). The purpose of an EAP is to outline appropriate actions and to designate parties responsible for those actions in the event of a potential failure of the dam. The Sponsors must update the EAP annually with assistance from local emergency response officials. The NRCS State Conservationist will ensure that a current EAP is prepared prior to execution of fund-obligating documents for rehabilitation of the structure.

Hazard Classification: McDaniel's Lake was originally constructed in 1967 to protect downstream lands from flooding. It was designed as a significant hazard potential structure with a 100-year design life. Currently, the Virginia Division of Dam Safety has designated McDaniel's Lake as a high hazard potential structure due to changes in land use in the downstream floodplain. The breach analysis completed for this Watershed Plan concurs with the current hazard class of the structure.

EVALUATION OF POTENTIAL FAILURE MODES

Dams are built for the conditions that existed or could reasonably be anticipated during the time of design. Sometimes these conditions change, resulting in dam failure. Several potential modes of failure were evaluated for McDaniel's Lake.

Sedimentation: The major land uses in the watershed above the dam are 97.3% Forest, 1.5% Hayland/Pasture, 0.7% Developed, 0.1% Cropland, and 0.4% Water. These uses are not expected to change significantly in the future. Future sedimentation rates are expected to be similar to the observed rates since the dam was constructed in 1967. Assuming a future sedimentation rate of 0.76 acre-feet per year, the remaining submerged sediment life of Johns Creek Dam No. 1 is approximately 276 years beyond the year 2016 (i.e., time of sediment survey). Therefore, the potential for failure due to inadequate sediment storage capacity is low.

Hydraulic Capacity: Hydrologic failure of a dam occurs when the auxiliary spillway is breached or when the dam is overtopped and fails. Under present NRCS criteria for high hazard potential dams, the auxiliary spillway must have sufficient capacity and integrity to completely pass the full PMF event. The auxiliary spillway at Johns Creek Dam No. 1 can pass approximately 38 percent of the 6-hour PMF. Consequently, overtopping of the earthen embankment is expected to occur during the PMF. The risk of failure from overtopping the dam is high.

Auxiliary Spillway Integrity: The auxiliary spillway at Johns Creek Dam No. 1 does not have sufficient integrity to withstand the flows from the PMF event and could breach. For this reason,

the overall potential for failure through erosion of the auxiliary spillway of Johns Creek Dam No. 1 is high.

Seepage: Embankment and foundation seepage may result in internal erosion (piping), in which the flow of water through the embankment/foundation is fast enough to dislodge and move small particles of soil. If left unchecked, this movement of soil particles may result in voids within the embankment which can lead to more aggressive piping and eventually a collapse of the embankment material located above the internal void. Damp areas, standing/flowing water and boils at the downstream toe of the dam are evidence of seepage conditions that may exist with the embankment and/or foundation. Seeps consisting of muddy water or water carrying sediment particles may indicate that internal erosion is occurring. Review of past inspection reports indicates that damp areas have been observed at the downstream toe of the dam including an observed seep near the left abutment of the dam during a high-water event in 2010. Noted deficiencies associated with the internal seepage collection and conveyance system (i.e., 8-inch diameter perforated corrugated metal pipes) include undersized perforations, deterioration of the corrugated metal piping and significant deposits of iron ochre within the drain pipes. Based on these deficiencies and historic observations of seepage at the downstream toe of the dam, the potential for a seepage failure at Johns Creek Dam No. 1 is considered to be moderate.

Seismic: Earthquakes can pose significant threats to the structural integrity of a dam. Earthen embankments subjected to ground motions caused by seismic activity are subject to cracks, seepage and possibly liquefaction which could result in an immediate or delayed failure of the dam. TR-60 (2005) indicates that Johns Creek Dam No. 1 is in Seismic Zone 2 and a historic earthquake with an estimated magnitude of at least M5.6 was reported in 1897 near Pearisburg, which is less than 30 kilometers from the dam site. While historic earthquakes have been reported, the potential for seismic activity to result in a failure of the dam is considered to be low.

The existing riser structure within the reservoir was determined to be unstable during the maximum credible earthquake, which has a return period of 9,950 years. Failure of the riser structure could result in two separate scenarios. If the riser were to fail and fall away from the principal spillway conduit, the contents of the reservoir would be released through the principal spillway conduit with no adverse impact other than the dewatering of the reservoir and increased and prolonged flows within the downstream channel. Should the failure of the riser structure result in a blockage of the principal spillway conduit, the reservoir would continue to fill until water elevations reached the auxiliary spillway crest. This condition could result in increased activation of the auxiliary spillway due to the loss of the flood pool which could subsequently lead to (1) erosion and possible failure of the auxiliary spillway and (2) overtopping of the dam embankment. While the probability of experiencing the maximum credible earthquake is low, the potential for failure of the riser structure during the maximum credible earthquake is considered to be high.

Material Deterioration: Materials used in typical dam construction, such as earth fill, concrete, metals, geotextiles, and conveyance piping, are subject to erosion, weathering, chemical reactions, and deterioration over time. In the case of Johns Creek No. 1 Dam, the concrete components of the principal spillway system are subject to cracking and surface deterioration, metal components on the riser structure (i.e., trash racks and gates) are subject to rust, corrosion and material loss, and the toe drain piping is subject to corrosion and possible collapse. A camera survey of the principal spillway and toe drain system performed on June 6, 2018 found the riser structure and principal spillway conduit to be in good condition. Visible portions of the toe drain system showed signs of deterioration. Except for the toe drain deterioration (as discussed under “seepage”),

pending continued maintenance of the dam, it is a reasonable to assume that the dam will continue to function as intended.

Conclusion: At the present time, the two most likely ways that Johns Creek Dam 1 could fail would be during an extreme storm event such as the PMF. During such an event, the auxiliary spillway could breach and/or the embankment could be overtopped, resulting in a breach of the embankment and an uncontrolled release of water from the reservoir. Either of these types of failure could occur at any time during the remaining life of the structure. The risk of seismic failure of the embankment is low but the risk of a seismic failure of the riser is moderate due to the configuration of the footer. There is some evidence of seepage and the toe drains are failing due to material deterioration. The risk of a seepage failure is moderate. There is adequate sediment capacity for the next 276 years.

CONSEQUENCES OF DAM FAILURE

A sunny day breach was performed in accordance with TR-60. It was assumed that the failure of the dam would occur with the water elevation at the auxiliary spillway crest, resulting in the release of 50.5 vertical feet of stored water having a volume of approximately 4,162 acre-feet. A maximum breach discharge of 68,760 cfs was computed using the criteria in TR-60.

The sunny day breach is expected to impact numerous downstream structures (figs. C-15 through C-26) Impacted infrastructure includes 22 residences and added/associated outbuildings, one emergency response building/volunteer fire department, two church buildings and 15 agricultural structures. Up to eight public bridges and six private bridges and various roads would also be impacted. Based on the 22 residences within the sunny day breach inundation zone, the resulting population at risk is approximately 66 people.

A breach event would cause significant economic damage to the homes, bridges, and roads located downstream of the dam. Most, if not all, of the homes along Johns Creek have septic systems that could be overtopped in a breach situation, rendering them ineffective. Other economic costs could include clean-up activities, damages to vehicles and the possibility of increased flood damages due to the absence of the dam and its flood protection benefits. Associated environmental impacts could include sediment deposition within the downstream channel and floodplain areas, loss of the ecosystem supported by the permanent pool within the reservoir, and stream headcutting upstream of the dam resulting from the loss of the reservoir.

A sudden release of sediment would be expected to have an adverse impact on the endangered mussel species which has been observed within Johns Creek downstream of the dam. A Freshwater Mussel Survey Report prepared by Three Oaks Engineering, dated May 13, 2016, identified siltation, point and non-point discharges, and stream modifications as significant factors contributing to the decline of the James Spinymussel species. Loss of the dam would be expected to result in increased downstream sediment loading rates as well as increased flows from more frequent storm events due to the loss of the retarding pool which may result in downstream changes to the stream channel. Based on the survey information provided by Three Oaks Engineering, these short-term and long-term changes would be expected to have an adverse impact on the mussel population.

The environmental damages from a dam failure would be significant. In addition to the damage caused by the water, the sediment stored in the pool area would be flushed downstream in the event

of a catastrophic breach. Approximately 16 miles of stream channel downstream of the dam would be damaged by scouring or deposition. Sediment would be deposited in the floodplain. This would constrict the floodplain and cause additional flooding in subsequent storm events. Deposition of sediment in the floodplain would also restrict normal use of the land which may cause water quality problems in the future. It is unlikely that a catastrophic breach would remove all the fill material used to build the dam. The embankment material remaining after a breach would also eventually erode into the stream, contributing to the downstream sediment deposition. Over time, the sediment could migrate downstream from Johns Creek into the James River.

There is also a potential for stream degradation upstream from the dam site. The abrupt removal of the water and sediment would cause instability in the stream feeding the reservoir. This channel could develop headcuts that would migrate upstream. If a bedrock ledge or other hardened point is encountered in the stream, the headcut would stop proceeding upstream. Downcutting and widening would continue to occur in the lake bed.

FORMULATION AND COMPARISON OF ALTERNATIVES

The stated objectives of the Sponsors for the McDaniel's Lake Dam Rehabilitation Plan are: 1) to bring the dam into compliance with current Virginia Division of Dam Safety and NRCS dam safety and performance standards; 2) to maintain the existing 200-year level of flood protection for downstream properties; and 3) to address the residents' concerns about the effects of the changing or removing the dam. These objectives can be met by installing measures which will bring the dam into compliance with State and Federal regulations. Under the Watershed Rehabilitation Provisions of the Watershed Protection and Flood Prevention Act, NRCS is required to consider the technical, social, and economic feasibility of the locally preferred solution and other alternatives identified through the planning process. All reasonable alternatives to the proposed federal action must be considered.

The purpose of this supplement is to comply with current NRCS and Virginia dam design and safety standards to reduce risks to life and property that could result from a potential catastrophic dam failure; and maintain the 200-year level of flood protection, which is currently provided by the dam's ability to attenuate floods, to life and property upstream and downstream of the dam.

FORMULATION PROCESS

Formulation of the alternative rehabilitation plan for Johns Creek Dam No. 1 followed procedures outlined in the NRCS *National Watershed Program Manual*. Other guidance incorporated into the formulation process included the NRCS *Principles and Guidelines for Water and Land Related Resources Implementation Studies*, and the *Economics Handbook, Part II for Water Resources*, and other NRCS watershed planning policies. Several alternatives were considered and three useful life (50, 75 and 100 year) options were evaluated as part of a period of analysis determination. Several federal action alternatives were carried through for detailed study. The recommended alternative that maximizes net economic benefits has a 52-year period of analysis, including a one-year for design and one-year for installation with 50 years of expected useful life. This lifespan was selected based upon the expected future life of the concrete components of the structure.

The formulation process began with formal discussions between the Sponsors, the Virginia Division of Dam Safety, and NRCS. The Virginia Division of Dam Safety conveyed state law and policy associated with a high hazard potential dam. NRCS explained agency policy associated with the Small Watershed Dam Rehabilitation Program and related alternative plans of action. As a result, alternative plans of action were developed based on NRCS planning requirements and the ability of the alternatives to address the initial objective of bringing Johns Creek Dam No. 1 into compliance with current dam safety and design criteria. The National Economic Development (NED) Alternative is the federally assisted alternative with the greatest net economic benefits. The alternative plans that must be considered include:

- No Federal Action
- Decommission the Dam
- Non-Structural – Relocate or Floodproof Structures in the Breach Zone
- Rehabilitate the Dam
- National Economic Development (NED) Alternative

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Some of the alternatives considered in the planning process were eliminated from detailed consideration because these alternatives either did not meet the proposed purpose or need for federal action or they were logistically impractical to implement.

Decommission Dam: Decommissioning is a mandatory alternative that must be considered under NRCS policy for dam rehabilitation. This option describes an alternative which removes the flood detention capacity of the dam by removing a portion of the existing embankment down to the valley floor to reestablish the natural drainage patterns and floodplain that existed prior to the original construction of the dam. Based on the hydrologic and hydraulic analysis, the 100-year floodplain immediately downstream of the dam (assuming no dam in place) is approximately 550-feet wide and located in the left half of the valley (looking downstream). A 550-foot wide breach opening would be required to mimic the original (i.e., pre-dam) topography shown on the as-built drawings. Decommissioning the dam would require removal and spoiling of approximately 155,000 cubic yards of material as well as removal of the principal spillway riser and outlet conduit. Excavated material would be spoiled both in the dewatered reservoir and within the existing auxiliary spillway. The spoil areas would be provided with mild slopes to facilitate future agricultural or livestock use.

Reconnection of Johns Creek and its side tributaries through the dewatered reservoir would allow upstream movement of aquatic species. To the greatest extent possible, stream restoration activities would mimic the original channel which existed prior to the original construction of the dam. While revegetation of the reservoir bottom is expected to occur naturally, a planting/vegetation plan is recommended to quickly stabilize the reservoir bottom and prevent/minimize intrusion of invasive species. See figure C-8 for a conceptual plan showing the decommissioning alternative.

Decommissioning of Johns Creek Dam No. 1 would be expected to result in increased downstream sedimentation and stream instability. Removal of the dam would expose the existing sediment contained within the reservoir, providing an immediate threat of downstream sedimentation, and removal of the dam would eliminate future sediment trapping capabilities, resulting in increased

long-term downstream sedimentation rates. Removal of the dam would also result in increased flow rates during more frequent storm events. Increases in flow rates would be expected to result in changes to the downstream channel as the stream bed and banks respond to the increased flows. These short-term and long-term changes in sediment transport would be expected to have an adverse impact on the mussel population. The immediate release of sediment from the reservoir would be addressed by physically removing the accumulated sediment from the reservoir prior to breaching the dam. This material could be spoiled immediately downstream of the right dam abutment. However, mitigation of increased stream flows during more frequent storm events would not be possible without the installation of detention facilities located within the headwaters of Johns Creek.

If the dam is removed, the structures located within the sunny day breach zone (22 residences, numerous outbuildings, one EMS/fire station building, two church buildings and 15 agricultural structures) will no longer be at risk from potential flooding caused by a breach of Johns Creek Dam No. 1. However, downstream roads, bridges, and homes would be at risk of more frequent, uncontrolled flooding during storm events due to the loss of flood control previously provided by the dam. To meet the purpose and need of the project, induced damages must be mitigated so that there would be no increase in the amount of damage sustained by structures previously protected by the dam. Mitigation of induced damages includes relocation or floodproofing the impacted structures. Without the dam in place it is estimated that 46 residences (36 single family homes and ten mobile homes), seven outbuildings, ten agricultural structures, three commercial properties with outbuildings, and one church building would experience increased flooding during the 200-year flood event. Access to the EMS/Fire station at the confluence of Johns Creek Road and Dicks Creek Road will be restricted due to water over the road in storm events greater than the 100-year event. The water depths will be approximately 0.8 feet and 1.3 feet in the 200-year and 500-year events, respectively. Downstream mitigation would also require raising of approximately 3.6 miles of roadway, and protection of eight public and six private bridges and approximately 2.2 miles of utilities and 58 utility poles.

Construction costs associated with the decommissioning alternative could exceed $8.2 million. Table G lists major cost components associated with decommissioning the dam.

This alternative would also have very high legal and financial consequences. Relocation costs were estimated using tax assessment valuation data from the Craig County Commissioner of Revenue (2018) for affected tax parcels within the 200-year floodplain without-dam inundation zone. The assessed value was used as a proxy for market value that would be paid to purchase each property and relocate residents. Actual relocation costs would likely exceed this figure, both because assessed value underrepresents market value and because of the administrative costs associated with acquiring the properties. Additional costs would also be expected to raise or otherwise protect impacted roads, bridges and utilities. Such improvements would be considered logistically impractical. Therefore, this alternative was not considered further.

Table G. Major Cost Components of Decommissioning the Dam

Work Item	Cost
Mobilization & Demobilization	$520,200
Site Preparation & Surveys	$145,000
Erosion and Sediment Control	$237,000
Dam Breach Activities	$4,432,100
Environmental Mitigation (Sediment Removal)	$965,400
Contingency (30%)	$1,889,900
Subtotal of Construction Cost	**$8,189,600**
Mitigation of Induced Damages to downstream Homes (relocation and/or floodproofing)	$2,972,400
Mitigation of Induced Damages to downstream infrastructure (roads, bridges and utility poles)	Not estimated due to high costs and logistical impracticality
Total Cost of Structure Removal:	**$11,162,000**

Rehabilitation Alternative – Widen Auxiliary Spillway: To increase conveyance capacity, the auxiliary spillway could be widened from 200 feet to 550 feet, extending the spillway into the right hillside (looking downstream) with the intention of excavating most of the spillway in non-erodible material. This option would require significant excavation into the right hillside, relocation of Johns Creek Road, property acquisition, and removal of the dwelling unit located along the south rim of the reservoir. A stabilized 550-foot-wide discharge channel would be required to direct discharge from the auxiliary spillway to the valley floor. Based on subsurface investigations within the existing auxiliary spillway identifying the presence of fill and overburden, it would be expected that all or part of this discharge channel would require hard armoring (i.e., conventional concrete, roller-compacted concrete, articulated concrete blocks, etc.) to prevent erosion and headcutting from causing a breach of the auxiliary spillway. Field investigations would be required to determine the type and extent of the hard-armoring system. Additional improvements would include the addition of a new seepage collection and conveyance system at the downstream embankment toe and reconstruction of the principal spillway riser structure to meet seismic criteria. This alternative could exceed $16 million in construction costs, require property acquisition and right-of-way for the relocation of a public road, and would require clearing of approximately 10 acres of forested land. This solution would meet the Sponsor requirements but would have very high legal, financial and environmental consequences. Therefore, this alternative was not considered further.

Rehabilitation Alternative – Labyrinth Spillway Located in the Existing Auxiliary Spillway: This alternative consists of increasing the conveyance capacity of Johns Creek Dam No. 1 to pass the 6-hour PMF by installing a 200-foot-wide, six-cycle labyrinth spillway within the footprint of the existing auxiliary spillway located at the right abutment of the dam. It is assumed that the existing auxiliary spillway crest elevation (El. 1960.0) and the top of dam elevation (El. 1966.5) would remain unchanged to maintain the current 200-year level of flood protection and avoid upstream impacts. The approach channel would be lowered to El. 1950.0 at the labyrinth spillway location

and would drain back into the reservoir at a 2 percent slope. The labyrinth control structure would discharge into a concrete-lined chute to convey flows to a concrete-lined stilling basin. The stilling basin would discharge to an exit channel placed on a very mild slope near the elevation of the valley floor which would convey flow back into Johns Creek. Excavated material from the labyrinth spillway and approach/exit channel construction would be placed in a spoil area downstream of the dam between Johns Creek and the auxiliary spillway exit channel to create additional protection for the dam embankment against potential head cutting which could occur within the auxiliary spillway outlet channel.

The existing toe drain system would be abandoned and a new chimney and toe drain system would be installed at the downstream embankment toe. The new toe drain would contain a perforated drain pipe to collect and convey seepage to the stilling basin located at the outfall of the principal spillway conduit. Weir boxes would allow easy and accurate monitoring of seepage flow rates. Approved fill from the labyrinth spillway excavation activities would be used to provide cover over the seepage collection system. While slope stability was not identified as an area of concern, placement of fill over the seepage collection system provides the opportunity to flatten the downstream embankment slope from 2.5H:1V to 3H:1V or flatter. This filling activity would increase the top width of the dam to approximately 28 feet.

Flattening the downstream embankment slope requires extending the outfall of the 42-inch diameter principal spillway conduit to facilitate installing a filter diaphragm around the conduit. One section of the principal spillway conduit would be removed, and three new sections of conduit would be installed to extend the conduit downstream. The new sections of pipe would be set on a concrete cradle founded on bedrock. The existing plunge pool would be extended downstream. Extension of the principal spillway conduit would require base flows in Johns Creek to be temporarily pumped around the dam to allow the conduit extension work to occur in the dry and to maintain water in the downstream reaches of Johns Creek to protect the endangered mussel species.

The riser structure would be replaced to comply with current seismic design criteria. Replacing the riser structure would require dewatering the reservoir and diversion of water around the work area.

Construction costs for the labyrinth spillway option at the right abutment are estimated at $19.4 million. These costs include a 30 percent contingency to account for unknowns and alterations of the design which may occur during the preliminary and final design phases. This alternative was not considered further because of exorbitant cost.

Non-Structural - Relocation or Floodproof Structures: Non-structural measures must be considered under NRCS policy. Non-structural measures consist of relocating or flood proofing structures in the sunny day breach zone of the dam to remove the unacceptable safety risk for the 22 residences, 15 outbuildings, one emergency response building, a church (two structures), and 66 persons at risk in the breach inundation zone. A flood control structure provides significant downstream flood damage reduction to homes, buildings, and transportation corridors. Flood proofing or relocating the breach zone structures would cost in excess of $2.9 million based upon the tax assessment valuation data and estimated water depths. Relocating or elevating 4.7 miles of roads, eight public and six private bridges, approximately 87 utility poles, and 3.3 miles of utility line protected by Johns Creek Dam No. 1 out of the inundation zone is judged to be

impractical and would generate substantial adverse economic and environmental impacts within the watershed.

In some places, protecting the structures in the breach zone would make it possible to retain a lower hazard classification of the dam. In the case of Johns Creek Dam No. 1, the existing auxiliary spillway does not meet the needed capacity for a significant hazard structure and rehabilitation would still be required. Therefore, the non-structural alternative would not change the need for rehabilitation of the dam to bring it into compliance with current dam safety standards. This alternative was determined not to be cost-effective compared to the structural alternatives available to rehabilitate the dam. Therefore, the non-structural alternative was eliminated from further consideration.

DESCRIPTION OF ALTERNATIVE PLANS CONSIDERED

Alternatives Without Federal Assistance

One of the alternatives that must be included in the plan is the "No Action" alternative. For the purposes of the rehabilitation program, the No Action alternative describes the action that the sponsors will take if no federal funds are provided. Since Johns Creek Dam No. 1 is a high hazard potential dam that does not meet current safety and performance standards, the Virginia Division of Dam Safety has issued a conditional certificate of operation for the dam. It is reasonable and prudent to expect that the Virginia Division of Dam Safety will soon issue an Administrative Order requiring the Sponsors to bring the dam up to State standards by rehabilitation of the dam or remove the hazard by removing the storage function of the reservoir. The Sponsors would be totally responsible for the cost of rehabilitation or removal of the dam. NRCS would still have the technical responsibility of approving the Sponsors' solution because the floodwater retarding structure is under an Operation & Maintenance Agreement between the local Sponsors and NRCS until 2067. Now, the potential for an uncontrolled breach and resulting damages is present and will continue until the existing dam safety issues are addressed and resolved.

Without NRCS assistance, the Sponsors would have the following options:

- Hire a consultant, prepare plans to meet NRCS and Virginia standards, and rehabilitate the dam using their own resources. The existing 200-year level of flood protection would be maintained.
- Do nothing. In this case, the Virginia Division of Dam Safety may choose to breach the dam at the Sponsors' expense. This option is likely to be more expensive than if the Sponsors performed the breach. The end results would be the same as those for the next option. This option would not meet the Sponsors' goal of maintaining the existing level of flood protection for downstream properties.
- The Sponsors could remove the flood storage capacity of the dam by breaching the dam using a least cost method. This breach would be a minimum size hole in the dam from the top of the dam to the valley floor, which would eliminate the structure's ability to store water. Downstream flooding conditions would be like those that existed prior to the construction of the dam. Without the dam in place it is estimated that 46 residences (36 single family homes and ten mobile homes), seven outbuildings, ten agricultural structures, three commercial properties with outbuildings, and one church building would experience increased flooding

during the 200-year flood event. The sediment would not be stabilized and would migrate downstream. This course of action would reduce the Sponsors' dam safety liability but would not eliminate all liability since it would induce flooding downstream. This option would not meet the Sponsors' goal of maintaining existing levels of flood control.

No Federal Action (Sponsor's Rehabilitation): In the absence of federal assistance, the Sponsors have indicated that they will rehabilitate the dam to meet the required dam safety and design criteria at their own expense using the alternative proposed by NRCS. For the purposes of this evaluation, the Sponsors' Rehabilitation will be the same as the No Federal Action alternative. The estimated total construction cost would be $9,138,800. The total project cost would be $9,930,000.

Alternatives with Federal Assistance

There are three topics which must be addressed in each of the proposed rehabilitation alternatives. There may be additional requirements for protection of endangered or threatened species if more animals or plants are confirmed to be impacted by the rehabilitation. The general concerns for each topic are addressed in the paragraphs below. Any specific concerns that apply only to the proposed alternative are addressed with the alternative.

Mussels. Each of the proposed rehabilitation alternatives involves work activities which require special attention to avoid/minimize potential impacts to the downstream mussel population. The requirements include a survey of the mussel population conducted no more than six months before the anticipated construction start, coordination with the U.S. Fish and Wildlife Service (USFWS) and Virginia Department of Game and Inland Fisheries (VDGIF), and preparation of a plan of action.

The plan will include, but is not limited to, the following topics:

- Each rehabilitation alternative involves earth disturbance activities associated with the permanent work and the need for construction access and staging, creating the potential for offsite sedimentation. All work activities will require a comprehensive plan for controlling sediment-laden runoff during the construction activities. This may include installation of sediment filtering practices, site stabilization practices (i.e., vegetation or aggregate stabilization), staged construction to limit the extent and duration of disturbed areas, etc.
- Each of the alternatives evaluated in detail involve work within the existing plunge pool at the outfall of the principal spillway conduit. This construction activity involves work directly in Johns Creek. During construction of the principal spillway pipe extension and new plunge pool, flow in Johns Creek would be pumped to create a dry work area. This would isolate the work area from live stream flows, reducing the potential for downstream sedimentation and contain other construction materials, such as concrete, which could adversely impact the mussel population if released downstream.
- Reconstruction of the riser structure will require dewatering of the reservoir, exposing accumulated sediment deposits. To reduce the potential for downstream sedimentation, temporary seed could be applied to quickly stabilize the exposed reservoir sediment and reduce the potential for downstream migration of this material.

Localized Flood Protection. A topographic survey performed by NRCS in 2012 indicates that the residential structure located along the southern rim of the reservoir immediately upstream of the auxiliary spillway has a point of entry elevation of 1965.5, which is approximately one foot below the existing top of dam elevation. The preferred solution is to protect the residence with an earthen berm. The height of the berm will vary by alternative, ranging from one to five feet high. Drainage culverts containing backflow preventers would be required to allow localized drainage to pass through the earth berm. During design, other options may be considered. An intermittently residential structure (hunting cabin) is in the upper area of the floodpool. The need for floodproofing this structure will be different for each alternative. Alternatives for floodproofing will be addressed during the design phase.

Aerial mapping also indicates that a portion of Johns Creek Road located along the southern side of the reservoir is located below the top of dam elevation. The upstream residents can exit the area via a local road. Since the flooding would be infrequent, a temporary road closure could be used during flood events.

Landrights/Easements. The Sponsors still hold the same easements that were certified to NRCS in 1967 prior to the original construction. These easements are specific to activities related to the construction, operation, and maintenance of the dam and the storage of water and apply to the existing top of the dam elevation (1966.5 feet). The Sponsors have determined that acquisition of additional easement area to meet current NRCS policy to the top of dam would require a significant added cost without an equally significant benefit. The Sponsors retain the landrights to the existing top of dam and will secure the right to flood up to the new top of dam elevation (1970.5 feet) from the nine upstream landowners with land below the elevation of the new top of dam (fig. C-14). The Craig County Board of Supervisors will enact a land use ordinance that prevents future development below the new top of dam elevation (el. 1970.5) and will revise the existing USFS Special Use Permit to allow the added flooding on USFS land that will result from raising the top of dam.

Alternatives. There are five identified deficiencies with Johns Creek Dam No. 1. The solutions to the riser footer instability, the embankment drainage issues, and failure to meet the 10-day drawdown criteria are identical for each of the possible alternatives identified as potential solutions for the needed modifications to the auxiliary spillway. The lake will be drained during construction.

Issue 1 - Seismic Stability of Riser Footing. NRCS has determined that the existing riser and footer will be replaced due to inadequacy of the riser footer.

Issue 2 - Embankment Drainage. A new toe drain system will be installed downstream of the existing drain. The new drain will be installed with a non-corrosive plastic pipe. The existing drain will remain in place. The new drain will provide drainage and filtering functions when the original drain fails due to pipe collapse or other cause. Installation of weir boxes will enable accurate monitoring of seepage flow.

Additional seepage protection will be provided by the installation of a blanket drain on the downstream embankment. The embankment slope will be flattened from 2.5 horizontal:1 vertical to 3H:1V to accommodate the drain and to provide for disposal of spoil material from the auxiliary spillway excavation. A filter diaphragm will be added around the principal spillway pipe. Adding the blanket drain and flattening the downstream embankment will increase the top width of the dam to approximately 24 feet. See figure C-9 for details of the embankment and toe drains.

Approved fill material from the auxiliary spillway excavation will be used to cover the seepage collection system.

Flattening the downstream embankment slope will require an extension of the principal spillway pipe. The pipe will be extended approximately 32 feet downstream from its current location. The new sections of pipe would be set on a concrete cradle founded on bedrock. The existing plunge pool would be moved downstream about 32 feet. During the extension of the principal spillway pipe, relocation of the plunge pool, and replacement of the riser, base flow in Johns Creek will be temporarily pumped around the dam to allow the work to occur in the dry and to maintain water in the downstream reaches of Johns Creek to protect the endangered mussel species.

Issue 3 – Failure to meet the 10-day drawdown criteria. Typically, the elevation of the auxiliary crest is set "such that the frequency of use of the auxiliary spillway is less than the one-percent annual-chance flood event." Flows in a vegetated earth auxiliary spillway can damage the vegetation, make the auxiliary spillway vulnerable to erosion, and increase maintenance costs for the Sponsors. Although the auxiliary spillway crest is set at an elevation that will detain the 200-year, 24-hour storm event, the drawdown criteria is still not met due to the hydraulics of the 42-inch-diameter principal spillway pipe. Gannett Fleming did not identify any practical ways to bring the dam into compliance with a vegetative earth solution. However, there are several alternatives for a structural solution, which will eliminate the concern about erosion during frequent flows.

Issues 4 and 5 – Inadequate capacity, integrity, and stability in the vegetated earth auxiliary spillway. Since one of the goals of this rehabilitation is to maintain the existing 200-year level of downstream flood protection, the crest of the rehabilitated auxiliary spillway will remain at the same elevation as the existing vegetated earth auxiliary spillway. Each of the proposed alternatives address the capacity, integrity, and stability issues.

Rehabilitation Alternative 1 – Labyrinth Spillway on Embankment: This alternative consists of increasing the conveyance capacity of Johns Creek Dam No. 1 to pass the 6-hour PMF by constructing a 200-foot-wide, six-cycle labyrinth spillway on the dam embankment. See figure 2 for an example of this type of structure. The existing auxiliary spillway crest elevation (El. 1960.0) and the top of dam elevation (El. 1966.5) would remain unchanged to maintain the current level of flood protection and avoid upstream impacts. At the labyrinth spillway location, the existing dam embankment would be lowered to El. 1950.0 to create an approach channel to the labyrinth spillway. The labyrinth spillway would discharge into a concrete-lined chute to convey flows over the downstream embankment to a concrete-lined stilling basin located at the toe of the dam. The stilling basin would be founded on bedrock. To avoid a standing pool of water within the stilling basin, the stilling basin could be backfilled with sacrificial earth material that would be scoured out in the event the auxiliary spillway is activated. An exit channel on a mild slope would convey flow back into Johns Creek. See figure C-10 for a drawing of the alternative.

Fill material needed to flatten the downstream slope of the dam will come from the labyrinth spillway excavation. The existing vegetated earth auxiliary spillway would be closed with an earthen berm. The berm material will also come from the labyrinth spillway excavation.

No change would be needed to the existing landrights. A berm about one-foot-high would be needed to protect the residence adjacent to the dam. No flood protection would be needed for the hunting cabin. Approximately 2.1 acres of wetland downstream of the dam would be temporarily impacted by construction. An additional 0.4 acres would be permanently affected.

Construction costs for the labyrinth spillway option on the dam embankment are estimated at $16.3 million. These costs include a 30 percent contingency to account for unknowns and alterations of the design which may occur during the preliminary and final design phases.

Figure 2. Example of a labyrinth weir auxiliary spillway with five cycles.

Rehabilitation Alternative 2 – 550-Foot-Wide Roller-Compacted Concrete (RCC) Spillway on the Embankment: This alternative consists of increasing the conveyance capacity of Johns Creek Dam No. 1 to pass the 6-hour PMF by constructing a 550-foot-wide RCC spillway within the dam embankment. See the example in figure 3. The existing auxiliary spillway crest elevation (El. 1960.0 feet) and the top of dam elevation (El. 1966.5 feet) would remain unchanged to maintain the current 200-year level of flood protection and avoid upstream impacts. At the RCC spillway location, the dam embankment would be lowered to El. 1956.0 to create an approach channel to the crest of the RCC spillway at El. 1960.0. The RCC would be placed in one-foot-thick horizontal lifts to form steps (typically 1 to 2 feet high) to cover the downstream embankment slope. The RCC would be extended to bedrock at the downstream embankment toe to form a stilling basin. Vertical RCC lifts would be formed to construct the left and right spillway training walls. To avoid large areas of standing water within the stilling basin (which may be viewed as a safety concern), those portions of the stilling basin beyond the location of the principal spillway outfall could be backfilled with earth material. This material would be scoured out in the event the auxiliary spillway is activated. See figure C-11 for a drawing of the alternative.

Fill material needed to flatten the downstream slope of the dam will come from the RCC spillway excavation. The existing vegetated earth auxiliary spillway would be closed with an earthen berm. The berm material will also come from the RCC spillway excavation.

The RCC auxiliary spillway would be constructed to the left (looking downstream) of the principal spillway outlet and plunge pool.

No change would be needed to the existing landrights. A berm about one foot high would be needed to protect the residence adjacent to the dam. No flood protection would be needed for the hunting cabin. Approximately 0.8 acres of wetland downstream of the dam could be temporarily impacted by construction. An additional 1.7 acres could be permanently affected.

Construction costs for the RCC spillway option on the dam embankment are estimated at $12.1 million. These costs include a 30 percent contingency to account for unknowns and alterations of the design which may occur during the preliminary and final design phases.

Figure 3. Example of an RCC auxiliary spillway over top of a dam.

Rehabilitation Alternative 3 – 370-Foot-Wide RCC Spillway on the Embankment with 2-Foot Embankment Raise: The cost of the RCC spillway alternative could be reduced by making the RCC spillway 370 feet wide and raising the top of the dam embankment by two feet to El. 1968.5. The auxiliary spillway crest would remain at El. 1960.0 to maintain the existing 200-year level of downstream flood protection. There would be no change to the upstream embankment slope. Fill would be placed on the downstream embankment slope to establish the new top of dam elevation. Fill material needed to raise the top of the dam will come from the RCC spillway excavation. The existing vegetated earth auxiliary spillway would be closed with an earthen berm. The berm material will also come from the RCC spillway excavation. See figure C-12 for a drawing of the alternative.

Raising the embankment will increase the hydraulic loading on the embankment during large flood events. Additional stability analysis would be needed during preliminary design to verify the stability of the embankment for the increased water elevations.

Although the purpose of rehabilitation is to prevent a dam failure, the Sponsors must still prepare the Emergency Action Plan as if a dam failure is possible. Increasing the height of the dam would increase downstream consequences should the dam fail during a flooding event. The dam breach analysis and Emergency Action Plan for the dam will be reviewed and revised, as appropriate.

The RCC auxiliary spillway would be constructed to the left (looking downstream) of the principal spillway outlet and plunge pool.

In the PMF event, the water depth in the floodpool would be two feet deeper and would cover an additional 8.4 acres. Additional easements/landrights would be secured by the Sponsors. A berm about three feet high would be needed to protect the residence adjacent to the dam. Flood protection or relocation would be needed for the hunting cabin. Flooding would increase on Johns Creek Road would increase by two feet in depth during passage of the 6-hour PMF event. Approximately 2.2 acres of wetland downstream of the dam could be temporarily impacted by construction and 0.3 acres could be permanently affected.

Construction costs for the 370-foot-wide RCC spillway option with a 2-foot embankment raise range are estimated at $9.9 million. These costs include a 30 percent contingency to account for unknowns and alterations of the design which may occur during the preliminary and final design phases.

Rehabilitation Alternative 4 – 270-Foot-Wide RCC Spillway on the Embankment with 4-Foot Embankment Raise: The cost of the RCC spillway alternative could be further reduced by making the RCC spillway 270 feet wide and raising the top of the dam embankment by four feet to El. 1970.5. The auxiliary spillway crest would remain at El. 1960.0 to maintain the existing 200-year level of downstream flood protection. Widening the auxiliary spillway from 200' to 270' will not increase the flooding for events up to and including the 500-year event. There would be no change to the upstream embankment slope. Fill would be placed on the downstream embankment slope to establish the new top of dam elevation. Fill material needed to raise the top of the dam will come from the RCC spillway excavation (figs. C-8 and C-9). Additional material will be needed to close the existing auxiliary spillway. One potential borrow area would be the hayfield downstream of the dam (fig. C-7).

Raising the embankment will increase the hydraulic loading on the embankment during large flood events. Additional stability analysis would be needed during preliminary design to verify the stability of the embankment for the increased water elevations.

Although the purpose of rehabilitation is to prevent a dam failure, the Sponsors must still prepare the Emergency Action Plan as if a dam failure is possible. Increasing the height of the dam would increase downstream consequences should the dam fail during a flooding event. The dam breach analysis and Emergency Action Plan for the dam will be reviewed and revised, as appropriate.

In the PMF event, the water depth in the floodpool would be four feet deeper and would cover an additional 15.7 acres. Additional easements/landrights would be secured by the Sponsors (fig. C-14). A berm about five feet high would be needed to protect the residence adjacent to the dam. Flood protection or relocation would be needed for the hunting cabin. Flooding would increase on Johns Creek Road by four feet in depth during passage of the 6-hour PMF event. Approximately 2.2 acres of wetland downstream of the dam could be temporarily impacted by construction and 0.3 acres could be permanently affected.

Construction costs for the 270-foot-wide RCC spillway with a 4-foot embankment raise are estimated at $9.4 million. These costs include a 30 percent contingency to account for unknowns and alterations of the design which may occur during the preliminary and final design phases.

NATIONAL ECONOMIC DEVELOPMENT (NED) ALTERNATIVE

Alternative 4, as described above, is the NED plan. For purposes of the rehabilitation program, the NED plan is defined as the federally assisted alternative with the greatest net economic benefits.

The Sponsors have indicated that, in the absence of federal assistance, they would rehabilitate the dam to meet the required dam safety and design criteria at their own expense using the alternative proposed by NRCS. The Sponsors' Rehabilitation is used as the No Federal Action alternative. The No Federal Action - Sponsor's Rehabilitation alternative would be the same in scope, cost, and effects as the Future with Federal Project alternative. The rehabilitation with federal assistance is the most locally acceptable alternative and best serves the Sponsors in achieving the needs and purpose of this rehabilitation. Therefore, installing a roller-compacted concrete cutoff wall within the existing auxiliary spillway is the NED plan and the preferred alternative. Per the Federal Principles and Guidelines document and NRCS National policy, when the Future Without Federal Project is the same as the Future With Federal Project, the local costs avoided are credited as benefits. This renders the federally assisted alternative as having zero net benefits. Net benefits are zero because, by policy, the total project cost is equal to the claimed benefits and the resulting benefit/cost ratio is 1:1. The results displayed in Table T are presented within a zero-based accounting context to highlight the costs and benefits associated with the recommended alternative alone. Within a zero-based accounting framework, the "Total Adverse Annualized" value associated with the Future Without Federal Project is displayed as the "Total Beneficial Annualized" in the Future With Federal Project column.

COMPARISON OF ALTERNATIVE PLANS

Table H summarizes the effects of each alternative considered. Refer to the Environmental Consequences section for additional information.

Table H - Summary and Comparison of Alternative Plans

Effects	**Future Without Federal Project No Federal Action – Sponsor's Rehabilitation**	**Alternative 4 - Future With Federal Project Rehabilitation with Federal Assistance** – 270' wide Roller-Compacted Concrete chute over the top of dam. 4' dam raise **Preferred Alternative (NED Plan)**	**Alternative 1 –** 200' wide, 6-cycle reinforced concrete labyrinth weir in the embankment. Closure of the existing auxiliary spillway.	**Alternative 2 –** 550' Roller-compacted concrete chute over the top of dam.	**Alternative 3 –** 370' Roller-compacted concrete chute over the top of dam. 2' dam raise.
Total Project Investment Johns Creek Dam 1	$9,930,000	$9,930,000	$17,245,000	$12,735,000	$10,408,000
Total Beneficial Annualized (AAEs[1/])	---	$349,800	$643,000	$474,900	$388,000
Total Adverse Annualized (AAEs[1/])	---	$349,800	$643,000	$474,900	$388,000
Net Beneficial	---	$0	$0	$0	$0
Benefit/Cost Ratio	---	1.0 to 1.0	1.0 to 1.0	1.0 to 1.0	1.0 to 1.0
Estimated OM&R[2/]	---	$5,000	$5,000	$5,000	$5,000
Prime and Unique Farmland	Up to 20.9 acres of designated Prime and Unique Farmland could be affected by the action alternatives.	Up to 20.9 acres of designated Prime and Unique Farmland could be affected by the action alternatives.	No effect.	No effect.	No effect.
Farmland of Statewide Importance	Up to 6.6 acres of designated Farmland of Statewide Importance could be affected by the action alternatives.	Up to 6.6 acres of designated Farmland of Statewide Importance could be affected by the action alternatives.	Loss of 0.1 acres of farmland of statewide importance.	Loss of 0.1 acres of farmland of statewide importance.	Loss of 0.1 acres of farmland of statewide importance.
Clean Water Act-303(d)/305(b)	Minimal temporary effects during construction.	Minimal temporary effects during construction.	Minimal temporary effects during construction.	Minimal temporary effects during construction.	Minimal temporary effects during construction.

Effects	Future Without Federal Project No Federal Action – Sponsor's Rehabilitation	Alternative 4 - Future With Federal Project Rehabilitation with Federal Assistance – 270' wide Roller-Compacted Concrete chute over the top of dam. 4' dam raise **Preferred Alternative (NED Plan)**	Alternative 1 – 200' wide, 6-cycle reinforced concrete labyrinth weir in the embankment. Closure of the existing auxiliary spillway.	Alternative 2 – 550' Roller-compacted concrete chute over the top of dam.	Alternative 3 – 370' Roller-compacted concrete chute over the top of dam. 2' dam raise.
Wetlands (Clean Water Act-401/404)	Temporary impact during construction to 24.2 ac. of freshwater forested/shrub wetland, 2.0 ac. of freshwater emergent wetland, and 32.1 ac. of Lake (Total of 58.3 ac); Permanent conversion of up to 1.7 ac. Freshwater Forested Shrub wetland below the dam to Wet Meadow.	Temporary impact during construction to 24.2 ac. of freshwater forested/shrub wetland, 2.0 ac. of freshwater emergent wetland, and 32.1 ac. of Lake (Total of 58.3 ac); Permanent conversion of up to 1.7 ac. Freshwater Forested Shrub wetland below the dam to Wet Meadow.	Temporary impact during construction to 24.2 ac. of freshwater forested/shrub wetland, 2.0 ac. of freshwater emergent wetland, and 32.1 ac. of Lake (Total of 58.3 ac); Permanent conversion of up to 0.4 ac. Freshwater Forested Shrub wetland below the dam to Wet Meadow.	Temporary impact during construction to 24.2 ac. of freshwater forested/shrub wetland, 2.0 ac. of freshwater emergent wetland, and 32.1 ac. of Lake (Total of 58.3 ac); Permanent conversion of up to 1.7 ac. Freshwater Forested Shrub wetland below the dam to Wet Meadow.	Temporary impact during construction to 24.2 ac. of freshwater forested/shrub wetland, 2.0 ac. of freshwater emergent wetland, and 32.1 ac. of Lake (Total of 58.3 ac); Permanent conversion of up to 1.7 ac. Freshwater Forested Shrub wetland below the dam to Wet Meadow.
Clean Water Act-402 (NPDES/VPDES)	Since construction disturbance will exceed 1 acre, permitting will be required.	Since construction disturbance will exceed 1 acre, permitting will be required.	Since construction disturbance will exceed 1 acre, permitting will be required.	Since construction disturbance will exceed 1 acre, permitting will be required.	Since construction disturbance will exceed 1 acre, permitting will be required.
Floodplain Management	No change from existing downstream conditions for storm events smaller than or equal to the 500-year frequency event. Increase upstream flooding of 15.7 acres.	No change from existing downstream conditions for storm events smaller than or equal to the 500-year frequency event. Increase upstream flooding of 15.7 acres.	No change from existing downstream conditions for storm events smaller than or equal to the 200-year frequency event.	No change from existing downstream conditions for storm events smaller than or equal to the 200-year frequency event.	No change from existing downstream conditions for storm events smaller than or equal to the 200-year frequency event. Increase upstream flooding of 8.4 acres.

Effects	Future Without Federal Project No Federal Action – Sponsor's Rehabilitation	Alternative 4 - Future With Federal Project Rehabilitation with Federal Assistance – 270' wide Roller-Compacted Concrete chute over the top of dam. 4' dam raise **Preferred Alternative (NED Plan)**	Alternative 1 – 200' wide, 6-cycle reinforced concrete labyrinth weir in the embankment. Closure of the existing auxiliary spillway.	Alternative 2 – 550' Roller-compacted concrete chute over the top of dam.	Alternative 3 – 370' Roller-compacted concrete chute over the top of dam. 2' dam raise.
Air Quality	Temporary effects during construction. Permits likely required for mobile concrete batch plant and on-site burning of vegetative debris.	Temporary effects during construction. Permits likely required for mobile concrete batch plant and on-site burning of vegetative debris.	Temporary effects during construction. Permits likely required for mobile concrete batch plant and on-site burning of vegetative debris.	Temporary effects during construction. Permits likely required for mobile concrete batch plant and on-site burning of vegetative debris.	Temporary effects during construction. Permits likely required for mobile concrete batch plant and on-site burning of vegetative debris.
Endangered and Threatened Species	Potential impact on endangered species.	Potential impact on endangered species.	Potential impact on endangered species.	Potential impact on endangered species.	Potential impact on endangered species.
Migratory Birds	Temporary effects during construction.	Temporary effects during construction.	Temporary effects during construction.	Temporary effects during construction.	Temporary effects during construction.
Bald Eagle and Golden Eagles	No effect.	No effect.	No effect.	No effect.	No effect.
Invasive Plant Species	Care will be taken during construction to avoid introduction or relocation of invasive plant species.	Care will be taken during construction to avoid introduction or relocation of invasive plant species.	Care will be taken during construction to avoid introduction or relocation of invasive plant species.	Care will be taken during construction to avoid introduction or relocation of invasive plant species.	Care will be taken during construction to avoid introduction or relocation of invasive plant species.
Riparian Areas	Up to 1.7 forested acres permanently removed.	Up to 1.7 forested acres permanently removed.	Up to 0.4 acres of trees removed.	Up to 1.7 forested acres permanently removed.	Up to 1.7 forested acres permanently removed.
Local and Regional Economy	Temporary positive effect on local and/or regional construction companies.	Temporary positive effect on local and/or regional construction companies.	Temporary positive effect on local and/or regional construction companies.	Temporary positive effect on local and/or regional construction companies.	Temporary positive effect on local and/or regional construction companies.

Effects	Future Without Federal Project No Federal Action – Sponsor's Rehabilitation	Alternative 4 - Future With Federal Project Rehabilitation with Federal Assistance – 270' wide Roller-Compacted Concrete chute over the top of dam. 4' dam raise **Preferred Alternative (NED Plan)**	Alternative 1 – 200' wide, 6-cycle reinforced concrete labyrinth weir in the embankment. Closure of the existing auxiliary spillway.	Alternative 2 – 550' Roller-compacted concrete chute over the top of dam.	Alternative 3 – 370' Roller-compacted concrete chute over the top of dam. 2' dam raise.
Public Health and Safety	Reduce potential for loss of life from a dam breach. Safety/noise concerns during construction. Provide floodproofing for 2 structures.	Reduce potential for loss of life from a dam breach. Safety and noise concerns during construction. Floodproofing provided for 2 structures.	Reduce potential for loss of life from a dam breach. Safety and noise concerns during construction. Floodproofing provided for 1 structure.	Reduce potential for loss of life from a dam breach. Safety and noise concerns during construction. Floodproofing provided for 1 structure.	Reduce potential for loss of life from a dam breach. Safety and noise concerns during construction. Floodproofing provided for 2 structures.
Cultural Resources	No Historic Properties Affected.	No Historic Properties Affected.	No Historic Properties Affected.	No Historic Properties Affected.	No Historic Properties Affected.
Environmental Justice and Civil Rights	No disparate treatment.	No disparate treatment.	No disparate treatment.	No disparate treatment.	No disparate treatment.
Land Use Changes	Up to 1.7 acres of Freshwater Forested Shrub wetland downstream of the dam changed to riparian herbaceous Wet Meadow. Land use ordinance to restrict upstream development.	Up to 1.7 acres of Freshwater Forested Shrub wetland downstream of the dam changed to riparian herbaceous Wet Meadow. Land use ordinance to restrict upstream development.	Up to 0.4 acres of Freshwater Forested Shrub wetland downstream of the dam changed to riparian herbaceous Wet Meadow.	Up to 1.7 acres of Freshwater Forested Shrub wetland downstream of the dam changed to riparian herbaceous Wet Meadow.	Up to 1.7 acres of Freshwater Forested Shrub wetland downstream of the dam changed to riparian herbaceous Wet Meadow. Land use ordinance to restrict upstream development.

[1/] Per 1.7.2 (a) (4) (ii) of the "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies" (P&G), U.S. Water Resources Council, March, 1983, allowing for abbreviated procedures, damage reduction and recreation benefits have not been displayed because they are the same for both alternatives and no net change in benefits occurs when comparing the two candidate plans to each other. The federally assisted alternative is displayed within a zero-based accounting context that credits local costs avoided (Total Adverse Annualized for the Future Without Federal Project scenario) as adverse beneficial effects (Total Beneficial Annualized) consistent with P&G 1.7.2(b)(3). Although the average annual benefits of rehabilitation are $349,800, net benefits are zero because the total project cost is equal to the claimed benefits and the resulting benefit/cost ratio is 1:1. "AAEs" stands for Average Annual Equivalents which are based on a 2.875% discount rate and a 52 year period of analysis (1 year to design, 1 year to install and a 50 year expected useful life).

[2/] "Estimated OM&R" stands for Operation, Maintenance and Replacement Costs.

Note: Regional Economic Development account (RED) concerns were not identified during the scoping process. Therefore, the RED account information is not included.

ENVIRONMENTAL CONSEQUENCES

Alternative plans of action can result in a multitude of effects on resources upstream and downstream of McDaniel's Lake. This section describes anticipated effects on resource concerns identified by the Sponsors, the public, and agency personnel in the Scoping meeting and the public meetings.

Five alternative plans were considered and evaluated in detail: 1) No Federal Action (Sponsors Rehabilitation); 2) Labyrinth Spillway on Embankment; 3) 550-Foot-Wide Roller-Compacted Concrete (RCC) Spillway on the Embankment; 4) 370-Foot-Wide RCC Spillway on the Embankment with 2-Foot Embankment Raise: and 5) 270-Foot-Wide RCC Spillway on the Embankment with 4-Foot Embankment Raise (Preferred Alternative/NED Plan). The Environmental Consequences section will describe the environmental effects of the existing conditions and the Preferred Alternative. Decommissioning the dam was not considered a viable alternative because it was exorbitantly expensive and logistically impractical.

The Sponsors have indicated that they will use the plan developed by NRCS to complete the rehabilitation of the dam if Federal funding is not available. The *No Federal Action (Sponsors' Rehabilitation)* alternative would be the same or involve the same components as the *Rehabilitation with Federal Assistance (NED Alternative).* This alternative maximizes net benefits with a benefit/cost ratio of 1:1 and is the rehabilitation alternative preferred by the Sponsors.

SUMMARY OF SPECIAL ENVIRONMENTAL CONCERNS NOT WITHIN THE AFFECTED ENVIRONMENT AND EXCLUDED FROM CONSEQUENCES ANALYSIS

- Chesapeake Bay Preservation Act
- Coastal Zone Management Areas
- Wild and Scenic Rivers
- Clean Air Act-General Conformity Rule
- Clean Air Act-Regional Haze Regulations
- Virginia Natural Area Preserves System
- Virginia Rare Species and Natural Communities
- Coral Reefs
- Essential Fish Habitat
- Scenic Beauty
- National Historic Landmarks Program
- Environmental Justice

SPECIAL ENVIRONMENTAL CONCERNS

SOILS

Existing Conditions: There are approximately 20.9 acres of Prime Farmland and 6.6 acres of Farmland of Statewide Importance located within the maximum extent of potential disturbance. Most of this is located in the adjacent hayfield currently used for the auxiliary spillway discharge (fig. C-5).

No Federal Action (Sponsors' Rehabilitation): Borrow material may be taken from the hayfield to close the existing spillway, raise the top of the dam, and build the dike around the house. The actual acres that will be disturbed will be determined during the design process but will not exceed 20.9 acres of Prime Farmland and 6.6 acres of Farmland of Statewide Importance.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

WATER

Clean Water Act (CWA) – Sections 303(d) and 305(b) (Water Quality)

Existing Conditions: The Final 2016 305(b)/303(d) Water Quality Assessment Integrated Report, released in April 2018, lists no impairments of any type within the Upper Johns Creek watershed.

No Federal Action (Sponsors' Rehabilitation): There will be a temporary impact on downstream water quality due to a sediment release when the water is drawn down prior to construction. With the required erosion and sediment control measures in place, there should be minimal impacts on water quality during construction. Any water releases from the project area are expected to meet the appropriate water quality standards. No long-term impacts on water quality from rehabilitation activities are anticipated.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

Waters of the U.S./Wetlands

Clean Water Act – Sections 401 (State Administered) and 404 (Federally Administered):

Existing Conditions: The McDaniel's Lake shoreline, inflows, and outflow and all areas within the maximum potential limits of disturbance were visually surveyed for wetlands. There is a total of 60.8 acres of wetlands within the maximum potential limits of disturbance that include 32.1 acres of Lake, 24.2 acres of freshwater forested/shrub wetlands and 2.0 acres of freshwater emergent wetlands upstream of the lake, and 2.5 acres of freshwater forested/shrub wetlands downstream of the dam (see figure C-6 for wetland map).

No Federal Action (Sponsors' Rehabilitation): The reservoir will be temporarily drained to allow construction of the recommended alternative. There will be a temporary impact to 24.2 acres of freshwater forested/shrub wetlands, 2.0 acres of emergent wetlands, and 32.1 acres of open water. Construction of the auxiliary spillway, chimney drain, auxiliary spillway, and toe drains, and relocation of the plunge pool may result in the permanent loss of up to 1.7 acres of the 2.5 acres of freshwater forested/shrub wetlands downstream of the embankment. There may be temporary

impacts to the remaining 0.8 acres. As needed, NRCS will mitigate by replacing the freshwater forested/shrub wetlands at a 2:1 ratio by construction of a similar wetland on-site, purchase credits from an approved mitigation bank, or purchase credits from the aquatic trust fund.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

Clean Water Act – Section 402 (State Administered) (Discharges of Stormwater from Construction Activities):

Existing Conditions: All areas around the dam and auxiliary spillway are maintained in vegetative cover.

No Federal Action (Sponsors' Rehabilitation): Since land disturbance will exceed one acre, a Virginia Stormwater Management Program Permit (VSMP) (i.e. construction general permit) would be required. The VSMP requires the construction activity operator to develop a site-specific stormwater pollution prevention plan (SWPPP) that must be submitted with the General VPDES Permit application for review/approval. With the required approved erosion and sediment control mitigation measures in place, and additional sediment discharge measures needed to reduce the impacts to the T&E aquatic species, there should be minimal temporary impacts on water quality during construction. No long-term impacts on water quality from rehabilitation activities are anticipated.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

Floodplain Management

Executive Order 11988 – Floodplain Management

Existing Conditions: The Johns Creek floodplain is managed by Craig County. They have a local floodplain ordinance, which imposes zoning restrictions within the flood zones that is consistent with FEMA and state regulations. Craig County is in good standing with the National Flood Insurance Program and has participated since February 1990.

No Federal Action (Sponsors' Rehabilitation): Rehabilitation of the Johns Creek 1 dam will be done in accordance with all necessary requirements and restrictions. The existing 200-year level of downstream flood protection will be maintained. Existing floodplain management zoning restrictions will not be changed. The upstream floodpool will increase by 15.7 acres. A land use ordinance will restrict future development on all the land below the elevation of the new top of dam.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

AIR

Applicable State and Local Air Quality Regulations

Existing Conditions: According to DEQ, Craig County is within an attainment area for all criteria pollutants. Air quality in the project area is satisfactory and below the Ambient Air Quality Standard for particulate matter.

No Federal Action (Sponsors' Rehabilitation): During the rehabilitation of the dam, particulate matter will increase during construction activities. A mobile concrete batch plant will be used that will generate dust. Also, open burning of vegetative debris usually occurs during construction. Required permits will be obtained by the contractor. Although there would be a temporary increase in particulate pollution during construction, the proposed work is not expected to violate any federal, state, or local air quality standards.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

ANIMALS AND PLANTS

Endangered and Threatened Species and Natural Areas

Existing Conditions: Table I lists the endangered or threatened species that may be present in the project area.

No Federal Action (Sponsors' Rehabilitation): Protection of endangered and threatened species in the project area will be conducted in accordance with the appropriate mitigation actions listed in Table I per final consultation with regulatory agencies.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

Migratory Birds

Existing Conditions: McDaniel's Lake could potentially be utilized by several species of migratory birds for feeding, nesting, or resting. No bald eagle or osprey nests are located within a quarter mile of the project area.

No Federal Action (Sponsors' Rehabilitation): Since the lake will be drained during construction, it will be temporarily unavailable to migratory birds. There are similarly-sized bodies of water throughout the region available for migratory bird use.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

Table I. Endangered and threatened species potentially impacted by rehabilitation and mitigation measures

Common Name	**Scientific Name**	**Status**	**Recommended Mitigation to Assure Less than Significant Impacts**
James Spinymussel	*Parvaspina collina*	FE(USFWS) SE(VDGIF)	Consultation is underway with USFWS. NRCS proposed several conservation measures to minimize potential erosion. Upon completion of consultation, the NRCS will incorporate into the Final EA any additional avoidance and minimization measures stipulated by the USFWS.
Yellow Lance	*Elliptio lanceolate*	FT (USFWS)	Consultation is underway with USFWS. NRCS proposed several conservation measures to minimize potential erosion. Upon completion of consultation, the NRCS will incorporate into the Final EA any additional avoidance and minimization measures stipulated by the USFWS.
Atlantic Pigtoe	*Fusconaia masoni*	ST(VDGIF)	Mitigation required for the James spinymussel by the USFWS and the VDGIF will minimize construction impacts to all downstream aquatic species.
Indiana Bat	*Myotis sodalis*	FE(USFWS) SE(VDGIF)	Consultation is underway with USFWS and the VDGIF. The NRCS will ensure that the contract documents stipulate no tree-clearing from June 01 to July 31 (pup season). Upon completion of consultation, the NRCS will incorporate into the Final EA any additional avoidance and minimization measures stipulated by the USFWS and the VDGIF.
Little Brown Bat	*Myotis lucifugus lucifigus*	SE(VDGIF)	Consultation is underway with VDGIF. The NRCS will ensure that the contract documents stipulate no tree-clearing from June 01 to July 31 (pup season). Upon completion of consultation, the NRCS will incorporate into the Final EA any additional avoidance and minimization measures stipulated by the VDGIF.
Tri-colored Bat	*Perimyotis subflavus*	SE(VDGIF)	Consultation is underway with VDGIF. The NRCS will ensure that the contract documents stipulate no tree-clearing from June 01 to July 31 (pup season). Upon completion of consultation, the NRCS will incorporate into the Final EA any additional avoidance and minimization measures stipulated by the VDGIF.

Common Name	Scientific Name	Status	Recommended Mitigation to Assure Less than Significant Impacts
Northern Long-eared Bat	*Myotis septentrionalis*	FT(USFWS) ST(VDGIF)	Consultation is underway with USFWS and the VDGIF. The NRCS will ensure that the contract documents stipulate no tree-clearing from June 01 to July 31 (pup season). Upon completion of consultation, the NRCS will incorporate into the Final EA any additional avoidance and minimization measures stipulated by the USFWS and the VDGIF.
Loggerhead Shrike	*Lanius ludovicianus*	ST(VDGIF)	Consultation is underway with the VDGIF regarding applicable BMPs to minimize potential impacts. Upon completion of consultation, the NRCS will incorporate into the Final EA any additional avoidance and minimization measures stipulated by the VDGIF.
Migrant loggerhead shrike	*Lanius ludovicianus migrans*	ST(VDGIF)	Consultation is underway with the VDGIF regarding applicable BMPs to minimize potential impacts. Upon completion of consultation, the NRCS will incorporate into the Final EA any additional avoidance and minimization measures stipulated by the VDGIF.
Henslow's Sparrow	*Ammodramus henslowii*	ST(VDGIF)	Consultation is underway with the VDGIF regarding applicable BMPs to minimize potential impacts. Upon completion of consultation, the NRCS will incorporate into the Final EA any additional avoidance and minimization measures stipulated by the VDGIF.

FE – Federally endangered
FT – Federally threatened
SE – State endangered
ST – State threatened

Bald Eagles

Existing Conditions: There is existing bald eagle habitat present in the project area. However, there are no known bald eagle nests within 35 miles of the site.

No Federal Action (Sponsors' Rehabilitation): No impacts to bald eagles are expected by project action. Prior to beginning construction, a field survey will be conducted to verify no nests exist within the project area. Should bald eagle nests be found, all applicable restrictions will be implemented.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

Invasive Species

Existing Conditions: While no invasive animal species were observed, several common invasive plant species were found. Fescue is dominant in all fields, the dam embankment, and beyond the toe of the embankment on the downstream side. Other prevalent invasive species downstream of the embankment included Multiflora Rose and Lespedeza (Chinese).

No Federal Action (Sponsors' Rehabilitation): During construction, measures will be taken to avoid the spread or introduction of invasive species. The critical areas of the dam embankment will be established to the standard NRCS seed mixture of fescue for erosion-resistance. All other disturbed areas will be vegetated with non-invasive species.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

Riparian Areas

Existing Conditions: There are riparian areas around the reservoir and along Johns Creek.

No Federal Action (Sponsors' Rehabilitation): There will be temporary impacts to the riparian areas around the reservoir while the lake is drawn-down during the construction period. The existing principal spillway pipe will be extended downstream by 32 feet to allow construction of the chimney drain. The existing plunge pool will be moved downstream to accommodate the outlet of the new pipe. There will be up to 1.7 acres of riparian zone permanently altered by conversion to riparian herbaceous Wet Meadow.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

HUMANS

Local and Regional Economy

Existing Conditions: The roads used for commuting to work sites contribute to the local economy.

No Federal Action (Sponsors' Rehabilitation): There would be a temporary positive effect on the local economy during construction.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

Public Health and Safety

Existing Conditions: The existing vegetated earth auxiliary spillway does not have the capacity or integrity necessary to withstand the Probable Maximum Precipitation event. A breach of the auxiliary spillway could cause a release of the water and sediment stored behind the dam. Overtopping the dam could cause the dam to erode and collapse. Approximately 66 people are at risk for loss of life. Eight public and six private roads would be affected by a breach.

No Federal Action (Sponsors' Rehabilitation): Under this alternative, the dam would be structurally rehabilitated using current design and safety criteria to provide continued flood protection for 50 years after the rehabilitation project is complete. The downstream flooding level would be the same as it is presently. The threat to loss of life from failure of the dam would be greatly reduced. Access to the site will be restricted during construction. A land use ordinance will restrict future development upstream of the dam below the elevation of the new top of dam.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

Cultural Resources

Existing Conditions: Johns Creek Dam No. 1 is located within the direct Impact Area of Potential Effect (APE) of the undertaking, and was built in 1967, making it eligible for National Register consideration due to its age (50+ years old).

No Federal Action (Sponsors' Rehabilitation): The NRCS completed a National Register eligibility evaluation recommending Johns Creek Dam No. 1 "not eligible" for the NRHP due to a lack of historic or architectural significance and integrity, per the NRHP eligibility evaluation criteria. The Virginia SHPO concurred with the recommendation on March 19, 2019.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

Environmental Justice

Existing Conditions: There is an estimated population of 250 people in the 200-year floodplain below the dam. The presence or absence of environmental justice groups within the watershed was assessed using EPA's EJSCREEN tool.

No Federal Action (Sponsors' Rehabilitation): Rehabilitation of the dam will have positive economic and social effects across all residents within the floodplain and above the dam. There will be no disparate treatment. Since vehicle operators also are significant beneficiaries of the proposed rehabilitation, it is reasonable to conclude that protection of the roads and bridges will benefit all racial, ethnic, and socio-economic groups within the watershed and below the

dam. Avoiding a dam breach will directly benefit all residents and taxpayers in general within Craig County, the Town of New Castle, and the Commonwealth of Virginia.

There are no known disparate impacts from the rehabilitation project. It was explained to residents that rehabilitation of the dam would not enhance their downstream flood protection, but simply maintain the existing 200-year level of flood protection while reducing the risk to life and property that might occur from a dam breach.

There would also be downstream benefits to the occupants of thousands of vehicles/day. This is primarily those people affected by impacts to the roads and bridges and includes others who would lose access to emergency services or would be cut off from their residences or jobs.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

Land Use Changes

Existing Conditions: The existing auxiliary spillway (ASW) is 200 feet wide and is in permanent grass vegetation that is currently harvested for hay. The area immediately below the dam is freshwater forested/shrub wetland.

No Federal Action (Sponsors' Rehabilitation): The existing ASW will be closed with soil material and re-seeded. It may continue to be utilized for hay, as needed. The hayfield adjacent to the dam may be used as a borrow site. This may negatively impact the future productivity of this land. Approximately 2.5 acres of wetland may be temporarily impacted by construction. Of those acres, up to 1.7 acres may be permanently impacted. The upstream floodpool will be increased by 15.7 acres due to the increase in dam height. A land use ordinance will restrict development in the area below the new top of dam.

Rehabilitation with Federal Assistance (NED Alternative): Same as the No Federal Action (Sponsors' Rehabilitation).

CUMULATIVE EFFECTS

NRCS constructed four flood control dams in this watershed. McDaniel's Lake dam and the other three dams are currently operating under conditional certificates due to a need for rehabilitation. The No Federal Action alternative for McDaniel's Lake calls for the Sponsors to rehabilitate the dam. The proposed rehabilitation alternative would have the same effect on the environment as the No Federal Action alternative. The cumulative effects of this project on the principal resources of concern, along with the social and economic effects, is to maintain the existing social, economic, and environmental conditions of the community. In both the selected plan and the rehabilitation by the local Sponsors, the four existing dams in the watershed stay in place and the same level of flood protection is provided. The existing emergency action plan will be revised to reflect the higher top of dam elevation.

There is an overall positive effect on the downstream residents due to the reduced threat to loss of life and property for a catastrophic breach of the dam. The useful life of the project will be extended by an additional 50 years following construction.

RISK AND UNCERTAINTY

Assessments, considerations, and calculations in this plan are based on a 52-year period of analysis. Associated monetary flooding impacts on downstream houses and businesses were based on the National Flood Insurance Program's Actuarial Rate Review. National averages were used to identify the value of potential damages. Actual damages occurring from each storm event could realistically be higher or lower, depending on soil moisture conditions at the time of a given event, associated debris flows, future development, and other factors such as changes in precipitation from various storm events. Although potential climatic changes are not expected to alter calculation of the PMP events, they could increase the occurrence of low frequency, high intensity storm events and associated flood damages.

The Sponsors procured easements for the construction, operation, and maintenance of the dam and the storage of water prior to original construction. Although none of the easements referred to a specific elevation for the crest of the auxiliary spillway or the top of the dam, the legal counsel for the Sponsors has determined that the easements are secured to the elevation of the existing top of dam. Additional easements from the landowners and a revised Special Use Permit from the U.S. Forest Service will be required when the dam is raised. In addition, the Craig County Board of Supervisors will enact a land use ordinance to restrict future development upstream of the dam below the new top of dam elevation.

The projected sediment life of the lake is 276 years. This information is based on a sediment survey that was conducted in 2016. Very large storm events, deforestation by fire, or increased construction of residential sites could cause an increased rate of erosion, sedimentation and deposition. There are no known plans for land use changes in this watershed that would affect the rate of sediment deposition in the reservoir.

The limiting factor for the expected useful life of the Future with Federal Assistance Alternative (Preferred Alternative) is based on the remaining expected life of the principal spillway and associated components. Thus a 52-year period of analysis was used for this structure.

The objective of this project is to meet applicable NRCS and Virginia safety and performance standards for a high hazard dam. From a financing and administrative standpoint, the Sponsors have committed to NRCS that they are able to fund the required 35% of the total project costs to complete installation of the preferred alternative and can perform the required maintenance on the upgraded structure for 50 years after construction.

After rehabilitation, the dam will continue to provide flood protection for downstream residents for at least another 50 years. The crest elevation of the auxiliary spillway will not change. The dam will detain the runoff from the 200-year storm event, which has about a 0.5% chance of occurring in a given year.

CONSULTATION AND PUBLIC PARTICIPATION

The sponsoring organizations are the Mountain Castles SWCD and Craig County. The Mountain Castles SWCD is the owner and operator of McDaniel's Lake. The District received their first Conditional Operation and Maintenance Certificate to operate and maintain the dam from the Virginia Division of Dam Safety in 2004. The certificate was issued because of problems identified with the auxiliary spillway.

Local, state and federal support for the rehabilitation of the McDaniel's Lake Dam has been strong. Input and involvement of the public has been solicited throughout the planning of the project. At the initiation of the planning process, many meetings were held with representatives of the Mountain Castles SWCD and Craig County to ascertain their interest and concerns regarding the dam. A Public Participation Plan was developed and approved for the project and has been followed during the planning process.

The Sponsors have worked closely with the local landowners and residents to provide information on the planning activities and to solicit their input on the pertinent issues to be considered during planning. The Sponsors worked to provide all residents with information on the planning effort and intended works of improvement.

A scoping meeting was held on October 17, 2017, in the Craig County Courthouse in New Castle, Virginia, to identify issues of economic, environmental, cultural, and social concerns in the watershed. Input was provided by local, regional, state and federal agencies at the meeting or through letters and emails to NRCS. There were 13 people in attendance. Agencies and organizations attending or providing input include the Craig County Board of Supervisors; Mountain Castles Soil and Water Conservation District; Virginia Marine Resources Commission; Virginia Department of Conservation and Recreation, Division of Natural Heritage and Division of Dam Safety and Floodplain Management; Virginia Department of Health; Virginia Department of Transportation; Virginia Department of Game and Inland Fisheries; U.S. Fish and Wildlife Service; U.S. Congressman Morgan Griffith's office; and the USDA Natural Resources Conservation Service.

The first public meeting for McDaniel's Lake was held in the Craig County Courthouse in New Castle, Virginia, on October 17, 2017. Local, state and federal perspectives on the rehabilitation needs of the McDaniel's Lake Dam were provided. The attending members of the public were informed of the dam rehabilitation program and potential alternative solutions to bring the dam into compliance with current dam safety and design criteria. Meeting participants provided input on their issues and concerns to be considered during the planning process. A fact sheet which addressed frequently asked questions regarding rehabilitation of the dam was distributed. There were 18 people in attendance. Agencies and organizations attending include area landowners, the Craig County Board of Supervisors; Mountain Castles Soil and Water Conservation District; Virginia Department of Conservation and Recreation, Division of Dam Safety and Floodplain Management; and the USDA Natural Resources Conservation Service.

A workshop meeting was held between NRCS staff and Sponsors on September 11, 2018 in New Castle, Virginia with about 20 people attending. The discussion centered on findings to date, various alternatives being analyzed, and the recommended alternative for dam rehabilitation.

A second workshop meeting was held between NRCS and the Sponsors on November 1, 2018 in New Castle, Virginia. This was part of the Craig County Board of Supervisors meeting. About 25 people attended. Information provided to meeting attendees included the costs and impacts of various alternatives being considered and evaluated, and a detailed explanation of the recommended alternative for dam rehabilitation.

A second public meeting was held on March 7, 2019 in the Craig County Courthouse in New Castle, Virginia. A summary of the findings, landrights issues, alternatives considered, and the preferred alternative were presented. A project fact sheet and a multi-page frequently asked questions document were distributed at the meeting. There were about 30 people in

attendance. Agencies and organizations attending or providing input include the Craig County Board of Supervisors; Mountain Castles Soil and Water Conservation District; Virginia Department of Conservation and Recreation, Division of Dam Safety and Floodplain Management and Division of Soil and Water Conservation; and the USDA Natural Resources Conservation Service.

A Draft Plan was distributed for interagency and public review on June 5, 2019. The distribution list of agencies and organizations is included on pages 81 and 82. Copies of the document were placed in the library in New Castle and news articles were placed in local newspapers to solicit comments from the public during the comment period. After the interagency and public review period, comments received on the draft were incorporated into the Final Plan. Letters of comments received on the draft plan and NRCS responses to the comments are included in Appendix A.

PREFERRED ALTERNATIVE

RATIONALE FOR PLAN SELECTION

The selected plan is to rehabilitate the dam to meet current NRCS and Virginia safety and performance standards for a high hazard dam. The selected plan meets the identified purposes and needs for the project and significantly reduces the potential risk to human life. The project Sponsors, residents, and state and local government agencies all prefer the selected plan because it:

- Reduces the threat to loss of life to approximately 66 people that live, work and play in the 40 structures and utilize the four major roads and five secondary roads within the breach inundation zone.
- Provides protection for 6,940 vehicles per day that utilize the eight public roads below the dam (7,640 including all roads cutoff during major flood events).
- Reduces the threat of loss of emergency service for a significant number of residences and several businesses.
- Provides downstream flood protection for the people living in the area, as well as those working, recreating, or traversing within the downstream floodplains, for an additional 50 years.
- Reduces the Sponsor liability associated with continuing to operate a non-compliant dam.
- Continues to protect the habitat of the endangered mussel species downstream of the dam.
- Retains the existing aquatic and terrestrial habitat around the lake.

The preferred alternative meets the Sponsors' objectives of bringing this dam into compliance with current dam design and safety criteria, maintaining the existing 200-year level of flood protection for downstream properties, and addressing resource concerns identified by the public. The selected plan is the NED Alternative. The plan reasonably meets the following four criteria: completeness, effectiveness, efficiency, and acceptability. NRCS and the Sponsors agree on the selected plan.

The preferred alternative for rehabilitating the auxiliary spillway is to install a 270-foot-wide, roller-compacted concrete chute spillway over the dam, raise the top of the dam by 4 feet, and close the existing auxiliary spillway with an earthen berm. The riser and footer will be replaced. The downstream embankment will be flattened to 3:1 to allow installation of a chimney drain and the toe drains will be replaced. The plunge pool will be moved downstream by about 32 feet to accommodate the flatter embankment. Floodproofing will be needed for one house and one hunting cabin. Figures 4-7 show renderings of the existing dam and the preferred alternative. Figures C-8 and C-9 show the plan view and profiles for this alternative.

Figure 4. Rendering of existing dam and plunge pool looking from the side.

Figure 5. Rendering of existing dam and plunge pool looking upstream.

Figure 6. Rendering of the 270-foot-wide RCC chute spillway – looking across the dam.

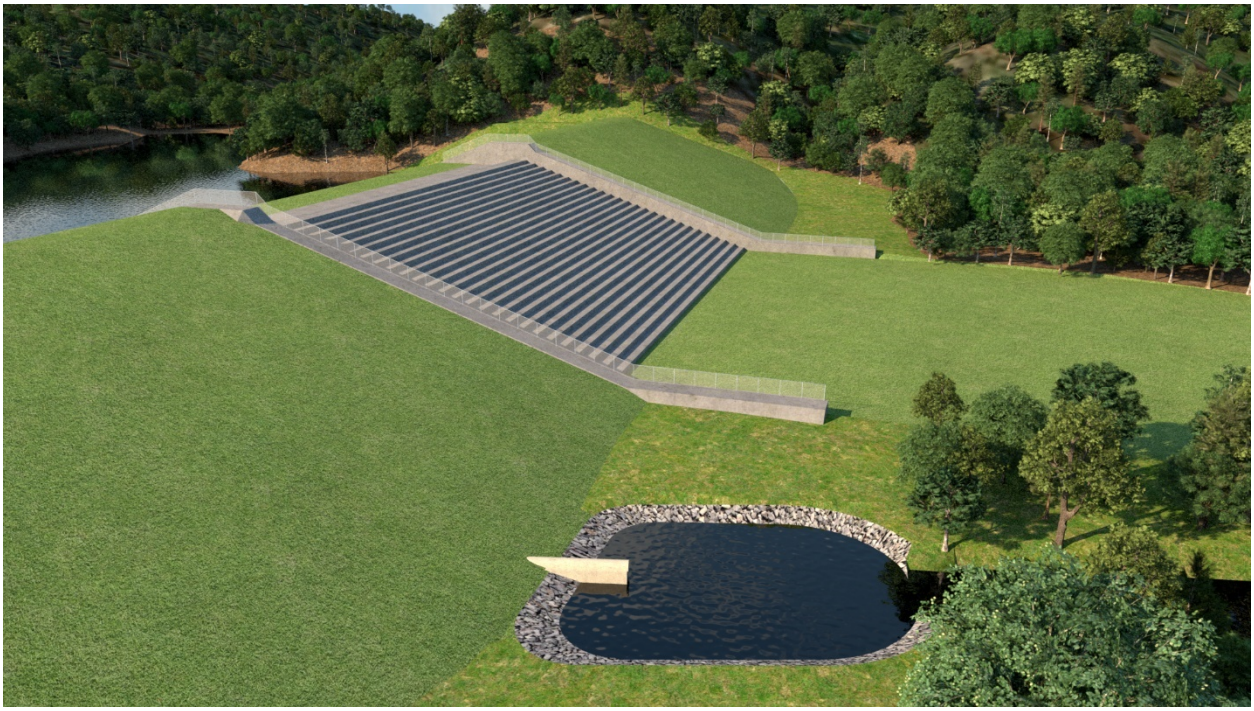
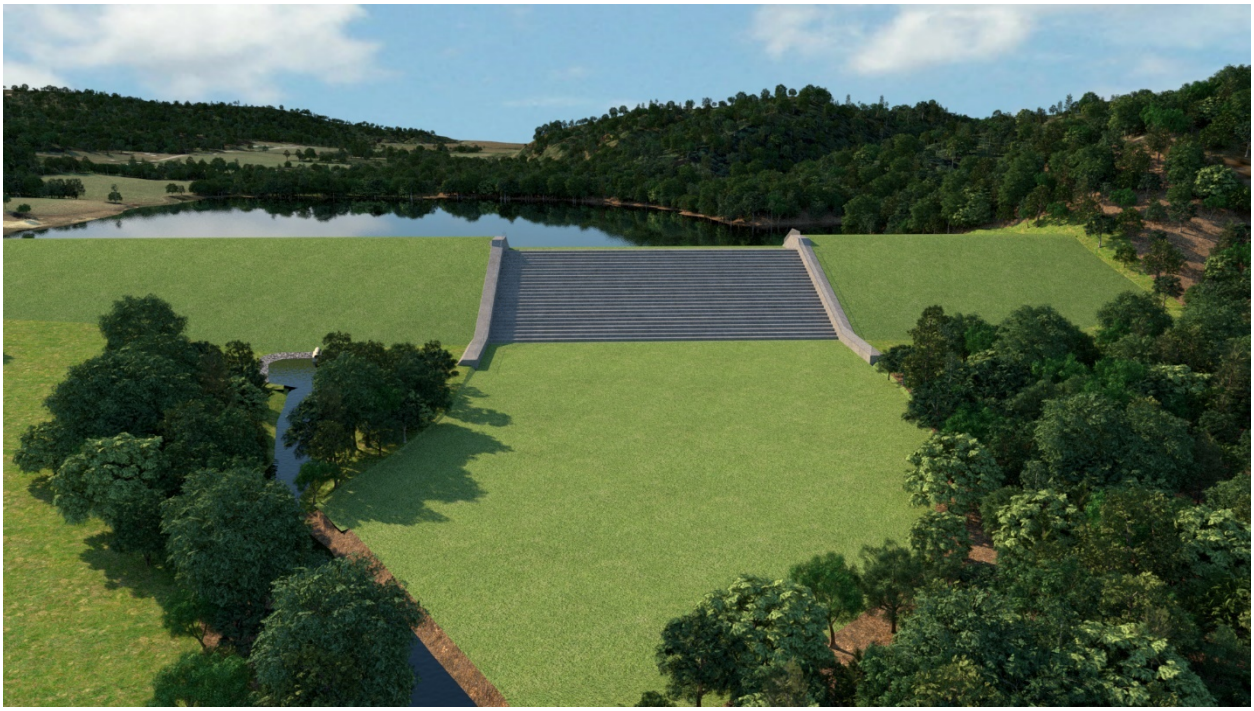


Figure 7. Rendering of the 270-foot-wide RCC chute spillway looking upstream at the dam.



SUMMARY AND PURPOSE

The selected plan of action for the dam is to:

- Install a 270-foot-wide roller-compacted concrete chute auxiliary spillway in the dam embankment.
- Raise the top of the dam by 4 feet to elevation 1970.5 feet.
- Close the existing vegetated earth auxiliary spillway with a berm.
- Replace the concrete riser with a new riser. Increase the footer size to meet seismic criteria.
- Flatten the downstream embankment to 3:1 to allow installation of a chimney drain.
- Extend the principal spillway pipe downstream by approximately 32 feet and install a new riprap-lined plunge pool.
- Install new toe drains with plastic pipe.
- Craig County will prohibit future construction of habitable dwellings upstream from the dam below the new top of dam elevation.

After the implementation of these planned works of improvement, Johns Creek Dam 1 will meet all current NRCS and Virginia Division of Dam Safety performance standards.

Detailed structural data for the proposed rehabilitated dam can be found in Table 3.

EASEMENTS AND LANDRIGHTS

Landrights for the structure currently exist for the construction, operation, and maintenance of the dam and the storage of water to the elevation of the existing top of dam based on the original easements procured for the project. The elevation of the crest of the auxiliary spillway will not change for implementation of the recommended alternative. The top of the dam will be raised by 4 feet to elevation 1970.5 feet. Additional landrights and a revised Special Use Permit from the U.S. Forest Service will be secured to the elevation of the new top of dam. The Craig County Board of Supervisors have committed to acquire a waiver of the flood pool risks from all nine landowners that have land below the new top of dam elevation. The Board of Supervisors will enact a land use ordinance that prevents future development below the new top of dam elevation.

MITIGATION

During construction, site mitigation measures will include erosion and sediment control, seeding of denuded areas, dust control, and other practices identified during the design process. Once all the threatened and endangered species that could be affected by the rehabilitation have been confirmed, additional mitigation measures will be identified. The primary mitigation measure for the threatened and endangered species will be time-of-year restrictions. Up to 1.7 acres of Forested Shrub wetland may be permanently converted to riparian herbaceous Wet Meadow. Needed mitigation measures will be identified after the amount of impacted land is finalized. Options for wetland mitigation include creation of a similar wetland offsite or purchase of wetland bank credits.

PERMITS AND COMPLIANCE

Prior to construction, the Sponsors will be responsible for obtaining an alteration permit from the Virginia Soil and Water Conservation Board, and, as needed, a 404 permit from the Army Corps of Engineers, subaqueous lands permit from the Virginia Marine Resources Commission, and any other required permits. During construction, the successful contractor is required to develop a Stormwater Pollution Prevention Plan and acquire any applicable air quality and erosion and sediment control permits.

The construction general permit would require the operator to implement a site-specific stormwater pollution prevention plan (SWPP). The SWPP would outline the steps that an operator must take to comply with the permit, including water quality and quantity requirements to reduce pollutants in the stormwater runoff from the construction site. The SWPP also specifies all potential pollutant sources that could enter stormwater leaving the construction site and covers methods used to reduce pollutants in stormwater runoff during and after construction.

Prior to construction, the NRCS will verify that no Bald eagle nests or known NLEB hibernacula or maternity roost trees are located within the project area.

If cultural resources are discovered during installation, work will cease and the State Historic Preservation Officer will be notified. Appropriate investigations procedures will be initiated.

The Sponsors will be responsible for obtaining a regular O&M Certificate from the Virginia Division of Dam Safety upon completion of the project.

Because there would be unavoidable wetland impacts, a Section 401 Virginia State Water Quality Certification would be required prior to application for a Section 404 Permit.

COSTS

As indicated in Table 2, the total installation cost of the selected plan is $9,930,000. Of this amount, PL-83-566 funds will bear $6,727,700 and nonfederal funds will bear $3,202,300. Table 2 shows details of the costs and cost-share amounts by category. Total annualized costs are shown in Table 4 along with the estimated costs for operation and maintenance. Table 5 displays the average annual flood damage reduction benefits by flood damage categories, and Table 6 displays a comparison of annual costs and benefits. A 2019 price base was used and amortized at 2.875 percent interest for the 52-year period of analysis (including a design and installation period of two years and an expected useful life of 50 years).

The cost projections for the proposed rehabilitation measures are estimated costs only for planning. The fact that these costs are included in this plan does not infer that they are final costs. Detailed structural designs and construction cost estimates will be prepared prior to contracting for the work to be performed. Final construction costs will be those costs actually incurred by the contractor performing the work, including the cost of any necessary contract modifications.

INSTALLATION AND FINANCING

The project is planned for installation in about 12 months. During construction, equipment will not be allowed to operate when conditions are such that soil erosion and water, air, and noise pollution cannot be satisfactorily controlled.

NRCS will provide assistance to the Sponsors with the Johns Creek Dam 1 rehabilitation project. NRCS will be responsible for the following:

- Execute a project agreement with the Sponsors before either party initiates work involving funds of the other party. Such agreements set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.
- Execute a Memorandum of Understanding with the Sponsors to provide a framework within which cost-share funds are accredited.
- Execute an updated Operation and Maintenance Agreement with the Sponsors that extends the O&M responsibilities for another 50 years following construction. This agreement will be based on the NRCS National Operation and Maintenance Manual.
- Provide financial assistance equal to 65% of total eligible project costs, not to exceed 100% of actual construction costs.
- Verify that a current Emergency Action Plan is developed before construction is initiated.
- Verify that a land use ordinance is in place to restrict future development of inhabitable dwellings below the new top of dam elevation (El. 1970.5 feet).
- Provide consultative engineering support, technical assistance, and approval during the design and construction of the project.

- Certify completion of all installed measures.

The Sponsors will be responsible for the following:

- Secure all needed environmental permits, easements, and rights for the installation, operation and maintenance of the rehabilitated structure. This includes securing the waiver of risk or easement from the upstream land owners and a revised Special Use Permit from the U.S. Forest Service to the elevation of the new top of dam (1970.5 feet).
- Enact a land use ordinance to restrict future development of inhabitable dwellings below the new top of dam elevation.
- Prepare an updated Emergency Action Plan for the dam prior to the initiation of construction.
- Execute an updated Operation and Maintenance Agreement with NRCS for the dam. This agreement will be based on the NRCS National Operation and Maintenance Manual.
- Provide engineering services for the design, construction, and certification of the project.
- Provide local administrative and contract services necessary for the installation of the project.
- Provide nonfederal funds from the Commonwealth of Virginia, or other sources, for cost-sharing of the project at a rate equal to, or greater than, 35% of the total eligible project costs.
- Acquire a regular Operation and Maintenance certificate from the Virginia Division of Dam Safety upon completion of the planned measures.
- Participate in and comply with applicable Federal floodplain management and flood insurance programs.
- Enforce all associated easements and rights-of-way for the safe operation of the dam.

OPERATION, MAINTENANCE, AND REPLACEMENT

Measures installed as part of this plan, and previously installed measures, will be operated and maintained by the Mountain Castles Soil and Water Conservation District with technical assistance from federal, state, and local agencies in accordance with their delegated authority. A new Operation and Maintenance (O&M) agreement will be developed for McDaniel's Lake and will be executed prior to construction of the project. The term of the new O&M agreement will be for 50 years following the completion of rehabilitation. The agreement will specify responsibilities of the Sponsors and include detailed provisions for retention, use, and disposal of property acquired or improved with PL 83-566 cost sharing. Provisions will be made for free access of district, state, and federal representatives to inspect all structural measures and their appurtenances at any time.

(This page intentionally left blank)

Table 1 - Estimated Installation Cost
Johns Creek Dam No. 1, Virginia
(Dollars)

Installation Cost Items	Estimated Costs		
	PL-83-566 Funds[1]	Other Funds	Total
Structural measures to rehabilitate Johns Creek Dam No. 1:	$6,727,700	$3,202,300	$9,930,000
Total Project:	$6,727,700	$3,202,300	$9,930,000

Price base: February 2019 Prepared: April 2019

Table 2 - Estimated Cost Distribution – Structural Measures
Johns Creek Dam No. 1, Virginia
(Dollars)

Installation Cost Items	Installation Cost: PL-83-566 Funds[2]				Installation Cost: Other Funds[3]						Total Project Cost[4]
	Construction Costs	Engineering Technical Assistance Costs	Project Admin. Costs	Total PL-83-566 Costs	Construction Costs	Engineering Costs	Real Property Landrights	Permits	Project Admin. Costs	Total Other Funds	
Rehab. Dam No. 1:	$5,988,000	$714,700	$25,000	$6,727,700	$3,150,800	$13,500	$0	$3,000	$35,000	$3,202,300	$9,930,000
Totals:	$5,988,000	$714,700	$25,000	$6,727,700	$3,150,800	$13,500	$0	$3,000	$35,000	$3,202,300	$9,930,000

Price base: February 2019 Prepared: April, 2019

---

[1] Paid by the USDA/NRCS – the Federal agency responsible for assisting in installation of improvements.
[2] 65% of total eligible project cost (The actual federal cost/share excludes technical assistance and permit costs and cannot exceed 100% of the construction cost).
[3] 35% of total eligible project cost. Per NRCS policy, $25,000 in local sponsor planning costs were excluded from Tables 1 and 2. These sponsor costs are included in the calculation of cost/share as shown in the watershed agreement.
[4] As per the NRCS National Watershed Manual, Part 508.44, the actual federal cost/share amount will be calculated based on a total eligible project cost that excludes federal technical assistance costs, water, mineral and other resource rights, and all federal, state and local permits. However, for the purposes of planning, all of these costs are included in the benefit/cost analysis and are displayed as part of the public record of this analysis.

Table 3 – Structural Data for Rehabilitated Dam
McDaniel's Lake – Johns Creek Dam No. 1
Craig County, Virginia

Item	Unit	Structure Data
Class of structure		High
Seismic zone		2
Total drainage area	mi^2	19.1
Runoff curve no. (1-day) (AMC II)		60
Time of concentration (Tc); uncontrolled drainage area only	hours	2.5
Elevation top dam [1/]	feet	1970.5
Elevation crest auxiliary spillway	feet	1960.0
Elevation crest high stage inlet	feet	1945.7
Elevation crest low stage inlet	feet	1923.4
Auxiliary spillway type		Structural
Auxiliary spillway bottom width	feet	270
Auxiliary spillway exit slope	percent	33.3
Maximum height of dam [2/]	feet	63
Volume of fill [3/]	yd^3	382,245
Total capacity [4/]	acre-feet	2,924.8
Sediment submerged	acre-feet	209.8
Sediment aerated	acre-feet	143.9
Floodwater retarding [4/]	acre-feet	2,571.1
Between high and low stage	acre-feet	1,031.5
Surface area		
Sediment pool	acres	29.9±
Floodwater retarding pool [2/]	acres	131.0±
Top of dam (El. 1970.5 feet)	acres	173.6±
Principal spillway design		
Rainfall volume (1-day)	inches	6.49
Rainfall volume (10-day)	inches	9.8
Runoff volume (10-day)	inches	5.5
Capacity of low stage (max.) [5/]	ft^3/sec	190
Capacity of high stage (max.) [5/]	ft^3/sec	53
Dimensions of conduit	inches	42
Type of conduit		circular RCP
Frequency of operation-auxiliary spillway	percent chance	0.5
Auxiliary spillway hydrograph		Structural spillway

Item	Unit	Structure Data
Freeboard hydrograph		
Rainfall volume	inches	15.2
Runoff volume	inches	9.35
Storm duration	hours	6
Max. reservoir water surface elev. [6/]	feet	1968.1
Capacity equivalents		
Sediment volume	inches	0.2
Floodwater retarding volume	inches	2.5

[1/] All elevations are recorded in North American Vertical Datum 1988 (NAVD88).
[2/] Height of Dam measured from downstream invert of PSW conduit to top of embankment.
[3/] Volume of fill taken from as-built drawings.
[4/] Crest of auxiliary spillway.
[5/] Interpolated from original design calculations dated December 13, 1965 at elevation where the principal spillway pipe begins to control flow.
[6/] Based on routed 6-hour PMF with 270-foot-wide RCC spillway in place.

Table 4 - Average Annual National Economic Development (NED) Costs
Johns Creek Dam No. 1, Virginia
(Dollars[5])

	Average Annual Equivalent Cost	Average Annual Equivalent O&M Costs	Total Average Annual Equivalent Cost
Rehabilitation of Johns Creek Dam No. 1	$345,100	$4,700	$349,800
Totals:	$345,100	$4,700	$349,800

Price base: February 2019 Prepared: April 2019

[5] The average annual equivalents are based on a 2.875% discount rate and a 52-year period of analysis (2 years for project design/installation and 50 years of expected useful life).

Table 5 - Estimated Average Annual Flood Damage Reduction Benefits

Johns Creek Dam No. 1, Virginia
(Dollars)

Flood Damage Category	Estimated Average Annual Equivalent Damages		Damage Reduction Benefits
	Without Federal Project	With Federal Project	Average Annual Equivalents
Crops and Pasture	$43,200	$43,200	$0
Other Agricultural	$16,400	$16,400	$0
Developed (roads and bridges, utility poles, homes, other buildings and content damages)	$222,500	$222,500	$0
Erosion – floodplain scour	$23,900	$23,900	$0
Sediment – overbank deposition	24,300	24,300	$0
Other (miscellaneous indirect damages)	$19,500	$19,500	$0
Totals:	$349,800	$349,800	$0

Price base: February 2019 Prepared: April 2019

Benefits are displayed within the NRCS policy context of Future with Federal Project – Future Without Federal Project (local Sponsor rehabilitation without federal funds) = $0 net benefits;

Table 6 - Comparison of National Economic Development (NED) Benefits and Costs

Johns Creek Dam No. 1, Virginia
(Dollars)

Evaluation Unit	Average Annual Equivalent Benefits[6]		Costs	Net Change	Benefit/ Cost Ratios
	Damage Reduction Benefits	Total Average Annual Equivalent Benefits[7]	Average Annual Equivalent Costs	Net Average Annual Equivalent Benefits	
Johns Creek Dam No. 1	$349,800	$349,800	$349,800	$0	1.0 to 1.0
Totals:	$349,800	$349,800	$349,800	$0	1.0 to 1.0

Price base: February 2019 Prepared: April 2019

[6] The average annual equivalents are based on a 2.875% discount rate and a 52-year period of analysis (2 years for project design/installation and 50 years of expected useful life).

[7] The costs and benefits of the Future With Project Plan are the same as those for the Future Without Project Plan. To maintain consistency with the display in Table 4, the costs associated with the No Action Alternative are tracked as a benefit of the Preferred Alternative.

REFERENCES

Army Corps of Engineers, 2003. Engineering Manual 1110-2-1902, Slope Stability, United States Department of the Army, Washington, D.C.

Bureau of Reclamation, 1998 (Reprinted 2001). Engineering Geology Field Manual, Chapters 3 and 10. U.S. Dept. of the Interior, Washington, D.C.

Bureau of Reclamation, 2015. Design Standards No. 13, Embankment Dams, Chapter 13: Seismic Analysis and Design. U.S. Dept. of the Interior, Washington, D.C.

Bollinger, G.A. and Wheeler, Russell L., 1988. The Giles County, Virginia, Seismic Zone – Seismological Results and Geological Interpretations, Professional Paper 1355, United States Geological Survey.

Census Bureau, 2010 Census, and 2013-2017 American Community Survey Projections, U.S. Department of Commerce.

Commonwealth of Virginia, Department of Historic Resources, State Archaeological Site File, Richmond, VA.

Commonwealth of Virginia, Department of Historic Resources, State Register of Historic Sites, Richmond, VA.

Commonwealth of Virginia, Virginia Soil and Water Conservation Board. Dam Safety Impounding Structures Regulations, 4VAC50-20-10 et seq.

Crone, Anthony J. and Wheeler, Russell L., 2000. Data for Quaternary Faults, Liquefaction Features, and Possible Tectonic Features in the Central and Eastern United States, East of the Rocky Mountain Front, Open-File Report 00-260, United States Geological Survey.

Federal Emergency Management Agency, 2005. Federal Guidelines for Dam Safety, Earthquake Analyses and Design of Dams, United States Department of Homeland Security, Washington D.C.

Mitchell, James, K. and Green, Russell, 2007. Liquefaction Potential Assessment, Virginia Tech CGPR #68 – Earthquake Engineering Short Course, 2011.

National Earthquake Information Center (NEIC) Database Search Website, https://earthquake.usgs.gov/earthquakes/search/ (accessed May 2018). U.S. Geological Survey, National Earthquake Hazards Program, National Earthquake Information Center, Golden, C.O.

Natural Resources Conservation Service, 2014. Draft Seismic Analysis Manual for Dams. U.S. Dept. of Agriculture, Washington, D.C.

Natural Resources Conservation Service, 2016. Draft Technical Release TR-60, Earth Dams and Reservoirs. U.S. Dept. of Agriculture, Washington, D.C.

Natural Resources Conservation Service, 2005. Technical Release TR-60, Earth Dams and Reservoirs. U.S. Dept. of Agriculture, Washington, D.C.

Natural Resources Conservation Service, 2017. National Engineering Handbook, Part 633, Chapter 26, Gradation Design of Sand and Gravel Filters. U.S. Dept. of Agriculture, Washington, D.C.

Natural Resources Conservation Service, 2007. National Engineering Handbook, Part 628 Dams, Chapter 45, Filter Diaphragms. U.S. Dept. of Agriculture, Washington, D.C.

Natural Resources Conservation Service, 2001. National Engineering Handbook, Part 628 Dams, Chapter 52, Field Procedures Guide for the Headcut Erodibility Index. U.S. Dept. of Agriculture, Washington, D.C.

NRCS Conservation Practice Standard, Number 402, Dams.

NRCS National Engineering Handbook.

NRCS National Engineering Manual.

NRCS National Operation and Maintenance Manual.

NRCS National Planning Procedures Handbook.

NRCS Risk Evaluation Sheet, September 17, 2010.

NRCS Soil Survey of Craig County, Virginia.

NRCS Technical Release 68 – Seismic Analysis of Risers, 1982. Amendment 1, 1992 and Amendment 2, 1993.

NRCS Topographic Survey, 2014.

NRCS Water Resources Site Analysis Computer Program (SITES).

NRCS National Watershed Program Manual, 2014, as amended January 2015.

NRCS National Watershed Program Handbook, 2014.

NRCS Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/.

Soil Conservation Service, 1964. Soil Tests Memorandum for Johns Creek Site No. 1 dated July 17, 1964, Soil Mechanics Laboratory, Lincoln, Nebraska.

Soil Conservation Service, 1965. As-Built Construction Drawings of Johns Creek Dam No. 1, U.S. Dept. of Agriculture, Washington, D.C.

Tarr, Arthur C. and Wheeler, Russell L., 2006. Earthquakes in Virginia and Vicinity 1774-2006, Open-File Report 2006-1017, United States Geological Survey.

Three Oaks Engineering, 2016. Freshwater Mussel Survey Report, Johns Creek below McDaniel's Lake (Johns Creek Dam No. 1), Craig County, Virginia.

U.S. Army Corps of Engineers – Hydraulic Engineering Center (HEC). HEC-River Analysis System (HEC-RAS).

U.S. Army Corps of Engineers, 1987 Wetland Delineation Manual.

U.S. Department of the Interior, National Park Service, National Register of Historic Landmarks, Washington, DC.

U.S. Department of the Interior, National Park Service, National Register of Historic Places, Washington, DC.

U.S. Department of the Interior, National Park Service, National Registry of Natural Landmarks, Washington, DC.

U.S. Fish and Wildlife. Environmental Conservation Online System, Information for Planning and Consultation: www.ecos.fws.gov/ipac.html.

U.S. Fish and Wildlife. Wetland mapper website: www.fws.gov/wetlands/data/mapper.html.

U.S. Water Resources Council. Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. Washington, DC, March 10, 1983.

Virginia Department of Conservation and Recreation, Division of Dam Safety and Floodplain Management. Probable Maximum Precipitation Study for Virginia and Associated PMP Evaluation Tools and Database. November 2015.

Virginia Department of Environmental Quality. 2016 305(b) Virginia Water Quality Assessment Report. Richmond, Virginia.

Virginia Department of Environmental Quality. 2016 303(d) Report on Impaired Waters. Richmond, Virginia.

REPORT PREPARERS

The Johns Creek Watershed Supplemental Plan and Environmental Assessment was prepared primarily by NRCS staff located in Richmond, Virginia; Verona, Virginia; Morgantown, West Virginia; Raleigh, North Carolina; and staff from Gannett Fleming, Incorporated. The document was reviewed and concurred in by state staff specialists having responsibility for engineering, resource conservation, soils, agronomy, biology, cultural resources, economics, geology, and contract administration. The in-house review was followed by a review by the NRCS National Water Management Center and then an interagency and public review.

The table identifies and lists the experience and qualifications of those individuals who were directly responsible for providing significant input to the preparation of the Supplemental Plan-EA. Appreciation is extended to many other individuals, agencies and organizations for their input, assistance and consultation, without which this document would not have been possible.

Name	**Present Title and Years in Current Position**	**Education**	**Previous Experience**	**Other**
R. Wade Biddix	Watershed Program Specialist (ACES) – 4	M.S. Public Administration B.S. Agriculture	Assistant State Conservationist for Water Resources – 13 yrs. Supervisory District Cons. – 1.5 yrs. Planning Coordinator – 10.5 yrs. Area Resource Conservationist – 2 yrs. District Conservationist – 4 yrs. Soil Conservationist – 4 yrs.	
Rebecca M. Evans	Civil Engineering Technician – 8	B.S. Natural Resources Recreation	Civil Engineering Technician – 2.5 yrs. Conservation Specialist – 2 yrs.	
David L. Faulkner	Natural Resource Economist – 29	M.S. Ag. Economics B.S. Ag. Education	Ag. Economist (SCS) – 2.5 yrs. Ag. Economist (U.S.A.I.D.) – 4.5 yrs. Ag. Teacher (Peace Corps) – 2 yrs.	
Fred M. Garst	GIS Specialist – 25 years	B.S. Geology	GIS/Soil Scientist – 25 yrs. Soil Conservation Technician – 7 yrs. Geologist (Private) – 4 yrs.	
Jeffray Jones	State Biologist – 6	B.S. Natural Resources Management	Ecologist - 25 yrs.	
Alica J. Ketchem	Environmental Engineer – 25	B.S. Civil Engineering M.S. Agricultural Eng.	Civil Engineer – 10 yrs.	P.E. (VA)
Kim Kroeger	Geologist – 29	B.S. Soil Science B.S. Resource Management	Geologist Trainee (SCS) – 1.6 years Soil Scientist (SCS) – 0.3 years County Soil Scientist – 2 years	
Mathew J. Lyons	State Conservation Engineer – 16	B.S. Civil Engineering	Civil Engineer – 12 yrs.	P.E. (VA)
Jeffrey D. McClure	Geologist – 12.5	B.A. Geology B.A. Biology B.S. Geology	NRCS Geologist – 14 yrs. Geologist (WV Dept. of Environmental Protection) – 10 yrs. Geologist (Private) – 8.5 yrs.	CPG in VA and PA
Dana Perkins	Environmental Specialist – 3	B.S. Biology	Environ. Program Specialist (FAA) – 9 yrs. Ecologist (U.S. Army) – 2 yrs. Environ. Scientist (Consultant) – 10 yrs.	
Nora Sheehan	Archaeologist (ACES) – 1	M.A History/Historical Archaeology	Cultural Resource Management – 25 yrs.	

Name	**Present Title and Years in Current Position**	**Education**	**Previous Experience**	**Other**
A&E Consultant – Gannett Fleming, Inc.				
Paul Schweiger	Vice President and Project Principal - 35	B.S. Civil Engineering M.S. Civil Engineering		P.E. (VA), CFM
Eric Neast	Project Manager - 28	B.S. Civil Engineering		P.E. (PA)
David Snyder	Geotechnical Engineer - 14	B.S. Civil & Environmental Engineering Meng Geotechnical Engineering		P.E. (VA)
Kate Sharpe	Senior Environmental Economist - 19	B.A. English MPS Environmental Management		AICP ENVSP

DISTRIBUTION LIST

Comments were requested on the Draft Supplemental Plan – EA from the following agencies and organizations.

	Response Received on Draft Supplemental Plan-EA
Federal Agencies	
Environmental Protection Agency Region III, Philadelphia	No
U.S. Army Corps of Engineers Roanoke Field Office	No
U.S. Department of the Interior Fish and Wildlife Service Gloucester, Virginia Office	No
Federal Emergency Management Agency Philadelphia	No
U.S. Department of Agriculture	
Farm Service Agency	No
Rural Development	No
U.S. Forest Service Roanoke, Virginia Office	No
Virginia State Agencies	
Virginia Department of Environmental Quality Office of Environmental Impact Review (State Clearinghouse)	Yes
Virginia Department of Conservation and Recreation	Yes
Virginia Marine Resources Commission	Yes
Virginia Department of Game and Inland Fisheries	Yes
Virginia Department of Historic Resources	No
Virginia Department of Forestry	No

	Response Received on Draft Supplemental Plan-EA
Virginia Department of Transportation	No
Virginia Department of Health	Yes
Other	
Virginia Association of Soil and Water Conservation Districts	No
Mountain Castles Soil and Water Conservation District	Yes
Craig County Board of Supervisors	Yes
Roanoke Valley-Alleghany Regional Planning Commission	Yes

APPENDIX A

LETTERS OF COMMENT AND NRCS RESPONSES TO COMMENTS RECEIVED ON DRAFT SUPPLEMENTAL PLAN – EA

Mountain Castles Soil & Water Conservation District
Serving Botetourt and Craig Counties
36 Executive Circle, Suite 1, Roanoke, VA 24012
(540) 400-0707
Email: mountaincastlesswcd@gmail.com

We work with the people who work the land.

July 9, 2019

To: Mr. John Bricker
State Conservationist
U.S.D.A. Natural Resources Conservation Service
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229

From: Jeffrey W. Henderson
Chairman
Mountain Castles Soil and Water Conservation District Board of Directors

Re: 'Letter of comments' regarding the June 2019 "DRAFT Supplemental Watershed Plan No.2 and Environmental Assessment" for the rehabilitation of Johns Creek Dam #1 (McDaniel's Lake) located in Craig County, Virginia

Dear Mr. Bricker,

This letter is in response to your June 5, 2019 cover letter sent to me that accompanied a copy of the "DRAFT Supplemental Watershed Plan No.2 and Environmental Assessment for the Rehabilitation of Floodwater Retarding Structure No. 1 (McDaniel's Lake) of the Johns Creek Watershed, Craig County, Virginia". This letter also requested that our comments on the DRAFT Plan be received by your office on or before July 12, 2019.

After reviewing this "DRAFT Plan and Environmental Assessment", the Mountain Castles SWCD Board of Directors offers the following comments:

* On behalf of myself and the entire MCSWCD Board of Directors, I want to begin by first thanking you and the numerous NRCS employees who have worked diligently over the last several years on the preliminary stages of the Johns Creek Dam #1 rehabilitation process. We all recognize that this entire complicated and time consuming process would not be where it is today without their many, many hours of dedication and hard work. We especially appreciate the continuing efforts of Wade Biddix, Watershed Program Specialist in your office, for his assistance to our District staff involved in the rehabilitation process.

* The Mountain Castles SWCD Board of Directors and the Craig County Board of Supervisors are the two "Co-Sponsors" of all four of the Johns Creek flood control dams have each agreed with the NRCS' preferred "Rehabilitation Alternative #4", which Alternative will include federal financial assistance and will consist of a 270 foot–wide RCC spillway on the embankment along with a 4-foot embankment raise. This alternative is the "National Economic Development (NED) Alternative" and is defined as the federally assisted alternative with the greatest net economic

Mountain Castles Soil & Water Conservation District
Serving Botetourt and Craig Counties
36 Executive Circle, Suite 1, Roanoke, VA 24012
(540) 400-0707
Email: mountaincastlesswcd@gmail.com

We work with the people who work the land.

benefits. In addition, it is the most locally acceptable alternative and best serves the "Co-Sponsors" in achieving the needs and purpose of this rehabilitation.

*The Mountain Castles SWCD staff has provided local assistance to the NRCS throughout the initial "Planning Phase" of the Dam #1 process including participation and assistance with all of the public meetings listed on Page 62 of the "DRAFT Plan and Environmental Assessment". We intend to continue assisting the NRCS as needed during both the upcoming "Design Phase" and as well as the final "Construction Phase".

* Finally, the Mountain Castles SWCD Board of Directors fully realizes that the Dam #1 rehabilitation process has and will continue to represent a substantial investment of taxpayer-based funding, specialized professional expertise, and time, as we continue working towards the completion of the process.

Thanks again for your agency's and your employee's continued assistance and support.

Sincerely,

Jeffrey W. Henderson
Chairman
Mountain Castles Soil and Water Conservation District Board of Directors

Cc: Wade Biddix, NRCS Watershed Program Specialist, Richmond, VA
Bill Keith, NRCS District Conservationist, Bonsack, VA

USDA

United States Department of Agriculture

July 16, 2019

Mr. Jeffrey W. Henderson, Chairman
Mountain Castles Soil and Water Conservation District
36 Executive Circle, Suite 1
Roanoke, Virginia 24012

Re: Draft Supplemental Watershed Plan-Environmental Assessment (EA) for the Rehabilitation of Johns Creek Dam No. 1 (McDaniel's Lake), Craig County, Virginia

Dear Mr. Henderson:

Thank you for your timely response to the referenced Draft Plan/EA submitted to your office for review. We appreciate the excellent partnership we have with the Mountain Castles Soil and Water Conservation District on this project. The assistance of Mr. Marlon Old during the many watershed site visits and public participation activities has been invaluable during the development of this watershed plan. We appreciate the time and effort needed to review the Draft Plan/EA.

If questions or concerns arise as the project proceeds to design and construction, please direct them to David Kriz, Assistant State Conservationist for Water Resource Operations, at David.Kriz@va.usda.gov or by phone at 804-287-1646.

Sincerely,

JOHN A. BRICKER
State Conservationist

cc: Bill Keith, District Conservationist, NRCS, Bonsack, VA
Robert Williams, ASTC (Field Operations), NRCS, Christiansburg, VA
David Kriz, ASTC (Water Resource Operations), NRCS, Richmond, VA

NATURAL RESOURCES CONSERVATION SERVICE
1606 Santa Rosa Road, Suite 209 ♦ Richmond, Virginia 23229
Phone: (804) 287-1691 ♦ Fax: (855) 627-9827

COUNTY OF CRAIG
P.O. Box 308
New Castle, Virginia 24127
540-864-5010 Phone

July 10, 2019

Mr. John Bricker
State Conservationist
USDA Natural Resources Conservation Service
1606 Santa Rosa, Suite 209
Richmond, VA 23229

Re: Comments regarding June 2019 "DRAFT Supplemental Watershed Plan No.2 and Environmental Assessment" for the rehabilitation of Johns Creek Dam #1 (McDaniel's Lake), Craig County, VA.

Mr. Bricker,

Thank you for the diligent work over the past few years in developing the "DRAFT Supplemental Watershed Plan No.2 and Environmental Assessment". Wade Biddix, Watershed Program Specialist, and his staff were instrumental in the development of the "Plan". It was a pleasure working with Mr. Biddix and his staff.

The Board of Supervisors agree with the Mountain Castles SWCD Board with the selection of Alternative #4 as the most appropriate and cost-effective choice. This alternative also appears to be the most acceptable with the Citizens of Craig County.

The Board realizes that the Dam #1 rehabilitation project is a substantial investment of Federal funds. As the project moves forward, we will request matching funds from the Commonwealth of Virginia. As mentioned in previous correspondence, Craig County is not able to provide County funds.

Proposed Edit - From Page 69 of the Draft Report, the 7th Bullet reads:

- Provide nonfederal funds for cost-sharing of the project at a rate equal to, or greater than, 35% of the total eligible project costs.

It has been the County's position, since the beginning of the preparation of this plan, that no county funds will be provided. However, the County has stated repeatedly that it will make every effort to secure State funding for any future improvements. Given our position, the 7th bullet should read:

- Provide nonfederal funds from the Commonwealth of Virginia or other sources, for cost-sharing of the project at a rate equal to, or greater than, 35% of the total eligible project costs.

The Craig County Board of Supervisors at their July 3rd, 2019 meeting reviewed, and with the suggested change to the 7th bullet on page 69, accepted the "Draft" plan for Johns Creek Dam #1.

Thank you again for your agency's continued assistance with this important project.

Sincerely,

Jesse Spence, Chairman
Craig County
Board of Supervisors

Cc: Craig County Board of Supervisors, New Castle, VA
Jeffery W. Henderson, Chairman, MCSCD Board of Directors
Wade Biddix, NRCS Watershed Program Specialist, Richmond, VA
Bill Keith, NRCS District Conservationist, Bonsack, VA

USDA

United States Department of Agriculture

July 16, 2019

Mr. Jesse Spence, Chairman
Craig County Board of Supervisors
P.O. Box 308
New Castle, Virginia 24127

Re: Draft Supplemental Watershed Plan-Environmental Assessment (EA) for the Rehabilitation of Johns Creek Dam No. 1 (McDaniel's Lake), Craig County, Virginia

Dear Mr. Spence:

Thank you for your timely response to the referenced Draft Plan-EA submitted to your office for review. We appreciate the partnership we have with Craig County and the Mountain Castles Soil and Water Conservation District on this project. Together we have produced a quality plan for rehabilitation of the Johns Creek Dam No. 1.

We appreciate the time and effort needed to review the Draft Plan/EA. We will make your proposed edit in the Final Plan-EA.

The NRCS Planning Team is working to finish the Final Plan-EA and have it available for the Sponsors approval and signatures during their August board meetings. Once the Sponsors have signed the Plan, the NRCS State Conservationist will sign it, and then it will be sent to Washington, D.C. for authorization by the NRCS Chief. Once authorized, the project can then move forward to the design phase.

If questions or concerns arise as the project proceeds to design and construction, please direct them to David Kriz, Assistant State Conservationist for Water Resource Operations, at David.Kriz@va.usda.gov or by phone at 804-287-1646.

Sincerely,

JOHN A. BRICKER
State Conservationist

cc: Bill Keith, District Conservationist, NRCS, Bonsack, VA
Robert Williams, ASTC (Field Operations), NRCS, Christiansburg, VA
David Kriz, ASTC (Water Resource Operations), NRCS, Richmond, VA

NATURAL RESOURCES CONSERVATION SERVICE
1606 Santa Rosa Road, Suite 209 ♦ Richmond, Virginia 23229
Phone: (804) 287-1691 ♦ Fax: (855) 627-9827

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 1111 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
www.deq.virginia.gov

Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

July 10, 2019

Mr. John A. Bricker
Natural Resources Conservation Service
U.S. Department of Agriculture
1606 Santa Rosa Road, Suite 209
Richmond, Virginia 23229

RE: Draft Supplemental Watershed Plan No. 2 and Environmental Assessment for the Rehabilitation of Floodwater Retarding Structure No. 1 (McDaniel's Lake) of the Johns Creek Watershed, Craig County, (DEQ 19-056F).

Dear Mr. Bricker:

The Commonwealth of Virginia has completed its review of the June 2019 Draft Supplemental Watershed Plan (SWP) No. 2 and Environmental Assessment (EA) (received June 5, 2019) for the above referenced project. The Department of Environmental Quality is responsible for coordinating Virginia's review of federal environmental documents and responding to appropriate federal officials on behalf of the Commonwealth. DEQ is also responsible for coordinating Virginia's review of federal consistency documents submitted pursuant to the Coastal Zone Management Act (CZMA) and providing the state's response. The following agencies and planning district commission participated in the review of this proposal:

Department of Environmental Quality
Department of Game and Inland Fisheries
Department of Conservation and Recreation
Marine Resources Commission
Department of Health
Roanoke Valley-Alleghany Regional Commission

In addition, the Department of Historic Resources and Craig County were invited to comment on the proposal.

PROJECT DESCRIPTION

The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), Craig County, and the Mountain Castles Soil and Water Conservation District

(project sponsors) propose to make improvements to the floodwater retarding structure (dam) No. 1 at McDaniel's Lake in the Johns Creek watershed in Craig County. Johns Creek Dam No. 1, McDaniel's Lake, does not presently meet Virginia Division of Dam Safety or NRCS standards for the capacity, stability, or integrity of a vegetated earth auxiliary spillway. In addition, the footer of the principal spillway riser does not meet NRCS seismic stability criteria. The preferred plan is to rehabilitate Johns Creek Dam No. 1 to meet current NRCS and Virginia Division of Dam Safety criteria. The plan is to construct a 270-foot-wide, roller-compacted concrete chute spillway over the top of the dam and raise the top of dam by 4 feet; close the existing vegetated earth auxiliary spillway with an earthen berm; replace the riser and footer; flatten the downstream slope of the embankment to 3:1 and install a chimney drain; replace the toe drains; and move the riprap-lined plunge pool downstream about 32 feet. For events equal to or smaller than the 200-year, 24-hour flood event, there will be no change in the current levels of flood protection downstream because of project activity.

CONCLUSION

Provided activities are performed in accordance with the recommendations which follow in the Impacts and Mitigation section of this report, this proposal is unlikely to have significant effects on ambient air quality, important farmland, forest resources, historic resources, water quality and wetlands. It is unlikely to adversely affect species of plants or insects listed by state agencies as rare, threatened, or endangered.

ENVIRONMENTAL IMPACTS AND MITIGATION

1. Water Quality and Wetlands. According to the SWP/EA (page 53), there will be a temporary impact on downstream water quality due to a sediment release when the water is drawn down prior to construction. With the required erosion and sediment control measures in place, there should be minimal impacts on water quality during construction.

The SWP/EA (pages 53-54) states that the reservoir will be temporarily drained to allow construction. There will be a temporary impact to 24.2 acres of freshwater forested/shrub wetlands, 2.0 acres of emergent wetlands, and 32.1 acres of open water. Construction of the auxiliary spillway, chimney drain, auxiliary spillway, and toe drains, and relocation of the plunge pool may result in the permanent loss of up to 1.7 acres of the 2.5 acres of freshwater forested/shrub wetlands downstream of the embankment. There may be temporary impacts to the remaining 0.8 acres.

1(a) Agency Jurisdiction. The State Water Control Board promulgates Virginia's water regulations covering a variety of permits to include the Virginia Pollutant Discharge Elimination System Permit regulating point source discharges to surface waters, Virginia Pollution Abatement Permit regulating sewage sludge, storage and land application of biosolids, industrial wastes (sludge and wastewater), municipal wastewater, and animal wastes, the Surface and Groundwater Withdrawal Permit, and the Virginia Water

Protection (VWP) Permit regulating impacts to streams, wetlands, and other surface waters. The VWP permit is a state permit which governs wetlands, surface water, and surface water withdrawals and impoundments. It also serves as §401 certification of the federal Clean Water Act §404 permits for dredge and fill activities in waters of the U.S. The VWP Permit Program is under the Office of Wetlands and Stream Protection, within the DEQ Division of Water Permitting. In addition to central office staff that review and issue VWP permits for transportation and water withdrawal projects, the six DEQ regional offices perform permit application reviews and issue permits for the covered activities:

- Clean Water Act, §401;
- Section 404(b)(i) Guidelines Mitigation Memorandum of Agreement (2/90);
- State Water Control Law, Virginia Code section 62.1-44.15:20 *et seq.*; and
- State Water Control *Regulations*, 9 VAC 25-210-10.

1(b) Agency Findings. DEQ-BRRO finds that since impacts to wetlands are anticipated, a VWP Permit may be required.

1(c) Recommendations. In general, DEQ recommends that stream and wetland impacts be avoided to the maximum extent practicable. To minimize unavoidable impacts to wetlands and waterways, DEQ recommends the following practices:

- Operate machinery and construction vehicles outside of stream-beds and wetlands; use synthetic mats when in-stream work is unavoidable.
- Preserve the top 12 inches of trench material removed from wetlands for use as wetland seed and root-stock in the excavated area.
- Erosion and sedimentation controls should be designed in accordance with the most current edition of the Virginia Erosion and Sediment Control Handbook. These controls should be in place prior to clearing and grading, and maintained in good working order to minimize impacts to State waters. The controls should remain in place until the area is stabilized.
- Place heavy equipment, located in temporarily impacted wetland areas, on mats, geotextile fabric, or use other suitable measures to minimize soil disturbance, to the maximum extent practicable.
- Restore all temporarily disturbed wetland areas to pre-construction conditions and plant or seed with appropriate wetlands vegetation in accordance with the cover type (emergent, scrub-shrub, or forested). The applicant should take all appropriate measures to promote revegetation of these areas. Stabilization and restoration efforts should occur immediately after the temporary disturbance of each wetland area instead of waiting until the entire project has been completed.
- Place all materials which are temporarily stockpiled in wetlands, designated for use for the immediate stabilization of wetlands, on mats, geotextile fabric in order to prevent entry in State waters. These materials should be managed in a manner that prevents leachates from entering state waters and must be entirely

removed within thirty days following completion of that construction activity. The disturbed areas should be returned to their original contours, stabilized within thirty days following removal of the stockpile, and restored to the original vegetated state.

- All non-impacted surface waters within the project or right-of-way limits that are within 50 feet of any clearing, grading, or filling activities should be clearly flagged or marked for the life of the construction activity within that area. The project proponent should notify all contractors that these marked areas are surface waters where no activities are to occur.
- Measures should be employed to prevent spills of fuels or lubricants into state waters.

1(d) Requirements. The project sponsors must submit a Joint Permit Application (JPA) to the Virginia Marine Resources Commission (VMRC), which serves as the clearinghouse for permits issued by VMRC, DEQ, U.S. Army Corps of Engineers, and local wetlands boards. Upon receipt of a JPA for the proposed surface water impacts, DEQ VWP Permit staff will review the proposed project in accordance with program regulations and current guidance.

2. State Subaqueous Lands. The SWP/EA (page 67) states that, prior to construction, the project sponsors will be responsible for obtaining subaqueous lands permits from the Virginia Marine Resources Commission.

2(a) Agency Jurisdiction. The Virginia Marine Resources Commission (VMRC) regulates encroachments in, on or over state-owned subaqueous beds as well as tidal wetlands pursuant to Virginia Code §28.2-1200 through 1400. For nontidal waterways, VMRC states that it has been the policy of the Habitat Management Division to exert jurisdiction only over the beds of perennial streams where the upstream drainage area is 5 square miles or greater. The beds of such waterways are considered public below the ordinary high water line.

2(b) Agency Findings. VMRC finds that the proposed project may be within its jurisdictional areas and may require a permit from the agency.

2(c) Requirements. Prior to commencing any instream construction activities, the project sponsors must submit a JPA to VMRC. As noted above, VMRC acts as the clearinghouse for the JPA review project and will forward the application to the Corps and DEQ for their concurrent reviews. Should project plans change to include any further disturbances to the stream bed, additional permitting may be required from VMRC.

3. Dam Safety and Floodplain Management. According to the SWP/EA (page 54) the Johns Creek floodplain is managed by Craig County through its local floodplain ordinance, which imposes zoning restrictions within the flood zones that is consistent with Federal Emergency Management Agency and state regulations. The document

states that the rehabilitation of the Johns Creek 1 dam will be done in accordance with all necessary requirements and restrictions. The existing 200-year level of downstream flood protection will be maintained. Existing floodplain management zoning restrictions will not be changed. The upstream floodpool will increase by 15.7 acres. A land use ordinance will restrict future development on all the land below the elevation of the new top of dam.

3(a) Agency Jurisdiction. The DCR Division of Dam Safety and Floodplain Management (DSFM) is the lead coordinating agency for the Commonwealth's floodplain management program and the National Flood Insurance Program (Executive Memorandum 2-97). Pursuant to §10.1-603 of the Virginia Code and in accordance with 44 CFR section 60.12 of the National Flood Insurance Program Regulations for Floodplain Management and Flood Hazard Identification, all construction or land-disturbing activities initiated by an agency of the Commonwealth, or by its contractor, in floodplains shall be submitted to the locality and comply with the locally adopted floodplain management ordinance. The Dam Safety program was established to provide proper and safe design, construction, operation and maintenance of dams to protect public safety. Authority is bestowed upon the program according to *The Virginia Dam Safety Act*, Article 2, Chapter 6, Title 10.1 (10.1-604 *et seq.*) of the Code of Virginia and Dam Safety Impounding Structure Regulations (Dam Safety Regulations), established and published by the Virginia Soil and Water Conservation Board (VSWCB).

3(b) Agency Findings.

(i) Proposed Construction Staging Area

The DCR Dam Safety program staff notes that a construction staging area is proposed to be located within the defined emergency spillway. A berm would be placed across the existing emergency spillway once the project is completed to take it out of service. The Dam Safety program finds that the proposed staging area has the potential to create flow-related blockages during large scale storm events before stabilization of the berm has occurred. This could result in large scale damage to the dam and emergency spillway areas.

(ii) Wet Sediment Below Normal Pool

According to DCR Dam Safety, the results of a bathymetric survey table in the EA (APPENDIX D, page D-3) show that approximately 37.4 acre-feet of sediment was found below normal pool. It appears, based on table footnotes, that the surveyed wet sediment volume was discarded and a lower volume number for normal pool (wet volume) was utilized for the weir/top of dam elevation raise calculations. While DCR Dam Safety appreciates the detailed volumetric calculation through a bathymetric survey, the existing sedimentation found within the lake's wet volume (wet sedimentation) cannot be discounted from the overall total volume behind the

impoundment as wet sediment (liquid state) can be still considered "flowable" when conducting dam based flowable calculations. This means the total volume to the top of the dam is considered a combination of the flowable sediment (liquid state), permanent water volume (up to normal pool), and the total dry storage to the top of dam (TOD). The total storage volume TOD for the dam should be approximately 2,962 acre-feet, based on the table on page D-3.

(iii) National Flood Insurance Program

According to the DCR Floodplain Management Program staff, the National Flood Insurance Program (NFIP) is administered by the Federal Emergency Management Agency (FEMA). Communities that elect to participate in this voluntary program manage and enforce the program on the local level through adoption of a local floodplain ordinance. The floodplain ordinance must comply with the minimum standards of the NFIP, outlined in 44 CFR 60.3. However, localities may adopt more restrictive requirements in their floodplain ordinances, such as regulating the 0.2% annual chance flood zone (shaded X Zone).

DCR Floodplain Management finds that the project appears to be located in an area of minimal flood risk (unshaded X Zone) on the community's Flood Insurance Rate Map (FIRM) Panel (51045C0175B, 4/2/09). An unshaded X Zone is not considered part of the Special Flood Hazard Area (SFHA).

3(c) Recommendations.

(i) Proposed Construction Staging Area

DCR Dam Safety recommends that the construction staging area be relocated outside of the defined emergency spillway area (both upstream and downstream).

(ii) Wet Sediment Below Normal Pool

DCR Dam Safety recommends the reevaluation of the proposed design to ensure the combination of the proposed weir/raising of TOD can safely pass the revised volume during a PMF level event (not overtop).

3(d) Requirements.

(i) DCR Dam Safety Program

Before commencing any type of dam related alteration and/or construction activities the applicant must complete form DCR199-101, *Design Report for the Construction or Alteration of Virginia Regulated Impounding Structures*, including all necessary attachments referenced in the document. If the application is satisfactory, DCR Dam Safety will issue an Alteration Permit to begin dam-related alteration and/or construction

activities.

Once the alteration of the dam has been completed, DCR Dam Safety will require copies of Professional Engineer sealed As-Built Plans and form DCR199-100, *Record Report for Virginia Regulated Impounding Structures*.

The applicant will need an Emergency Action Plan (EAP) to include a Temporary EAP for the duration of construction.

The applicant should ensure that all other applicable federal, state, and local permits have been obtained prior to completing any dam related alterations and/or construction activities.

(ii) DCR Floodplain Management Program

All development within a SFHA or floodplain, as shown on the locality's FIRM, must be permitted and comply with the requirements of the local floodplain ordinance. Projects conducted by federal agencies within the SFHA must comply with Executive Order 11988: Floodplain Management.

DCR's Floodplain Management Program does not have regulatory authority for projects in the SFHA. The applicant/developer should coordinate with the Craig County floodplain administrator to comply with the local floodplain ordinance.

4. Erosion and Sediment Control and Stormwater Management. According to the SWP/EA (page 67), the successful contractor will be required to obtain a construction general permit and an erosion and sediment control permit. The construction general permit would require the operator to implement a site-specific stormwater pollution prevention plan (SWPP).

4(a) Agency Jurisdiction. The DEQ Office of Stormwater Management (OSWM) administers the following laws and regulations governing construction activities:

- Virginia Erosion and Sediment Control Law (§ 62.1-44.15:51 *et seq.*) and *Regulations* (*VESCL&R*) (9 VAC 25-840);
- Virginia Stormwater Management Act (§ 62.1-44.15:24 *et seq.*);
- *Virginia Stormwater Management Program* (*VSMP*) *Regulation* (9 VAC 25-870); and
- 2014 General Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater from Construction Activities (9 VAC 25-880).

In addition, DEQ is responsible for the Virginia Stormwater Management Program (VSMP) General Permit for Stormwater Discharges from Construction Activities related to Municipal Separate Storm Sewer Systems (MS4s) and construction activities for the

control of stormwater discharges from MS4s and land disturbing activities under the Virginia Stormwater Management Program (9 VAC 25-890-40).

4(b) Requirements.

(i) Erosion and Sediment Control and Stormwater Management Plans

According to DEQ-OSWM, the applicant and its authorized agents conducting regulated land-disturbing activities on private and public lands in the state must comply with *VESCL&R* and Virginia Stormwater Management Law and Regulations (*VSWML&R*), including coverage under the general permit for stormwater discharge from construction activities, and other applicable federal nonpoint source pollution mandates (e.g. Clean Water Act-Section 313, federal consistency under the Coastal Zone Management Act). Clearing and grading activities, installation of staging areas, parking lots, roads, buildings, utilities, borrow areas, soil stockpiles, and related land-disturbing activities that result in the total land disturbance of equal to or greater than 10,000 square feet would be regulated by *VESCL&R.* Accordingly, the applicant must prepare and implement an erosion and sediment control (ESC) plan to ensure compliance with state law and regulations. Land-disturbing activities that result in the total land disturbance of equal to or greater than 1 acre would be regulated by *VSWML&R.* Accordingly, the applicant must prepare and implement a Stormwater Management (SWM) plan to ensure compliance with state law and regulations. The ESC/SWM plan is submitted to DEQ-BRRO for review for compliance. The applicant is ultimately responsible for achieving project compliance through oversight of on-site contractors, regular field inspection, prompt action against noncompliant sites, and other mechanisms consistent with agency policy. [Reference: VESCL 62.1-44.15 *et seq.*]

(ii) Virginia Stormwater Management Program General Permit for Discharges of Stormwater from Construction Activities (VAR10)

The owner or operator of projects involving land-disturbing activities of equal to or greater than 1 acre is required to register for coverage under the General Permit for Discharges of Stormwater from Construction Activities and develop a project-specific Stormwater Pollution Prevention Plan. Construction activities requiring registration also include land disturbance of less than one acre of total land area that is part of a larger common plan of development or sale if the larger common plan of development will collectively disturb equal to or greater than one acre. The SWPPP must be prepared prior to submission of the registration statement for coverage under the general permit and the SWPPP must address water quality and quantity in accordance with the *VSMP Permit Regulations.* General information and registration forms for the General Permit are available at: http://www.deq.virginia.gov/Programs/Water/StormwaterManagement/VSMPPermits/ConstructionGeneralPermit.aspx. [Reference: Virginia Stormwater Management Act 62.1-44.15 *et seq.*; VSMP Permit Regulations 9 VAC 25-880 *et seq.*]

5. Air Pollution Control. According to the SWP/EA (page 55), particulate matter will increase during construction. A mobile concrete batch plant will be used that will generate dust. In addition, the open burning of vegetative debris usually occurs. Required permits will be obtained by the contractor. Air pollution abatement actions will mitigate any potential temporary air quality concerns during construction and is not expected to violate any federal, state, or local air quality standards.

5(a) Agency Jurisdiction. The DEQ Air Division, on behalf of the State Air Pollution Control Board, is responsible for developing regulations that implement Virginia's Air Pollution Control Law (Virginia Code §10.1-1300 *et seq.*). DEQ is charged with carrying out mandates of the state law and related regulations as well as Virginia's federal obligations under the Clean Air Act as amended in 1990. The objective is to protect and enhance public health and quality of life through control and mitigation of air pollution. The division ensures the safety and quality of air in Virginia by monitoring and analyzing air quality data, regulating sources of air pollution, and working with local, state and federal agencies to plan and implement strategies to protect Virginia's air quality. The appropriate DEQ regional office is directly responsible for the issuance of necessary permits to construct and operate all stationary sources in the region as well as monitoring emissions from these sources for compliance. As a part of this mandate, EIRs of projects to be undertaken in the state are also reviewed. In the case of certain projects, additional evaluation and demonstration must be made under the general conformity provisions of state and federal law.

The Air Division regulates emissions of air pollutants from industries and facilities and implements programs designed to ensure that Virginia meets national air quality standards. The most common regulations associated with major State projects are:

- Open burning: 9 VAC 5-130 *et seq.*
- Fugitive dust control: 9 VAC 5-50-60 *et seq.*
- Permits for fuel-burning equipment: 9 VAC 5-80-1100 *et seq.*

5(b) Agency Findings. According to the DEQ Air Division, the project site is located in an ozone attainment area.

5(c) Recommendation. The applicant should take all reasonable precautions to limit emissions of oxides of nitrogen (NO_x) and volatile organic compounds (VOCs), principally by controlling or limiting the burning of fossil fuels.

5(d) Requirements.

(i) Fugitive Dust

Fugitive dust must be kept to a minimum by using control methods outlined in 9 VAC 5-50-60 *et seq.* of the *Regulations for the Control and Abatement of Air Pollution*. These precautions include, but are not limited to, the following:

- Use, where possible, of water or chemicals for dust control;
- Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials;
- Covering of open equipment for conveying materials; and
- Prompt removal of spilled or tracked dirt or other materials from paved streets and removal of dried sediments resulting from soil erosion.

(ii) Open Burning

If project activities include the open burning or use of special incineration devices for the disposal of land clearing debris, this activity must meet the requirements of 9 VAC 5-130-10 through 9 VAC 5-130-60 and 9 VAC 5-130-100of the *Regulations* for open burning, and it may require a permit. The *Regulations* provide for, but do not require, the local adoption of a model ordinance concerning open burning. The project sponsors should contact Craig County fire officials to determine what local requirements, if any, exist.

(iii) Fuel-Burning Equipment

The installation, operation or modification of stationary or portable fuel burning equipment (e.g., generators, wood chippers/grinders, boilers, etc.) or other sources of air pollutants may be subject to registration and/or air permitting requirements (http://www.deq.virginia.gov/Programs/Air/PermittingCompliance/Permitting/TypesofAirPermits.aspx).

6. Solid and Hazardous Wastes and Hazardous Management. The SWP/EA does not discuss solid and hazardous waste issues and their management.

6(a) Agency Jurisdiction. On behalf of the Virginia Waste Management Board, the DEQ Division of Land Protection and Revitalization (DEQ-DLPR) is responsible for carrying out the mandates of the Virginia Waste Management Act (Virginia Code §10.1-1400 *et seq.*), as well as meeting Virginia's federal obligations under the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response Compensation Liability Act (CERCLA), commonly known as Superfund.

Virginia:

- Virginia Waste Management Act, Virginia Code § 10.1-1400 *et seq.*
- *Virginia Solid Waste Management Regulations*, 9 VAC 20-81 (9 VAC 20-81-620 applies to asbestos-containing materials).
- *Virginia Hazardous Waste Management Regulations*, 9 VAC 20-60 (9 VAC 20-60-261 applies to lead-based paints).

- *Virginia Regulations for the Transportation of Hazardous Materials*, 9 VAC 20-110.

Federal:

- Resource Conservation and Recovery Act, 42 U.S. Code sections 6901 *et seq.*
- U.S. Department of Transportation *Rules for Transportation of Hazardous Materials*, 49 *Code of Federal Regulations*, Part 107
- Applicable rules contained in Title 40, *Code of Federal Regulations*.

DEQ-DLPR also administers laws and regulations on behalf of the State Water Control Board governing Petroleum Storage Tanks (Virginia Code §62.1-44.34:8 *et seq.*), including Aboveground Storage Tanks (9 VAC 25-91 *et seq.*) and Underground Storage Tanks (9 VAC 25-580 *et seq.* and 9 VAC 25-580-370 *et seq.*), also known as 'Virginia Tank Regulations', and § 62.1-44.34:14 *et seq.* which covers oil spills.

6(b) Agency Findings. DEQ-DLPR staff conducted a search of solid and hazardous waste databases (including petroleum releases) in the project area (1,000-foot radius) and did not identify any waste sites in close proximity which might impact the project.

6(c) Requirement. Any soil that is suspected of contamination or wastes that are generated during construction must be tested and disposed of in accordance with applicable federal, state, and local laws and regulations. All construction waste must be characterized in accordance with the *Virginia Hazardous Waste Management Regulations* prior to management at an appropriate facility.

6(d) Recommendations. DEQ-DLPR recommends the implementation of pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All generation of hazardous wastes should be minimized and handled appropriately.

For questions or further information regarding waste comments, contact DEQ-DLPR, Carlos Martinez at (804) 698-4575 or carlos.martinez@deq.virginia.gov.

7. Pesticides and Herbicides. DEQ recommends that the use of herbicides or pesticides for construction or landscape maintenance should be in accordance with the principles of integrated pest management. The least toxic pesticides that are effective in controlling the target species should be used. Contact the Department of Agriculture and Consumer Services at (804) 786-3501 for more information.

8. Natural Heritage Resources. According to the SWP/EA (page 16), a January 2019 search of the Virginia Natural Heritage Program's Rare Species and Natural Community database identified the Small whorled pogonia in the project area.

8(a) Agency Jurisdiction.

(i) The Virginia Department of Conservation and Recreation (DCR) Division of Natural Heritage (DNH)

DNH's mission is conserving Virginia's biodiversity through inventory, protection and stewardship. The Virginia Natural Area Preserves Act (Virginia Code §10.1-209 through 217), authorizes DCR to maintain a statewide database for conservation planning and project review, protect land for the conservation of biodiversity, and the protect and ecologically manage the natural heritage resources of Virginia (the habitats of rare, threatened and endangered species, significant natural communities, geologic sites, and other natural features).

(ii) Virginia Department of Agriculture and Consumer Services (VDACS)

The Endangered Plant and Insect Species Act of 1979 (Virginia Code Chapter 39 §3.1-1020 through 1030) authorizes VDACS to conserve, protect and manage endangered and threatened species of plants and insects. Under a Memorandum of Agreement established between VDACS and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species.

8(b) Agency Findings.

(i) James Spinymussel

According to DCR-DNH, the potential may exist for the James spinymussel (*Pleurobema collina*, G1/S1/LE/LE) to occur in Johns Creek within the project area. Threats to the James spinymussel include competition with the exotic clam (*Corbicula fluminea)*, erosion and sedimentation from logging, road construction, and livestock grazing, sewage effluent, and water quality degradation (Neves, 1991). Please note that this species is currently classified as endangered by the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (DGIF).

(ii) State-listed Plant and Insect Species

DCR-DNH finds that the activity will not affect any documented state-listed plants or insects at the site.

(iii) State Natural Area Preserves

DCR files do not indicate the presence of any State Natural Area Preserves under the agency's jurisdiction in the project vicinity.

(iv) Bats

DCR-DNH finds that there is the potential for the little brown bat (*Myotis lucifugus),* tricolored bat (*Perimyotis subflavus)* and the Northern Long-eared bat (*Myotis septentrionalis,* G1G2/S1S3/LT/LT) to occur within the project area.

8(c) Recommendation.

(i) James Spinymussel

DCR recommends the applicant coordinate with the USFWS and DGIF on a survey of the mussel population and the preparation of a work plan to minimize adverse impacts to the aquatic ecosystems as a result of the proposed activities.

(ii) Bats

DCR recommends coordination with the USFWS on the potential presence of the little brown bat, tricolored bat, and the Northern Long-eared bat in the project area.

(iii) Natural Heritage Resources

Contact DCR-DNH to secure updated information on natural heritage resources if the scope of the project changes or six months pass before the project is implemented, since new and updated information is continually added to the Biotics Data System.

9. Wildlife Resources and Protected Species. According to the SWP/EA (page 15), the NRCS performed a search in February 2019 of the DGIF Virginia Fish and Wildlife Information Service (VAFWIS) database to identify species that may be present in the affected environment for the proposed action. The results of the search indicated the potential presence of a number of state-listed animal species. State agency feedback will be incorporated in the Final EA, including assessment of habitat presence for each species, documented presence within the affected environment, specific species best management practice recommendations, and any time of year restrictions applicable to specific construction activities.

9(a) Agency Jurisdiction. The Virginia Department of Game and Inland Fisheries (DGIF), as the Commonwealth's wildlife and freshwater fish management agency, exercises enforcement and regulatory jurisdiction over wildlife and freshwater fish, including state- or federally-listed endangered or threatened species, but excluding listed insects (Virginia Code, Title 29.1). DGIF is a consulting agency under the U.S. Fish and Wildlife Coordination Act (16 U.S. Code §661 *et seq.*) and provides environmental analysis of projects or permit applications coordinated through DEQ and several other state and federal agencies. DGIF determines likely impacts upon fish and wildlife resources and habitat, and recommends appropriate measures to avoid, reduce

or compensate for those impacts. For more information, see the DGIF website at www.dgif.virginia.gov.

9(b) Agency Findings.

(i) James Spinymussel and Yellow Lance

DGIF documents the federal-listed Endangered James spinymussel and federal-listed Threatened yellow lance from the project area. As a result, Johns Creek has been designated a Threatened and Endangered Species Water due to the presence of these species.

(ii) Johns Creek Wild Trout Water

Johns Creek, upstream of the dam, is designated a wild trout water known to support brook trout. However, based on the location of the proposed work, DGIF does not anticipate it to result in adverse impacts upon this resource.

9(c) Recommendations.

(i) Mussel Survey and Relocations

DGIF recommends that a mussel survey be performed 100 meters upstream through 400 meters downstream of impact areas in John's Creek (even if submerged under the lake). The survey should be performed by a qualified, permitted biologist, preferably no more than six months prior to the start of construction.

If the applicant prefers, representative photographs of the impact area(s) may be provided to DGIF for its review. The photographs should clearly depict the size of the stream, the substrate type, and the banks up and downstream of the site. Upon review, DGIF may be able to rule out the need for a mussel survey based on the habitat available on site.

Coordinate any mussel relocations with DGIF Region II Aquatic Resources Biologist, Brian Watson at (434) 525-7522 or brian.watson@dgif.virginia.gov. No federal-listed species should be relocated without first coordinating with the USFWS at (804) 693-6694. In addition, contact Brian to discuss flood management activities within this system known to support listed mussels.

All survey and relocation activities should adhere to *Freshwater Mussel Guidelines for Virginia* (attached). Survey results should be made available to Amy Ewing (DGIF Central Office) and Brian Watson (DGIF Forest Office). Upon review of the results, DGIF will make final recommendations regarding the protection of listed species known from the area. All survey reports should reference the ESSLog# 39933.

DGIF recommends a time-of-year restriction on all instream work (not including any mussel surveys) from May 15 through July 31 of any year.

(ii) Federal-Listed Species

Coordinate with the USFWS regarding federal-listed species in the area.

10. Water Supply. According to the SWP/EA (page 6), the impoundment is not used as a water supply source.

10(a) Agency Jurisdiction. The Virginia Department of Health (VDH) Office of Drinking Water (ODW) reviews projects for the potential to impact public drinking water sources (groundwater wells, springs and surface water intakes). VDH administers both federal and state laws governing waterworks operation.

10(b) Agency Findings. VDH-ODW finds the following public groundwater wells are located within a 1-mile radius of the project site (wells within a 1,000-foot radius are formatted in **bold):**

PWS ID Number	City/County	System Name	Facility Name
1071550	**GILES**	**MT. LAKE BIOLOGICAL STATION**	**WELL**
1071551	**GILES**	**MOUNTAIN LAKE LODGE**	**WELL NO. 3**
1071551	**GILES**	**MOUNTAIN LAKE LODGE**	**WELL NO. 1**
1071551	**GILES**	**MOUNTAIN LAKE LODGE**	**WELL NO. 2**
1071955	**GILES**	**WHITE ROCKS RECREATION AREA**	**WELL**
1071470	GILES	GLEN ALTON	WELL
1071080	GILES	CASCADES	WELL
1121751	MONTGOMERY	CAMP TUK-A-WAY	DRILLED WELL

The project is within the watershed of the following public surface water sources:

PWS ID Number	System Name	Facility Name
4087125	HENRICO COUNTY WATER SYSTEM	HENRICO RAW WATER INTAKE
4075735	JAMES RIVER CORRECTIONAL CTR	JAMES RIVER INTAKE
5680200	LYNCHBURG, CITY OF	JAMES RIVER-COLLEGE HILL
5680200	LYNCHBURG, CITY OF	JAMES RIVER-ABERT
4760100	RICHMOND, CITY OF	RAW WATER INTAKE
3670800	VIRGINIA-AMERICAN WATER CO	APPOMATTOX RIVER

There are no surface water intakes located within a 5-mile radius of the project site.

10(c) Recommendations. VDH-ODW recommends the following:

- Employ Best Management Practices on the project site to protect water supply sources, including erosion and sediment controls and spill prevention controls and countermeasures.
- Transport materials into and out of the project site in a manner that prevents impacts to surface waters.
- Field mark wells located within a 1,000-foot radius of the project site to protect them from accidental damage during construction.

11. Regional Review.

11(a) Agency Jurisdiction. In accordance with the Virginia Code, §15.2-4207, planning district commissions encourage and facilitate local government cooperation and state-local cooperation in addressing, on a regional basis, problems of greater than local significance. The cooperation resulting from this is intended to facilitate the recognition and analysis of regional opportunities and take account of regional influences in planning and implementing public policies and services. Planning district commissions promote the orderly and efficient development of the physical, social and economic elements of the districts by planning, and encouraging and assisting localities to plan for the future.

11(b) Agency Findings. The Roanoke Valley-Alleghany Regional Commission reviewed the SWP/EA and has no comments on the proposed project.

For additional information, contact RV-ARC, Eddie Wells at (540) 343-4417.

REGULATORY AND COORDINATION NEEDS

1. Water Quality and Wetlands. Surface water and wetland impacts associated with this proposal may require a VWP Permit issued by the DEQ-BRRO pursuant to Virginia Code §62.1-44.15:20. For additional information and coordination, contact DEQ-BRRO, Kip Foster at (540) 562-6782 or kip.foster@deq.virginia.gov.

2. State Subaqueous Lands. Pursuant to Virginia Code §28.2-1200 through 1400, the project sponsors must obtain a permit from VMRC for anticipated impacts to state subaqueous lands. This requires the submission of a JPA to VMRC. For additional information and coordination, contact VMRC, Mark Eversole at (757) 247-8028 or mark.eversole@mrc.virginia.gov.

3. Dam Safety and Floodplain Management. Coordinate with DCR-DSFM, David Wilmoth (Dam Safety) at (804) 625-3977 or david.wilmoth@dcr.virginia.gov, regarding the acquisition of a Dam Alteration Permit (form DCR199-101) and the submission of an Emergency Action Plan, prior to dam-related alteration and/or construction activities. Upon completion of the project, As-Built Plans and form DCR199-100 will be required.

Contact Craig County, Tom Cantrell at (540) 864-5010 or tcantrell@craigcountyva.gov to ensure project compliance with the local floodplain ordinance.

4. Erosion and Sediment Control and Stormwater Management.

4(a) Erosion and Sediment Control and Stormwater Management. The project sponsors must ensure the project is conducted in compliance with *Virginia's Erosion and Sediment Control Law* (*Virginia Code* §62.1-44.15:51 *et seq.*) and *Regulations* (9 VAC 25-840 *et seq.*) and *Stormwater Management Law* (*Virginia Code* §62.1-44.15:24 *et seq.*) and *Regulations* (9 VAC 25-870 *et seq.*). Additional information and coordination on erosion and sediment control and stormwater management plans may be addressed to DEQ-BRRO, Jay Roberts at (540) 562-6785.

4(b) General Permit for Stormwater Discharges from Construction Activities (VAR10). For land-disturbing activities of equal to or greater than one acre, the applicant is required to register for coverage under the Virginia Stormwater Management Program General Permit for Discharges of Stormwater from Construction Activities (9 VAC 25-880-1 *et seq.*). Specific questions regarding the Stormwater Management Program requirements should be directed to DEQ-OSWM, Holly Sepety at (804) 698-4039.

5. Air Quality Regulations. This project is subject to air regulations administered by the Department of Environmental Quality. The following sections of the Code of Virginia and Virginia Administrative Code are applicable:

- fugitive dust and emissions control (9 VAC 5-50-60 *et seq.*);
- open burning restrictions (9 VAC 5-130 *et seq.*); and
- fuel-burning equipment (9 VAC 5-80 *et seq.*).

For more information and coordination contact DEQ-BRRO, Paul Jenkins at (540) 562-6822. Also, contact Craig County fire officials for information on any local requirements pertaining to open burning.

6. Solid and Hazardous Wastes.

6(a) Solid and Hazardous Waste Management Regulations. All solid waste, hazardous waste, and hazardous materials must be managed in accordance with all applicable federal, state, and local environmental regulations. Contact DEQ-BRRO, Beth Lohman at (540) 562-6872 for information on the location and availability of suitable waste management facilities in Virginia if free product, discolored soils, or other evidence of contaminated soils are encountered.

6(b) Fuel Storage Tanks. If petroleum-contaminated soils or water are encountered during work or if petroleum storage tanks are used, contact DEQ-BRRO, David Miles at

(540) 562-6741.

7. Natural Heritage Resources.

7(a) Bats. Coordinate with the Virginia Field Office at (804) 693-6694, on the potential presence of the little brown bat, tricolored bat, and the Northern Long-eared bat in the project area.

7(b) Natural Heritage Resources. Contact DCR-DNH, Rene Hypes at (804) 371-2708 to secure updated information on natural heritage resources if the scope of the project changes and/or six months passes before the project is implemented, since new and updated information is continually added to the Biotics Data System.

8. Wildlife Resources and Protected Species.

8(a) Mussel Survey and Relocations. Coordinate mussel surveys and relocations with Brian Watson at (434) 525-7522 or brian.watson@dgif.virginia.gov and Amy Ewing at (804) 367-2211 or amy.ewing@dgif.virginia.gov. Upon review of the results, DGIF will make final recommendations regarding the protection of listed species known from the area. All survey reports should reference the ESSLog# 39933. No federal-listed species should be relocated without first coordinating with the USFWS at (804) 693-6694. In addition, contact Brian to discuss flood management activities within this system known to support listed mussels.

8(b) Federal-Listed Species. Coordinate with the USFWS Virginia Field Office at (804) 693-6694 on federal-listed species.

9. Water Supply. Contact VDH, Arlene Fields Warren at (804) 864-7781 or arlene.warren@vdh.virginia.gov, regarding its comments on the projection of nearby wells and other water supply resources.

Thank you for the opportunity to review the Supplemental Watershed Plan No. 2 and Environmental Assessment for the Rehabilitation of Floodwater Retarding Structure No. 1, McDaniel's Lake, in the Johns Creek Watershed, Craig County. Detailed comments of reviewing agencies are attached for your review. Please contact me at (804) 698-4204 or John Fisher at (804) 698-4339 for clarification of these comments.

Sincerely,

Bettina Rayfield, Program Manager
Environmental Impact Review and Long-Range Priorities

Enclosures

Ec: Amy Ewing, DGIF
Robbie Rhur, DCR
Tony Watkinson, VMRC
Arlene Fields Warren, VDH
Roger Kirchen, DHR
Robert R. "Dan" Collins, Craig County
Wayne Strickland, RV-ARC
John Bricker, NRCS
Wade Biddix, NRCS

USDA

United States Department of Agriculture

July 22, 2019

Ms. Bettina Rayfield, Program Manager
Environmental Impact Review and Long-Range Priorities Program
Commonwealth of Virginia
Department of Environmental Quality
P.O. Box 1105
Richmond, VA 23218

Re: Draft Supplemental Watershed Plan-Environmental Assessment (EA) for the Rehabilitation of Johns Creek Dam No. 1 (McDaniel's Lake), Craig County, Virginia

Dear Ms. Rayfield:

Thank you for providing the Commonwealth's consolidated comments on the referenced project. We agree with your conclusion that the proposal is unlikely to have significant effects on ambient air quality, important farmland, forest resources, historic resources, water quality and wetlands. We also agree that it is unlikely to adversely affect species of plants or insects listed by state agencies as rare, threatened, or endangered. During design and construction, NRCS will work closely with all the agencies responsible for protection of environmental resources. We will also work with the local sponsors regarding the regulatory and coordination issues of this project.

The Division of Dam Safety and Floodplain Management had one finding that we would like to address. With reference to table D-3, Dam Safety expressed the concern that NRCS had discarded the wet sediment volume in the calculations. The purpose of table D-3 was to identify the available water storage to the crest of the auxiliary spillway. The volume of sediment present in the normal pool of the reservoir is not included in the water storage volume. Both the water and the sediment in the normal pool and the detained storm water at the auxiliary spillway crest are included in the NRCS Sunny Day Breach.

The Virginia Department of Health Office of Drinking Water provided information which identified eight public groundwater wells located within a 1-mile radius of the project location. Since NRCS believed the information to be in error based on the location of the wells, we contacted the reviewer, Ms. Arlene Warren, to discuss our concern. After the call, NRCS provided the project coordinates to Ms. Warren by email. Ms. Warren re-ran the search using the coordinates provided and responded promptly with updated results that were provided to both the NRCS and Mr. John Fisher, Virginia Department of Environmental Quality by email. There are no public ground water wells within a one-mile radius of the project site and there are no surface water intakes located within a five-mile radius of the project site.

The Virginia Department of Conservation and Recreation – Division of Natural Heritage and the Virginia Department of Game and Inland Fisheries both expressed concern about the presence of threatened and endangered mussel species in Johns Creek. NRCS contracted and completed a full freshwater mussel survey in May 2016. The survey was completed by an approved qualified biologist following the protocol per the "Freshwater Mussel Guidelines for Virginia." Copies of the Final Survey Report were distributed to Brian Watson, DGIF, and Jennifer Stanhope, USFWS.

NATURAL RESOURCES CONSERVATION SERVICE
1606 Santa Rosa Road, Suite 209 ♦ Richmond, Virginia 23229
Phone: (804) 287-1691 ♦ Fax: (855) 627-9827

As stated in the EA, NRCS has and will continue to coordinate with DGIF and USFWS and conduct an additional mussel survey within six months prior to start of construction.

Since most of the comments, including time of year restrictions, focus on issues that are required during the implementation process, they will be addressed during the design, permitting, and/or construction phases of this project. It is very helpful to have this comprehensive listing of the State's requirements in your letter and we appreciate your support of this project.

If questions or concerns arise as the project proceeds, please contact David Kriz, Assistant State Conservationist for Water Resource Operations, by phone at (804) 287-1646 or by email at david.kriz@usda.gov.

Sincerely,

Acting,

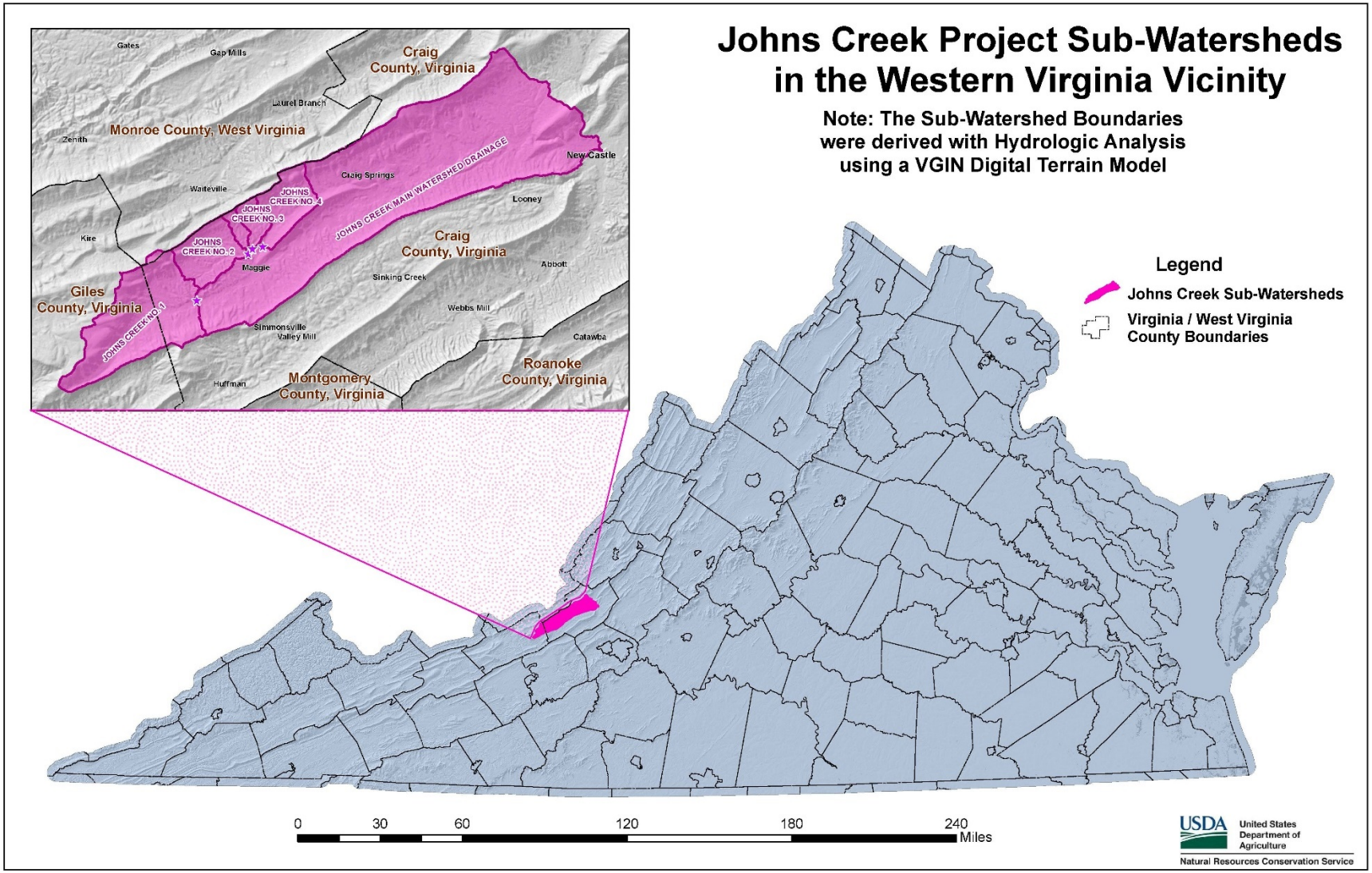
JOHN A. BRICKER
State Conservationist

NATURAL RESOURCES CONSERVATION SERVICE
1606 Santa Rosa Road, Suite 209 ♦ Richmond, Virginia 23229
Phone: (804) 287-1691 ♦ Fax: (855) 627-9827

APPENDIX B

PROJECT MAP

Figure B-1. General Johns Creek Watershed Location Map.



APPENDIX C

SUPPORT MAPS

Figure C-1. Johns Creek Dam No. 1 Sub-Watershed Map

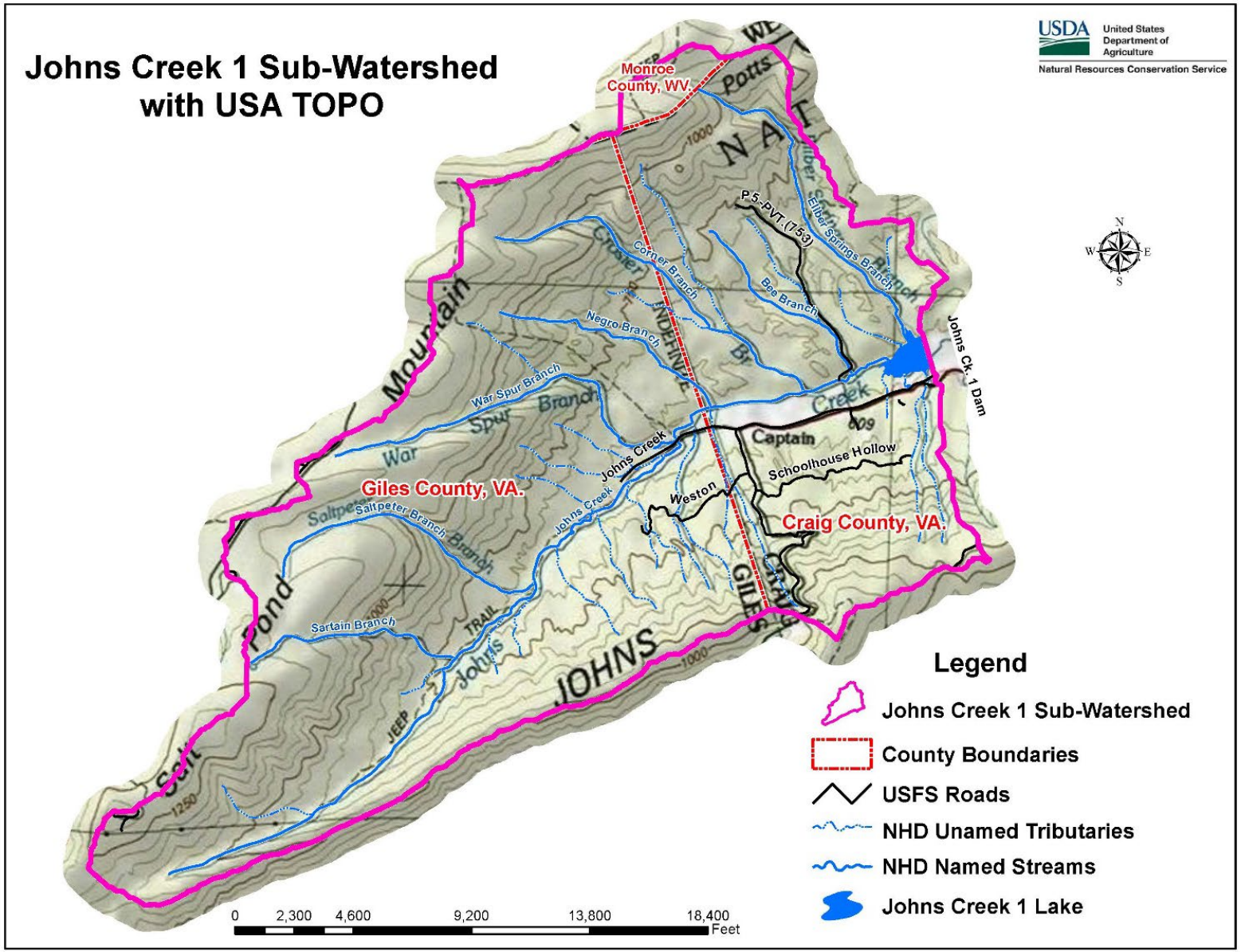


Figure C-2. Johns Creek Project Sub-Watershed Map

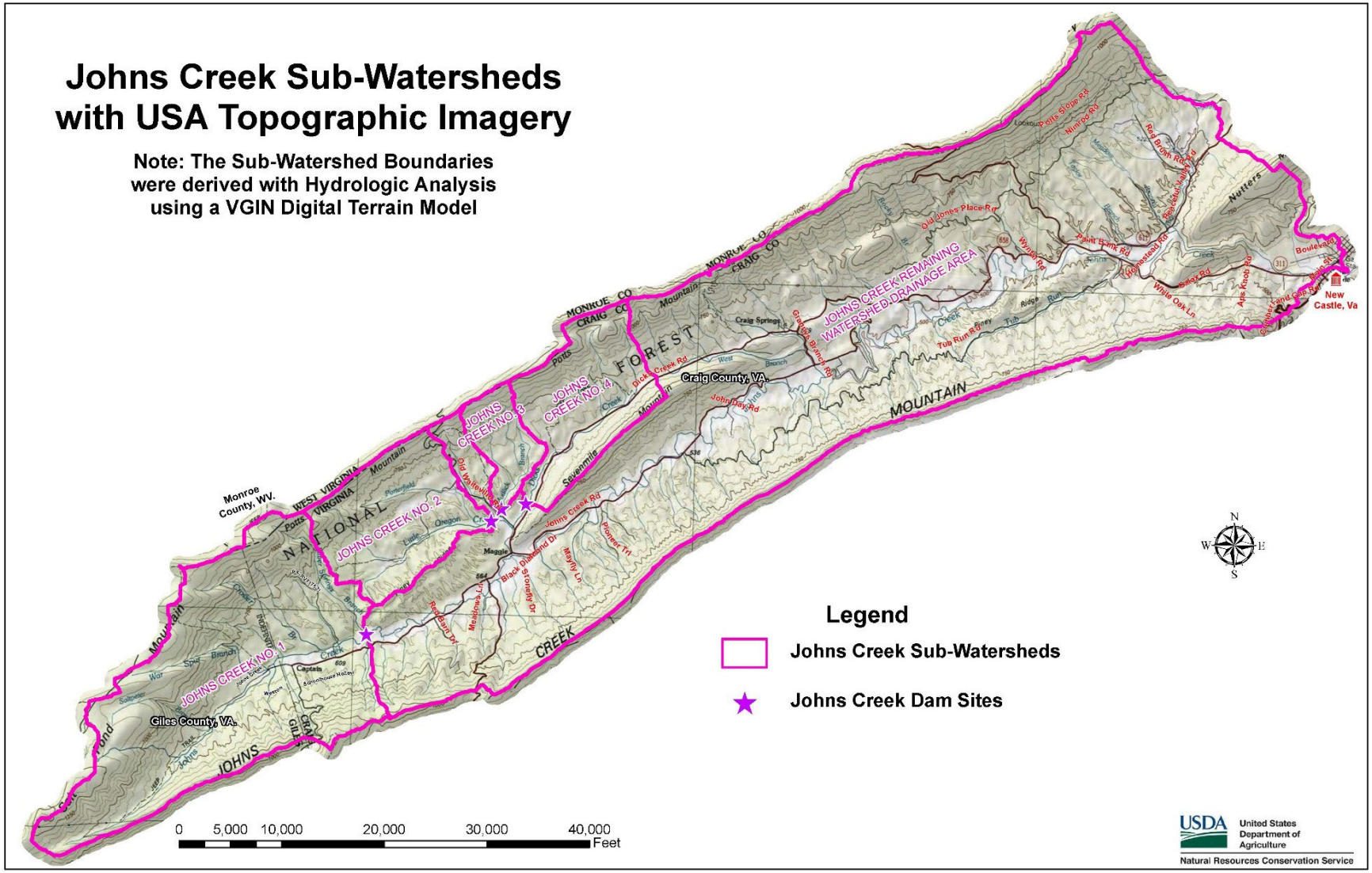


Figure C-3. Johns Creek Dam No. 1 Watershed Soils Map.

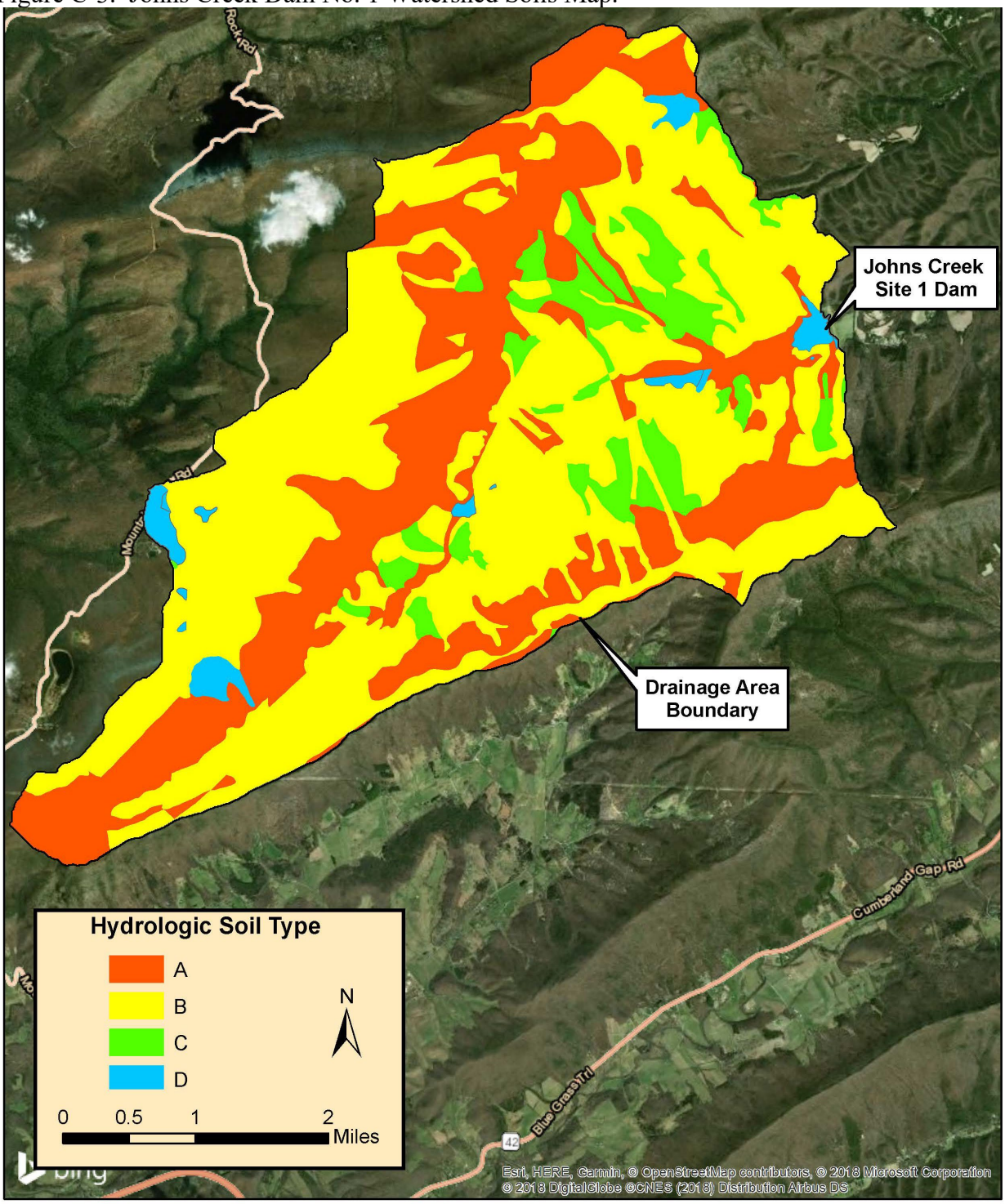
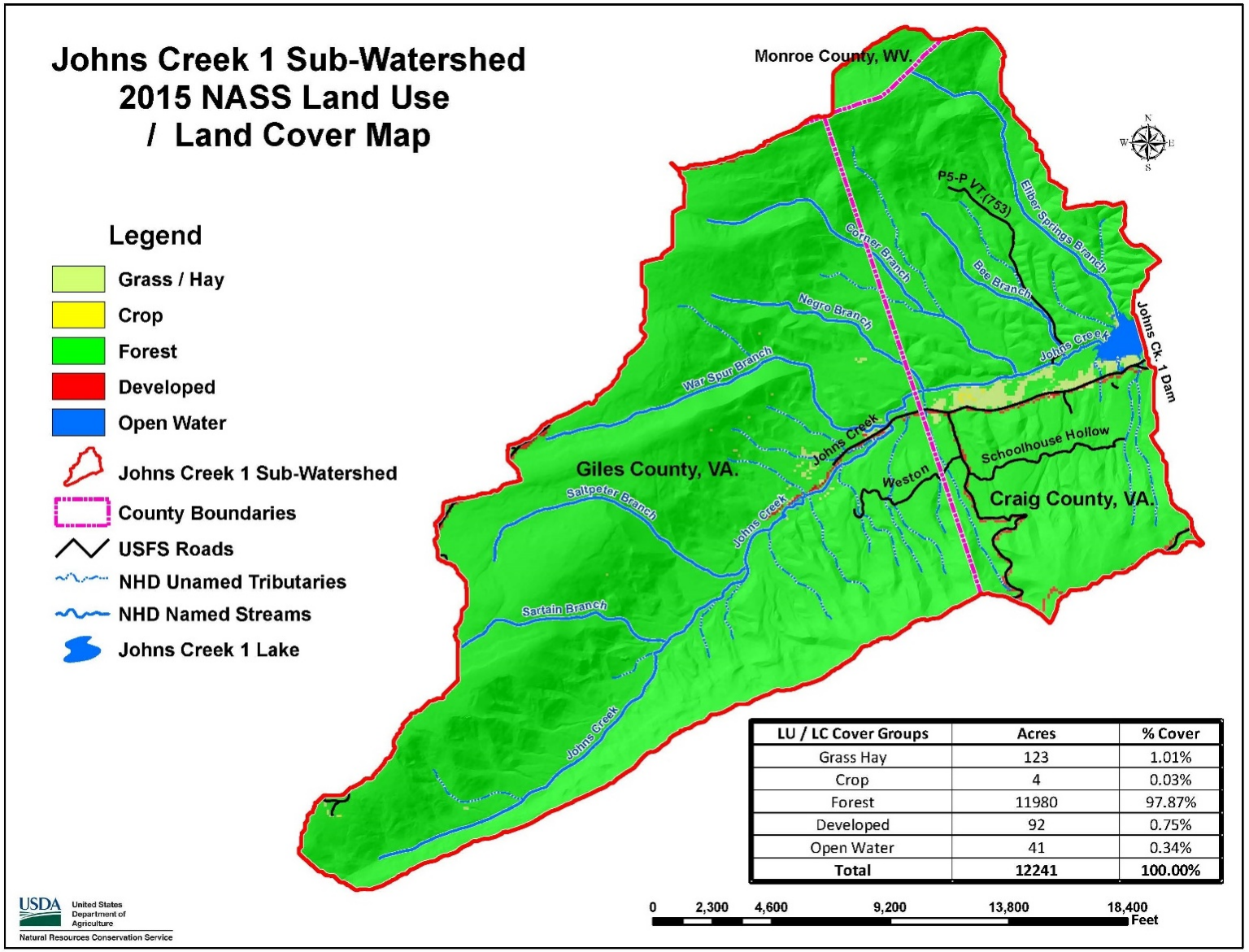
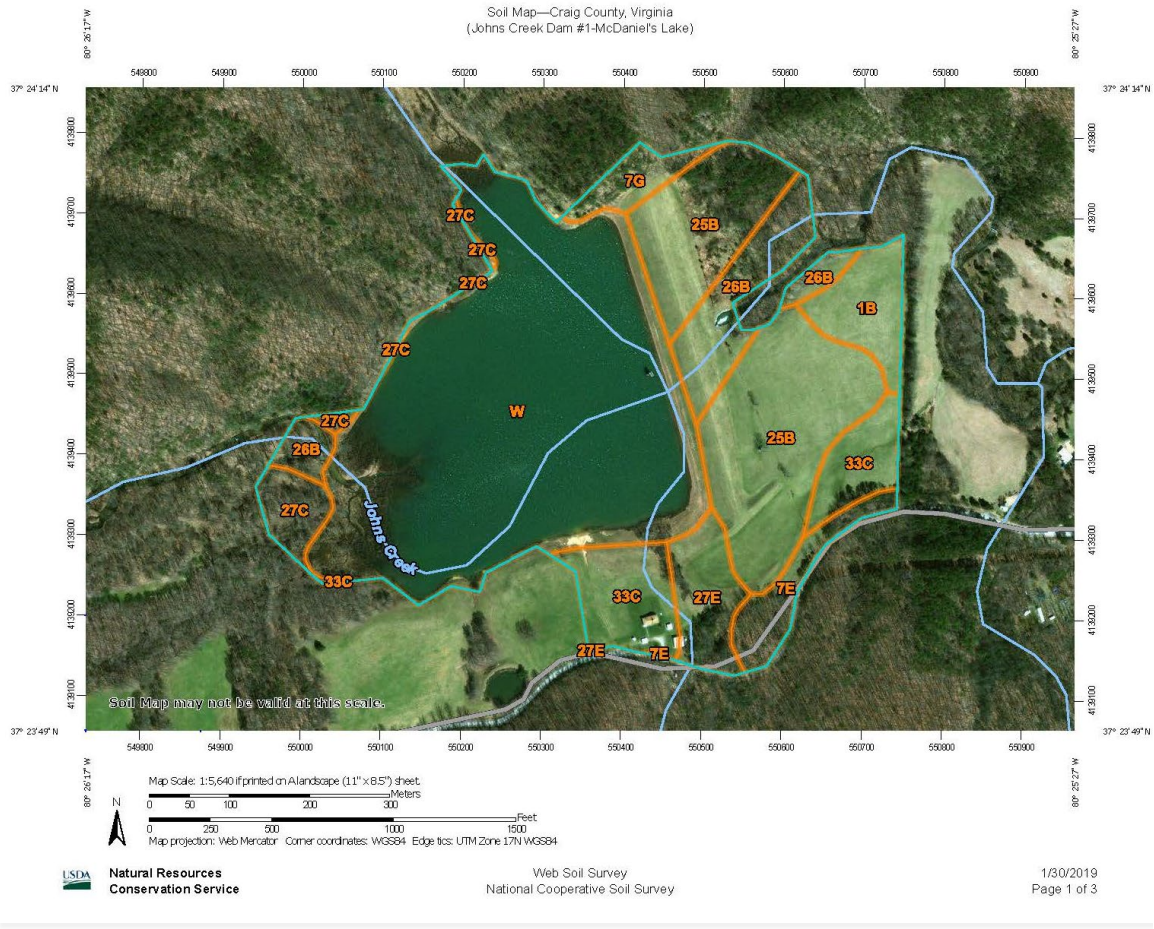


Figure C-4. Land Use/Land Cover Map



LU / LC Cover Groups	Acres	% Cover
Grass Hay	123	1.01%
Crop	4	0.03%
Forest	11980	97.87%
Developed	92	0.75%
Open Water	41	0.34%
Total	**12241**	**100.00%**

Figure C-5. McDaniel's Lake Prime Farmland Map.



Map Unit Symbol	Map Unit Name	Acres in Area of Interest (AOI)	Percent of AOI	Status
1B	Alonzville loam, 3 to 8 percent slopes, rarely flooded	3.3	3.9	Prime & Unique Farmland
7E	Berk-Weikert complex, 15 to 35 percent slopes	2.7	3.1	
7C	Berk-Weikert complex, 35 to 70 percent slopes	1.8	2.1	
25B	Nicelytown silt loam, 3 to 8 percent slopes	17.9	21.1	Prime & Unique Farmland
26B	Ogles very stony loam, 0 to 5 percent slopes, frequently flooded	6.2	7.3	
27C	Oriskany gravelly fine sandy loam, 8 to 15 percent slopes, extremely stony	2.2	2.6	
27E	Oriskany gravelly fine sandy loam, 15 to 35 percent slopes, extremely stony	3.4	4.0	
33C	Shelocta silt loam, 8 to 15 percent slopes	6.6	7.8	Farmland of Statewide Importance
W	Water	40.9	48.2	

Figure C-6. Wetland Map

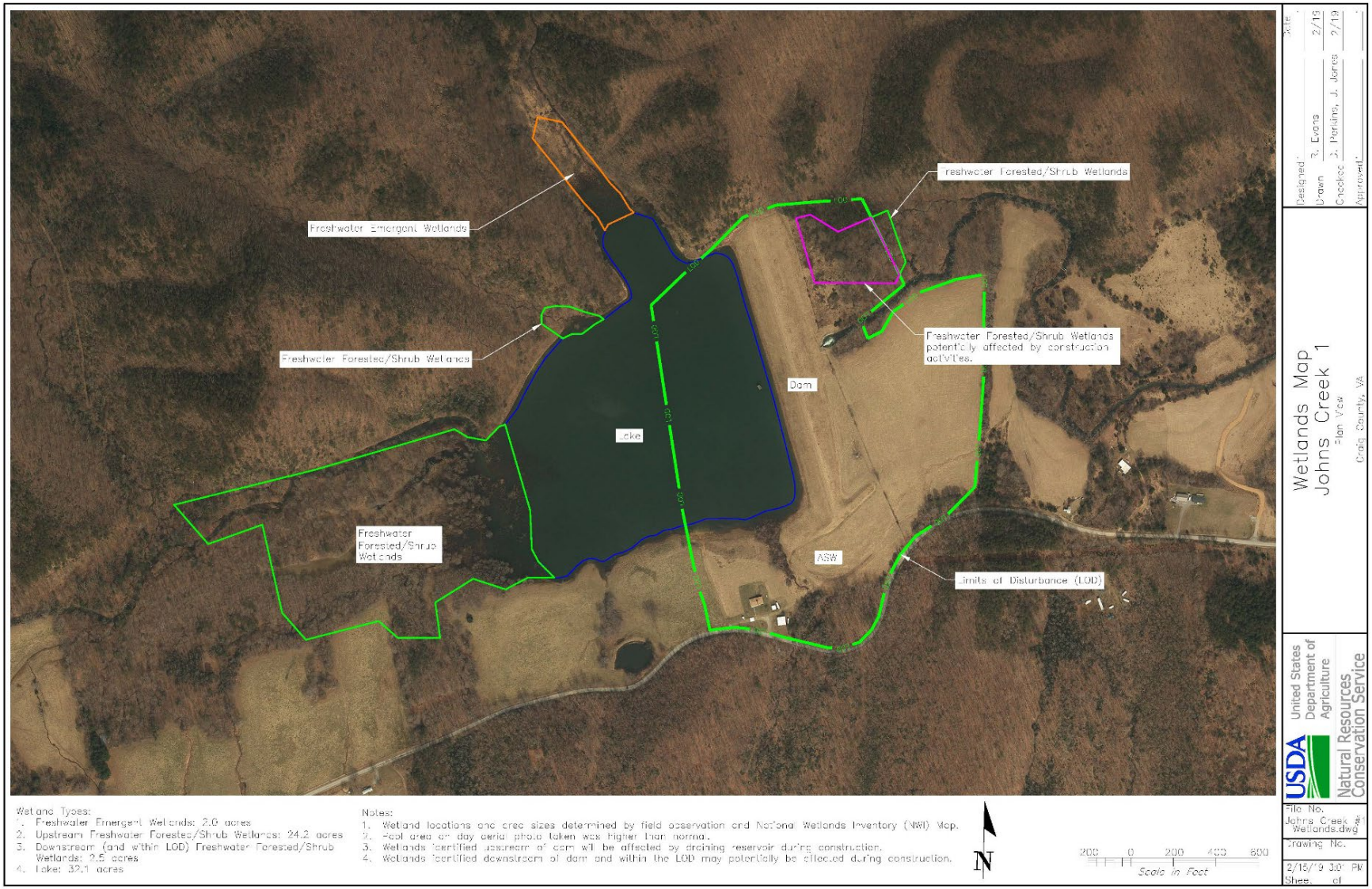


Figure C-7. Area of Potential Effect for Preferred Alternative (Aerial View).

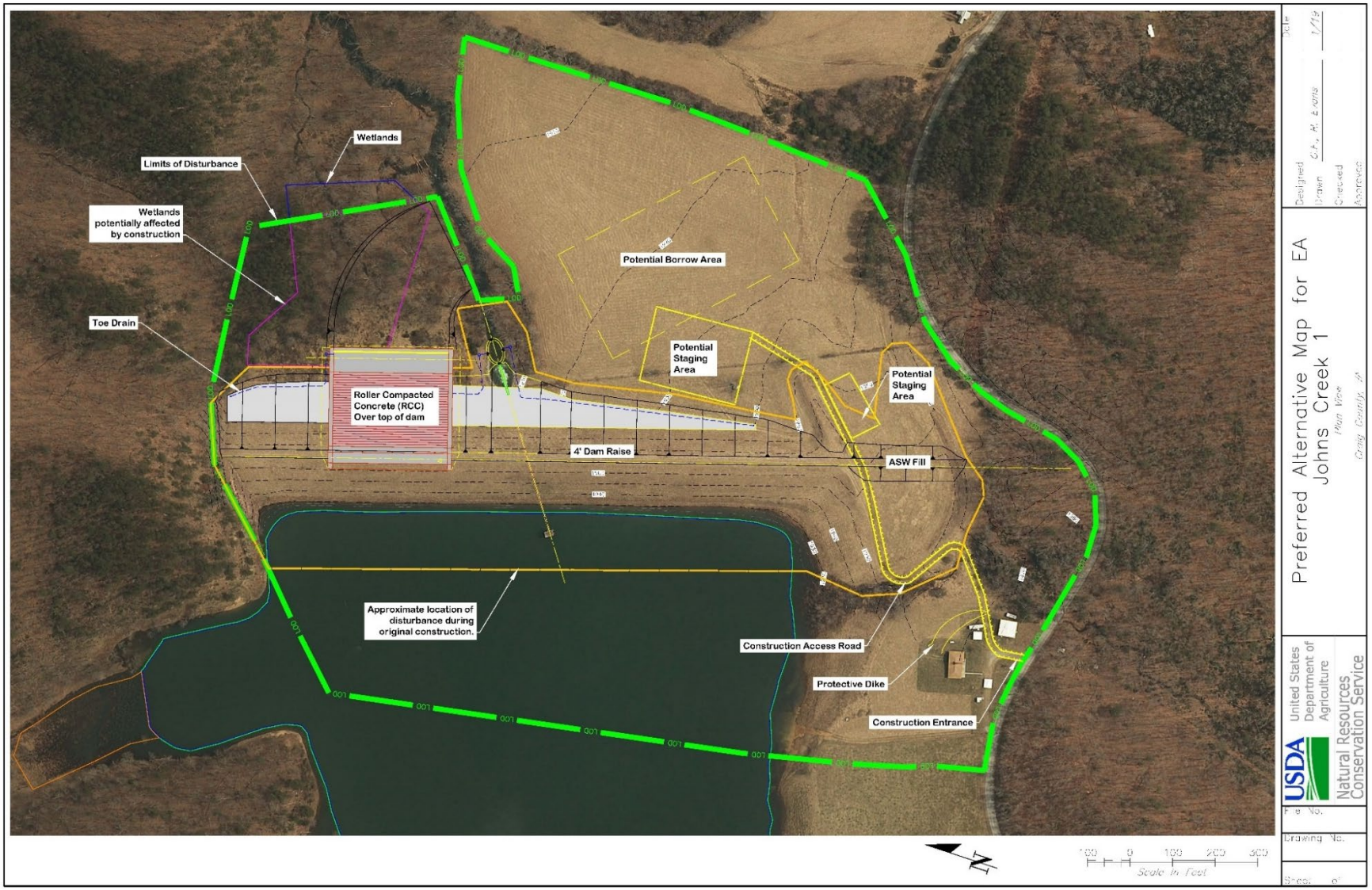


Figure C-8. Plan View of Preferred Alternative – 270-Foot-Wide RCC Chute on the Embankment with 4-Foot Embankment Raise.

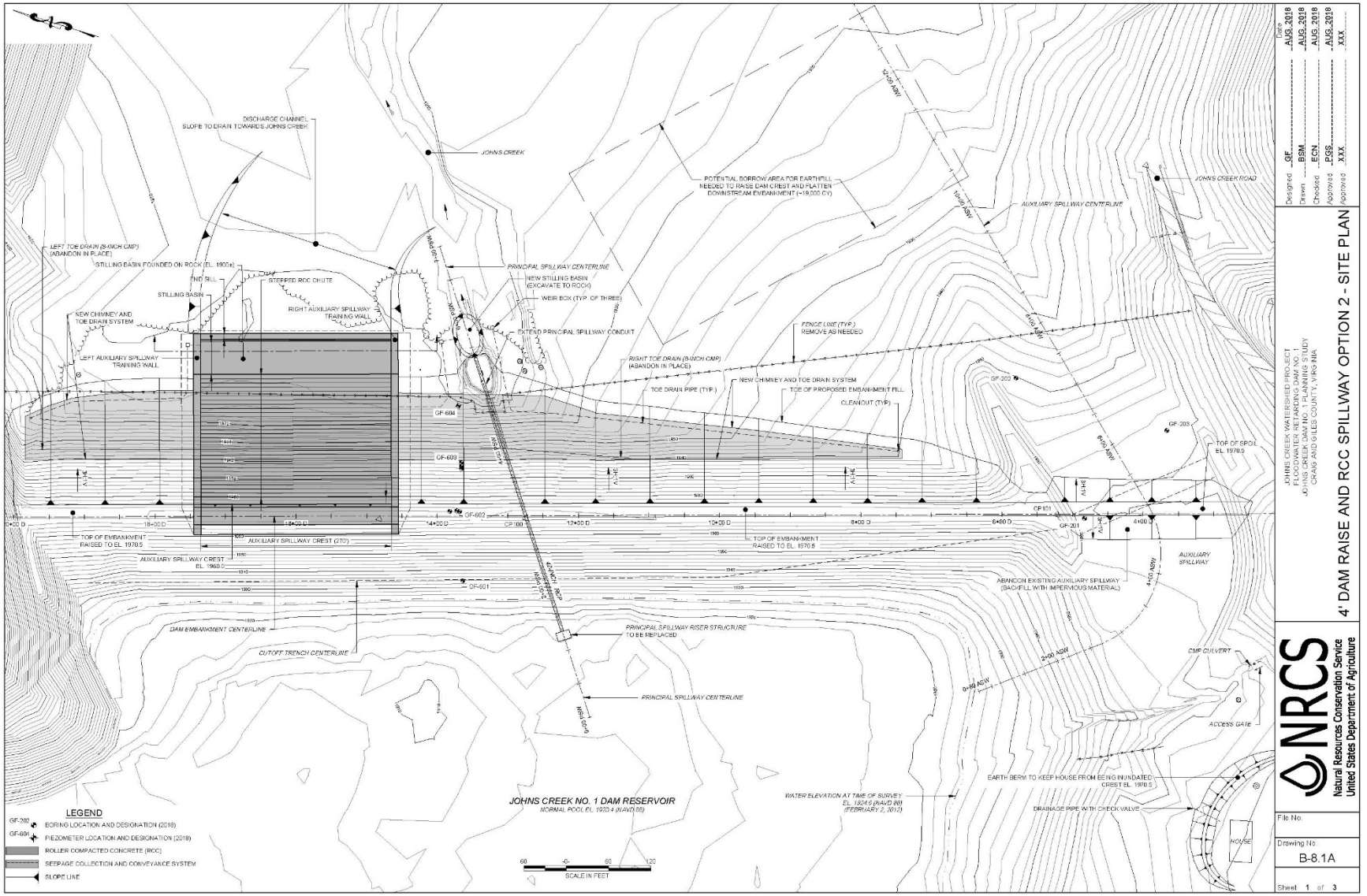


Figure C-9. Preferred Alternative - Details of Embankment, Toe Drain, and RCC Chute.

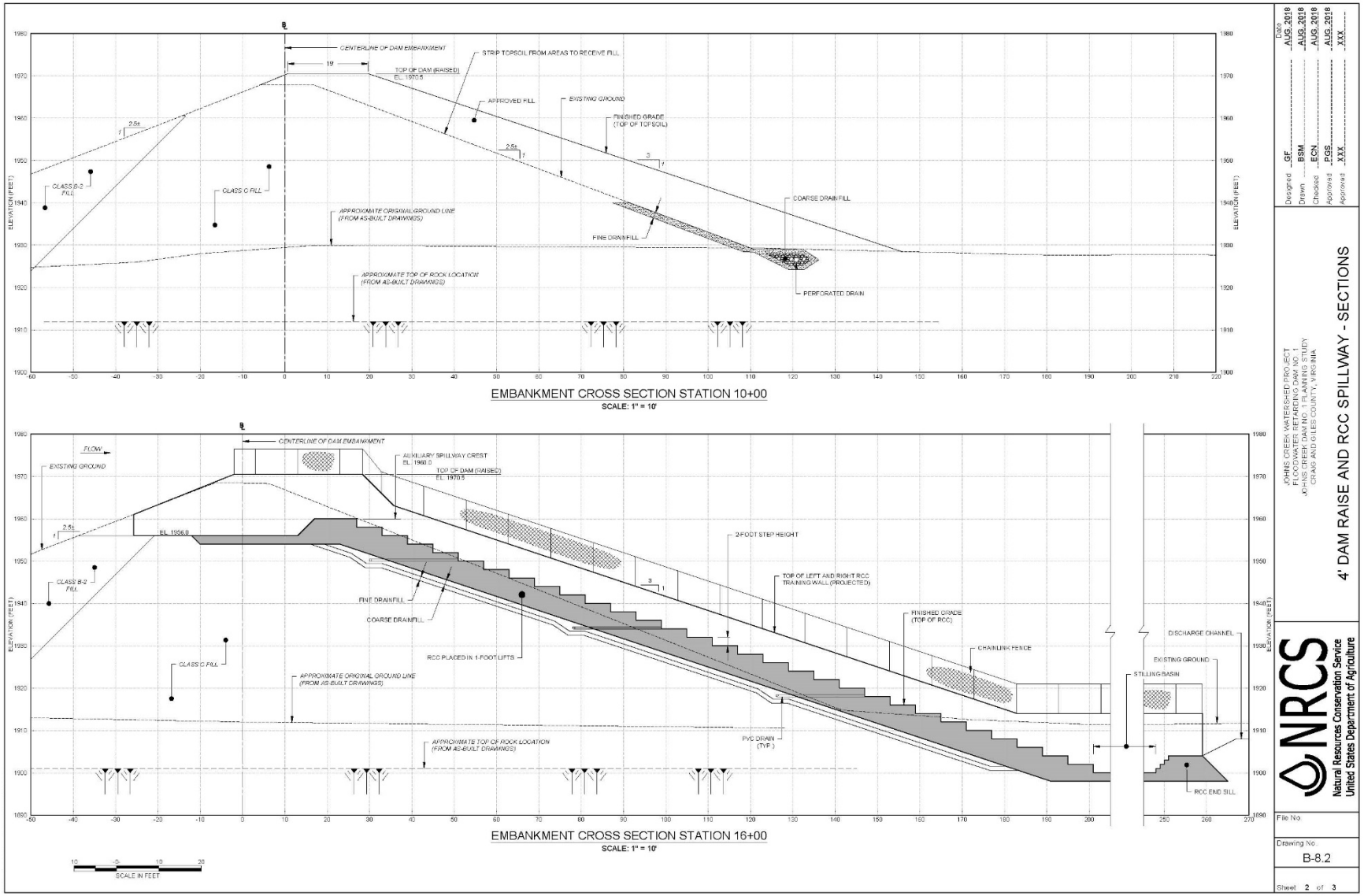


Figure C-10. Alternative 1 – Labyrinth Weir on Embankment

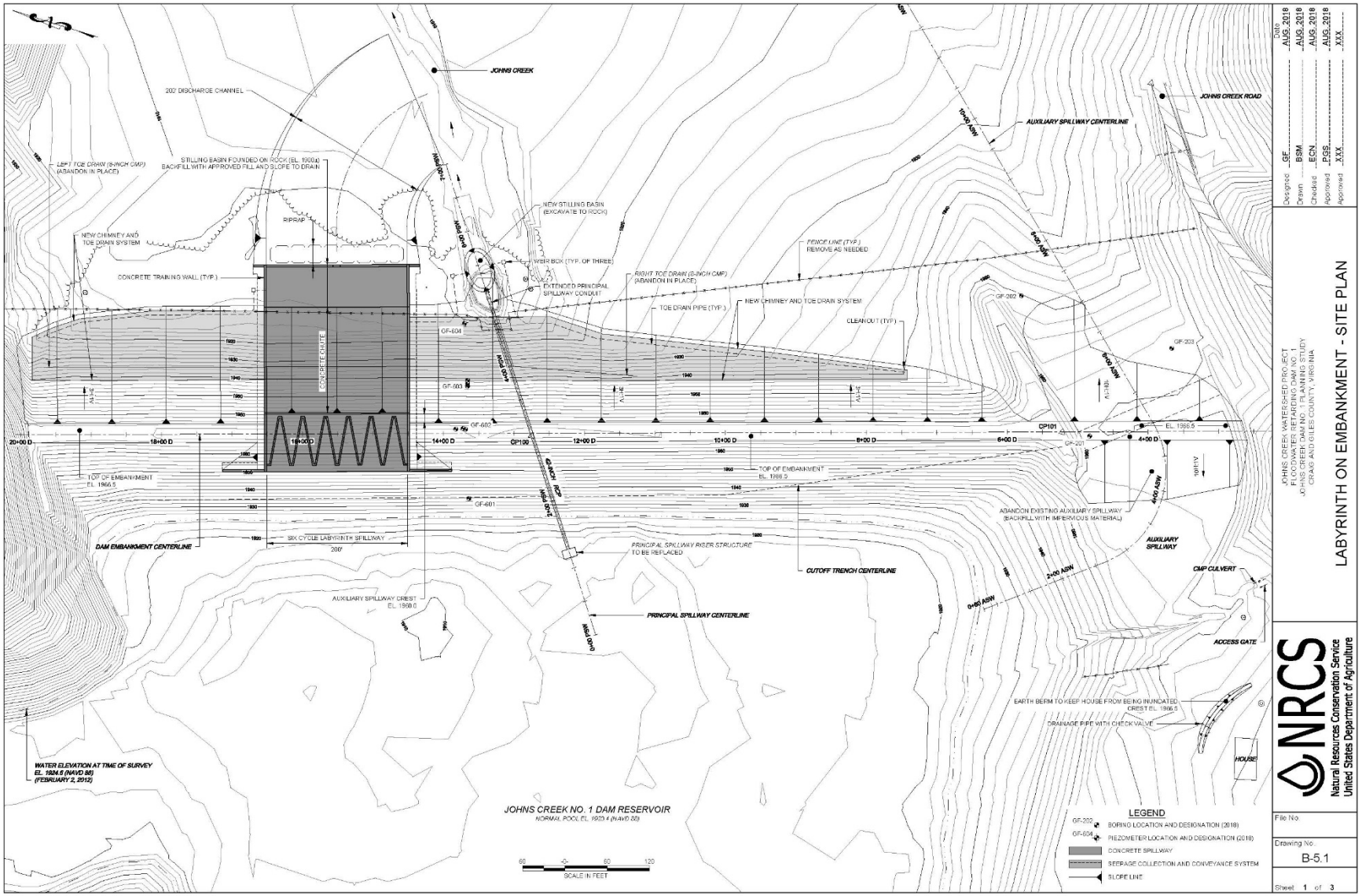


Figure C-11. Alternative 2 – 550-foot-wide RCC Spillway on the embankment.

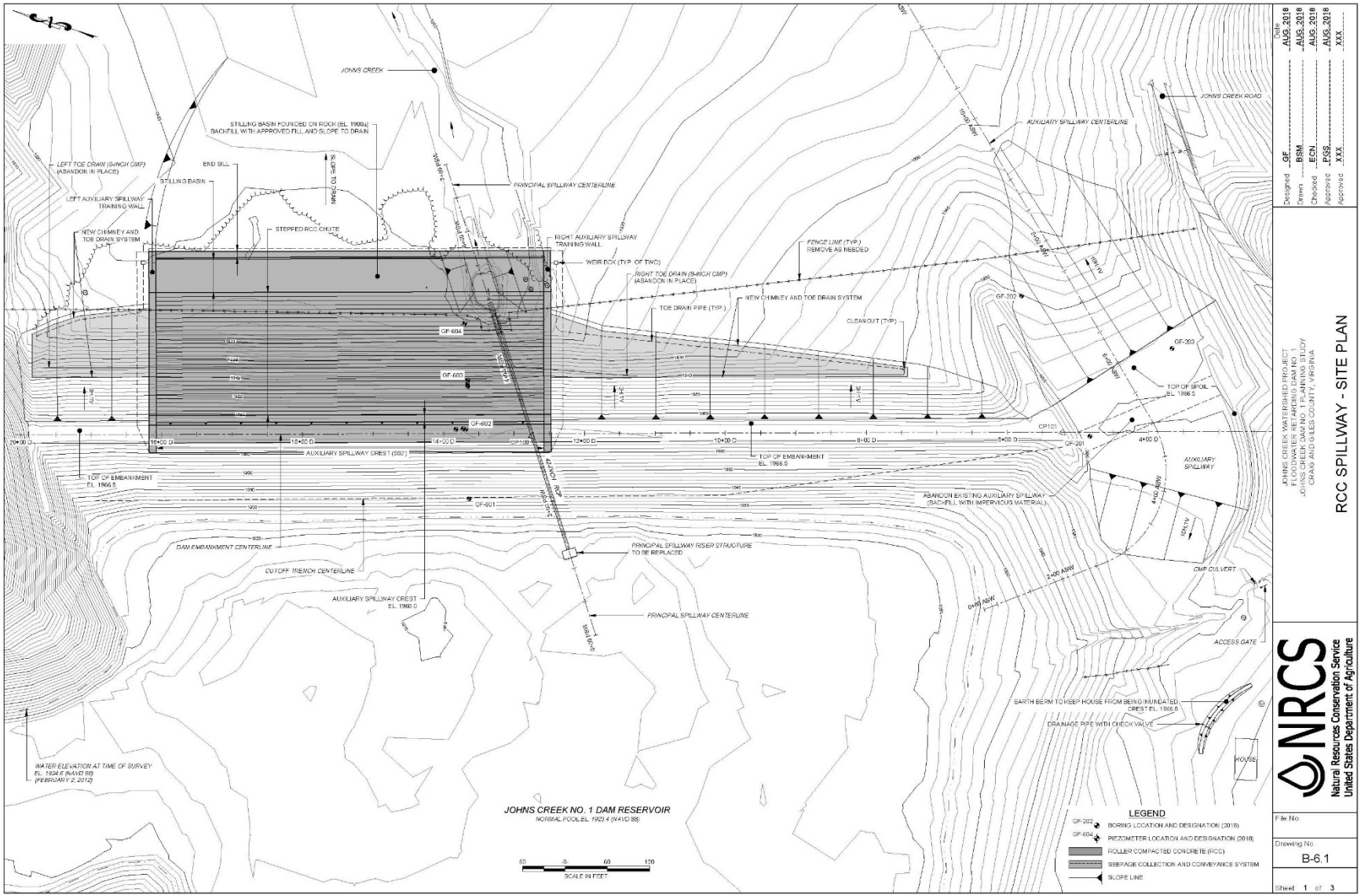


Figure C-12. Alternative 3 – 370-foot-wide RCC Spillway on the embankment with 2-foot embankment raise.

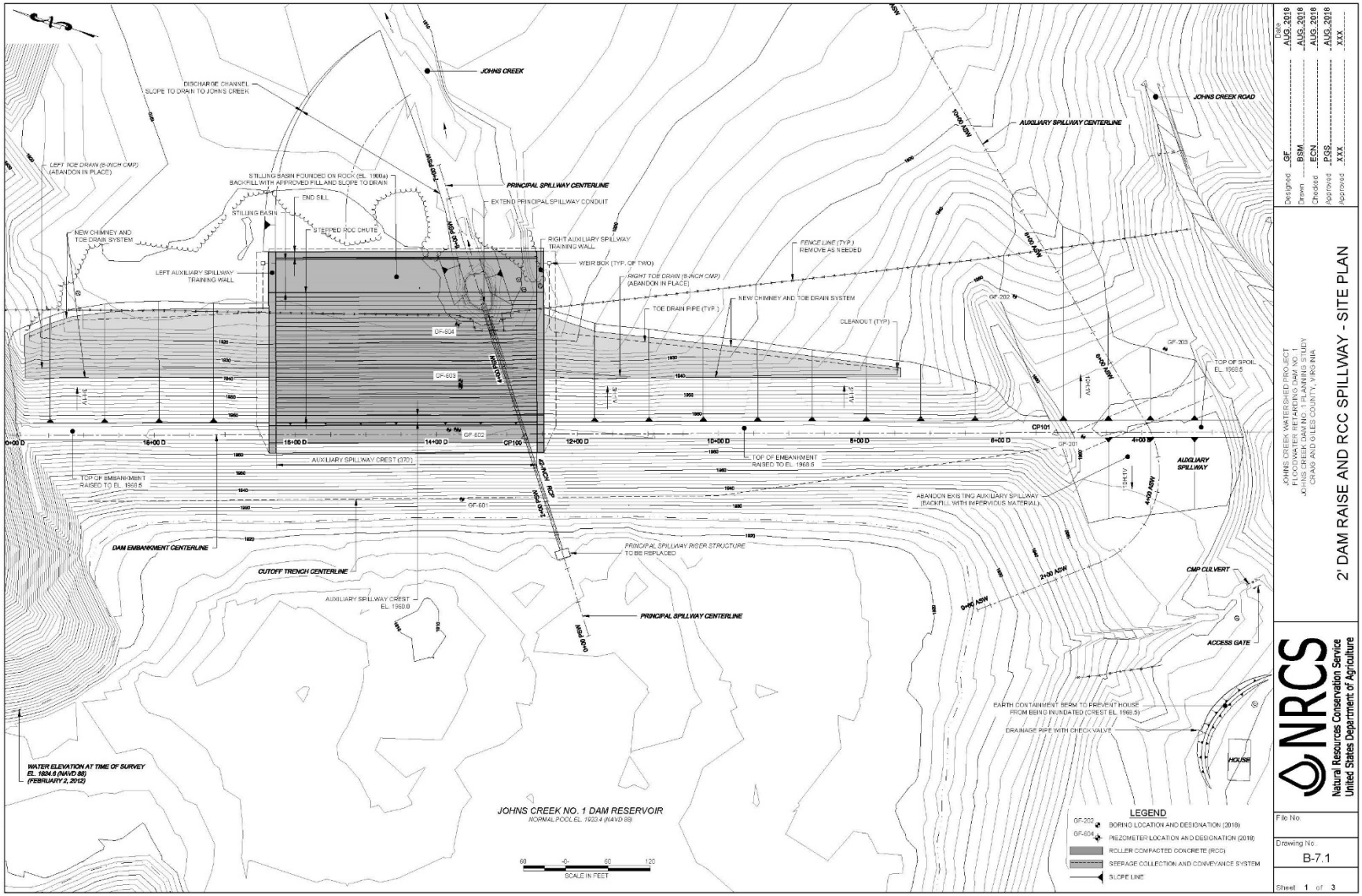


Figure C-13. Decommissioning – Plan view

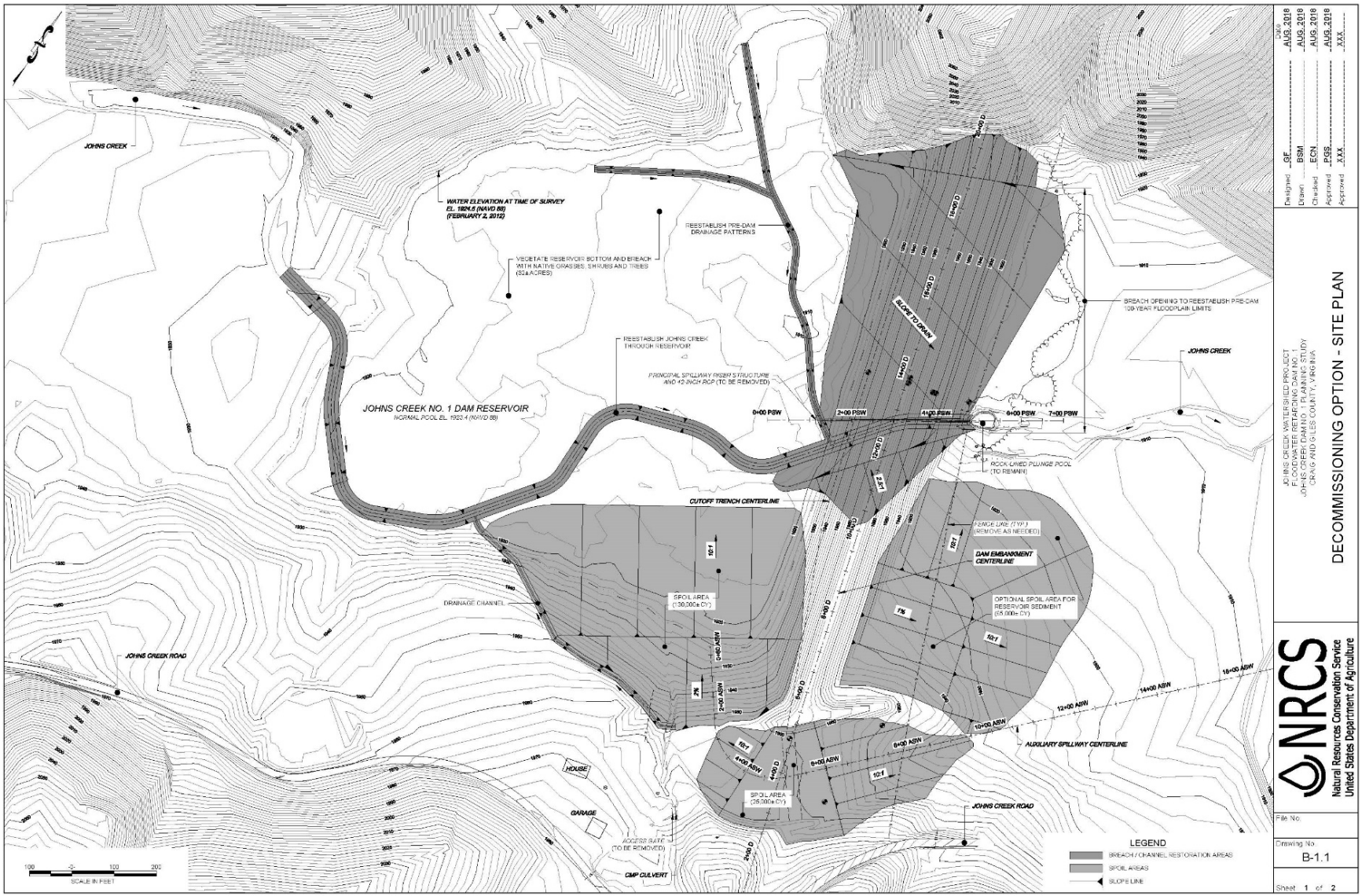


Figure C-14. Map of area affected by dam raise

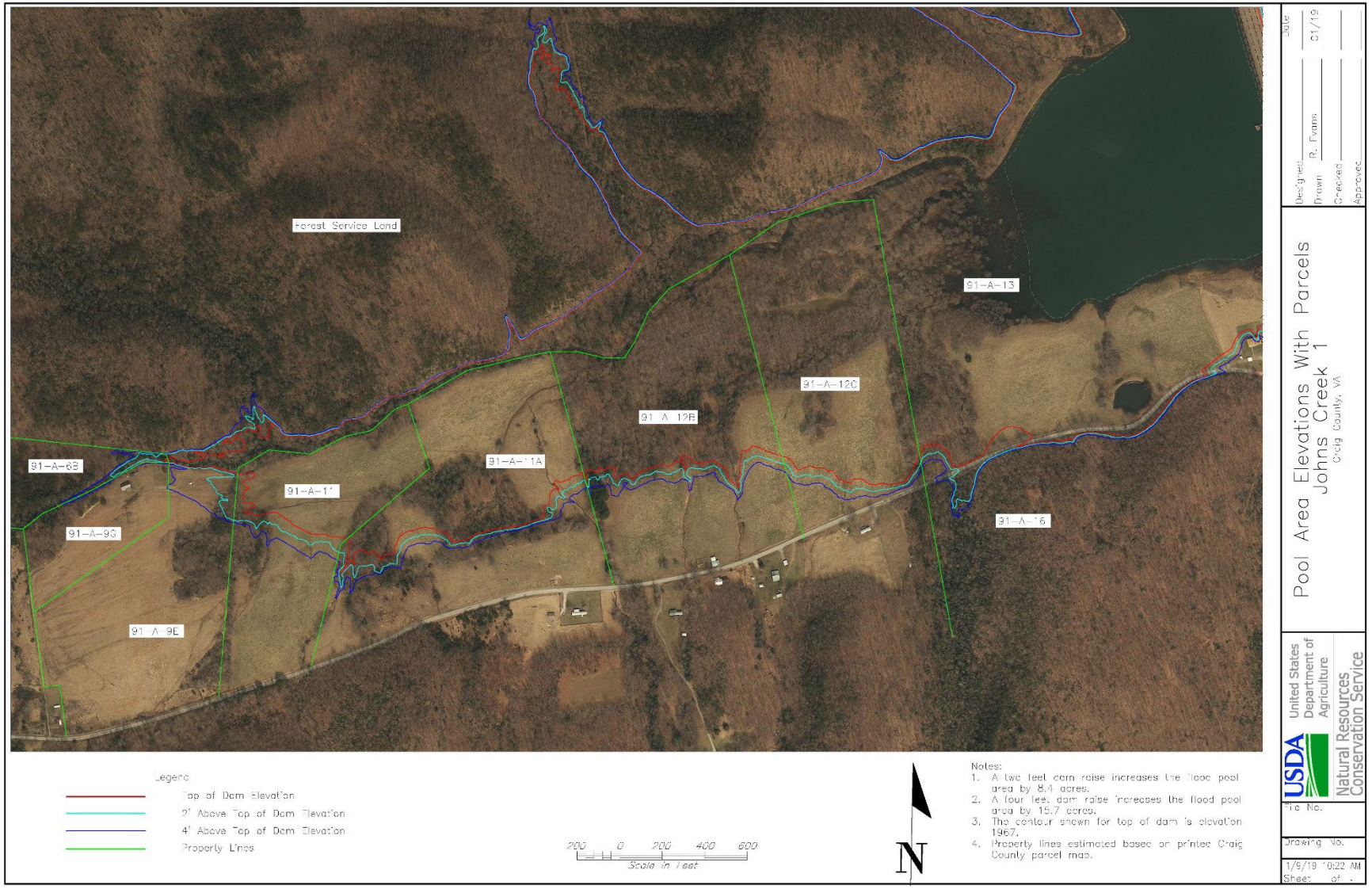


Figure C-15. Sunny Day Breach Inundation Map (Index).

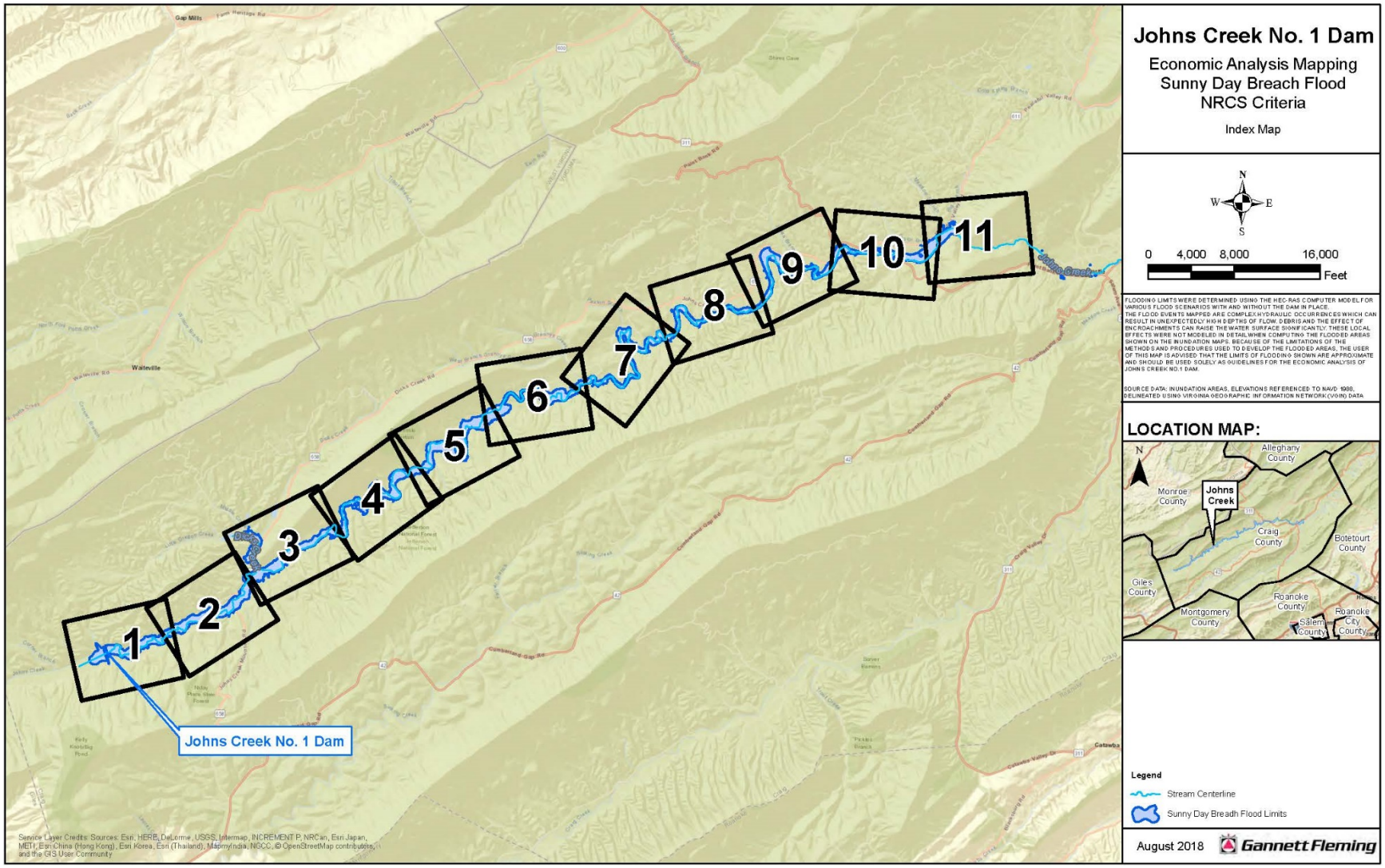


Figure C-16. Sunny Day Breach Inundation Map (Panel 1 of 11)

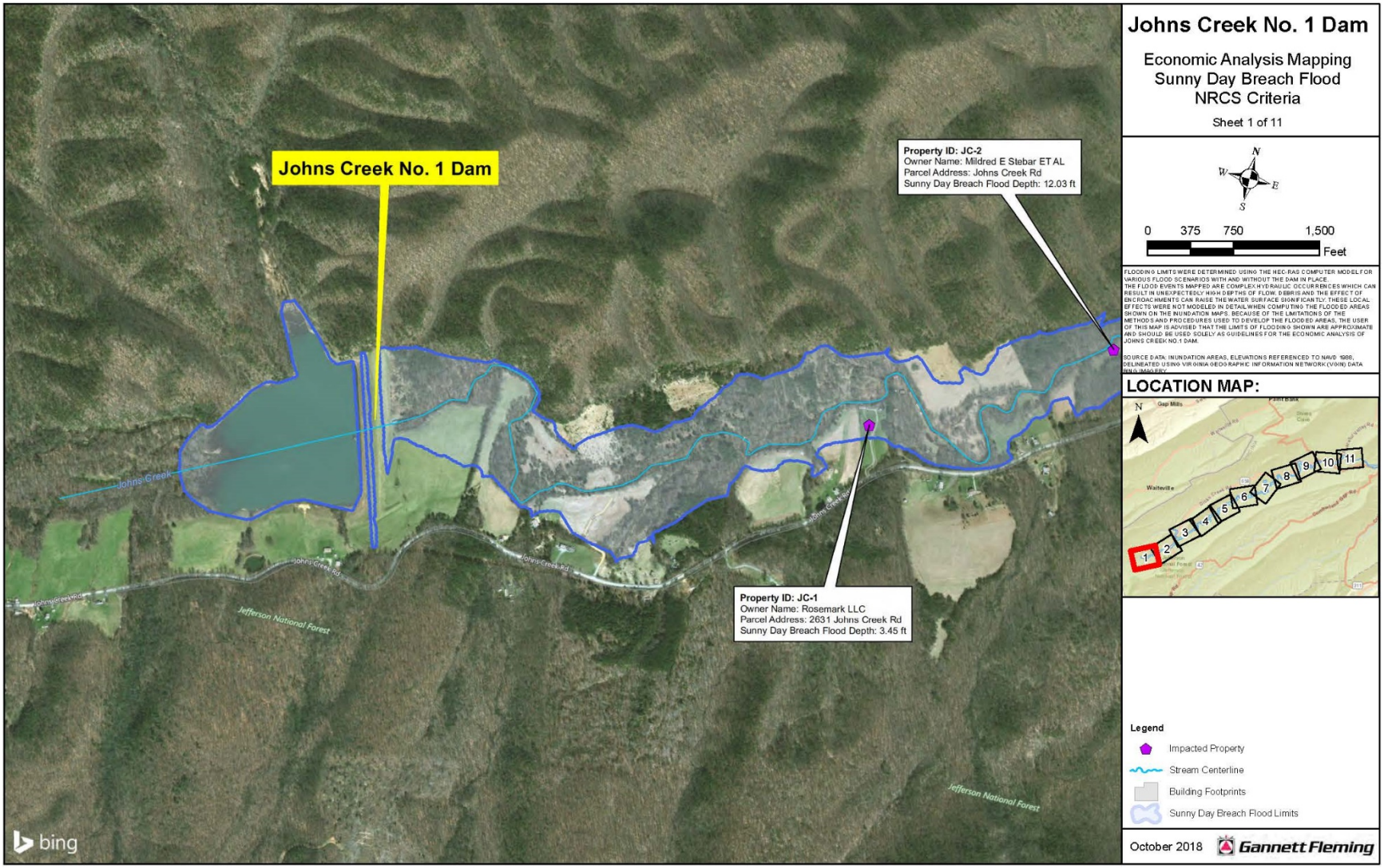


Figure C-17. Sunny Day Breach Inundation Map (Panel 2 of 11)

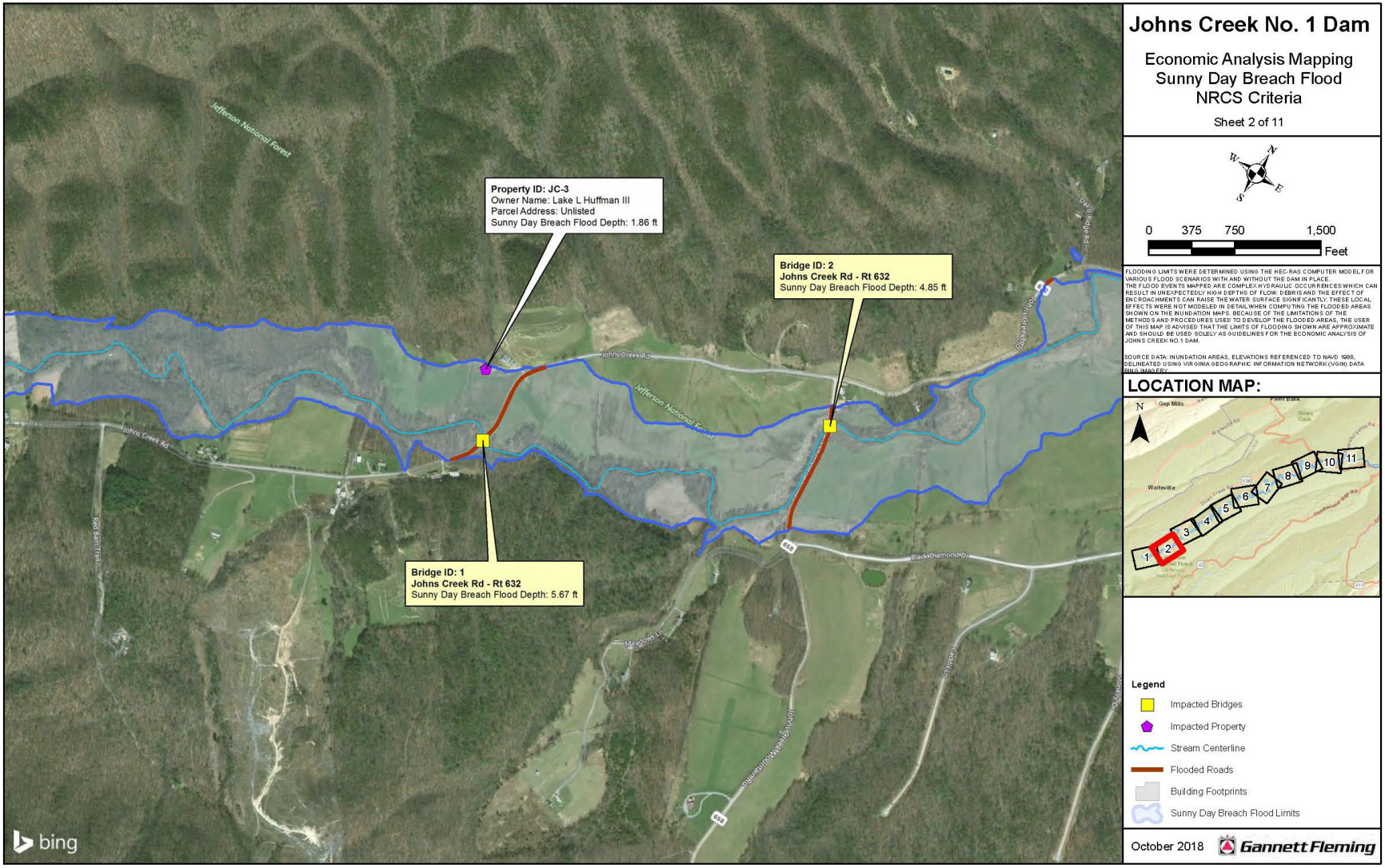


Figure C-18. Sunny Day Breach Inundation Map (Panel 3 of 11)

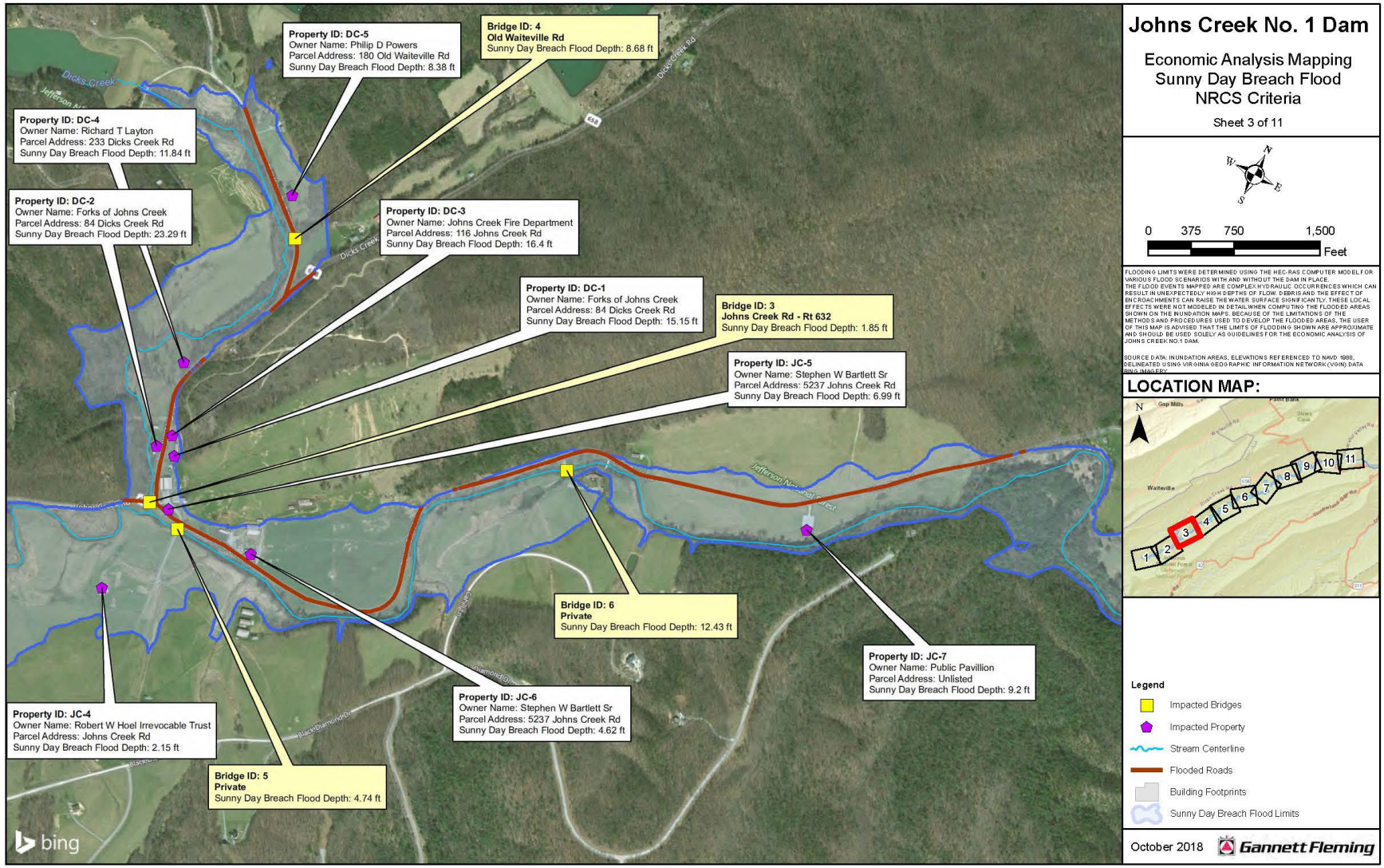


Figure C-19. Sunny Day Breach Inundation Map (Panel 4 of 11)

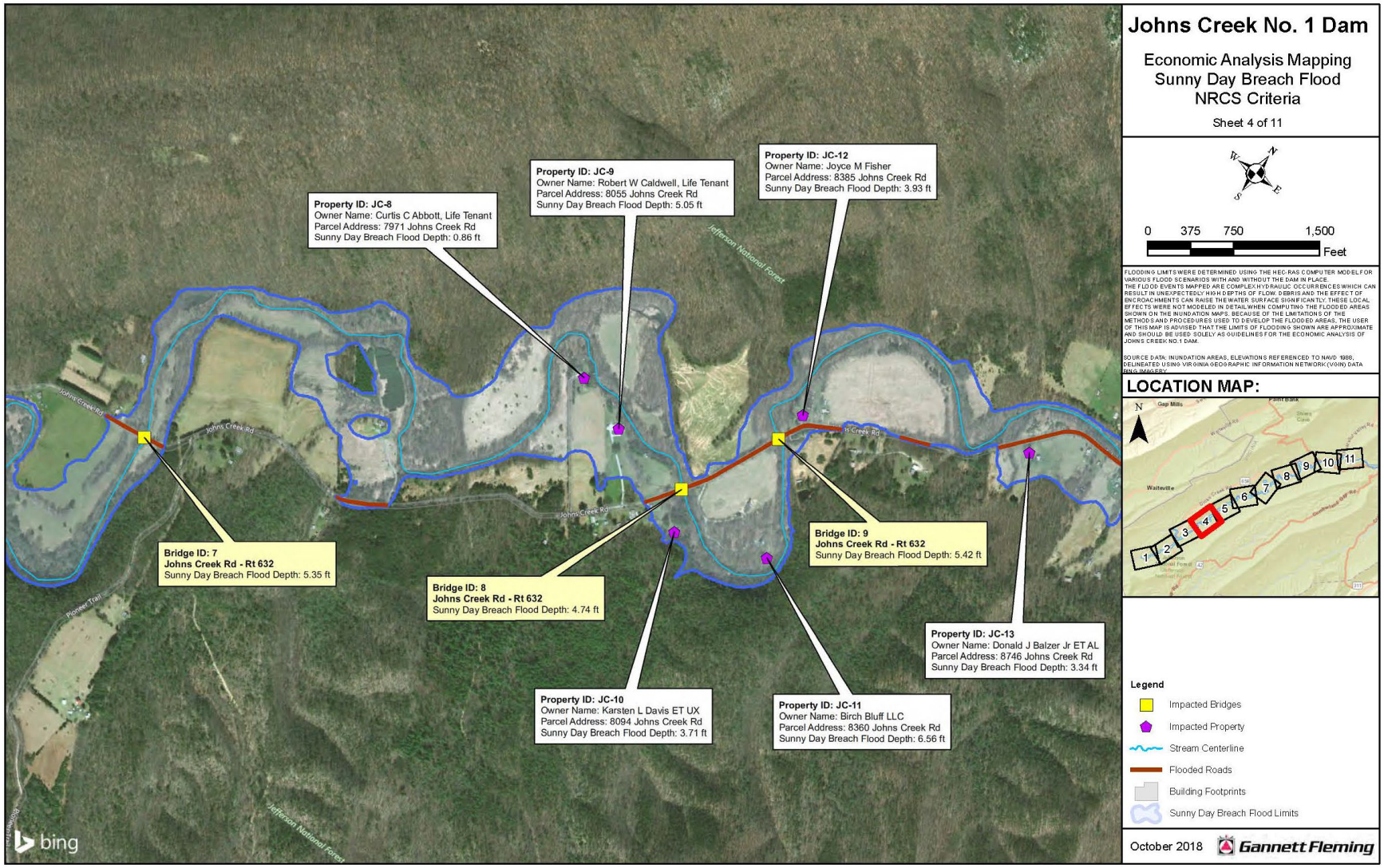


Figure C-20. Sunny Day Breach Inundation Map (Panel 5 of 11)

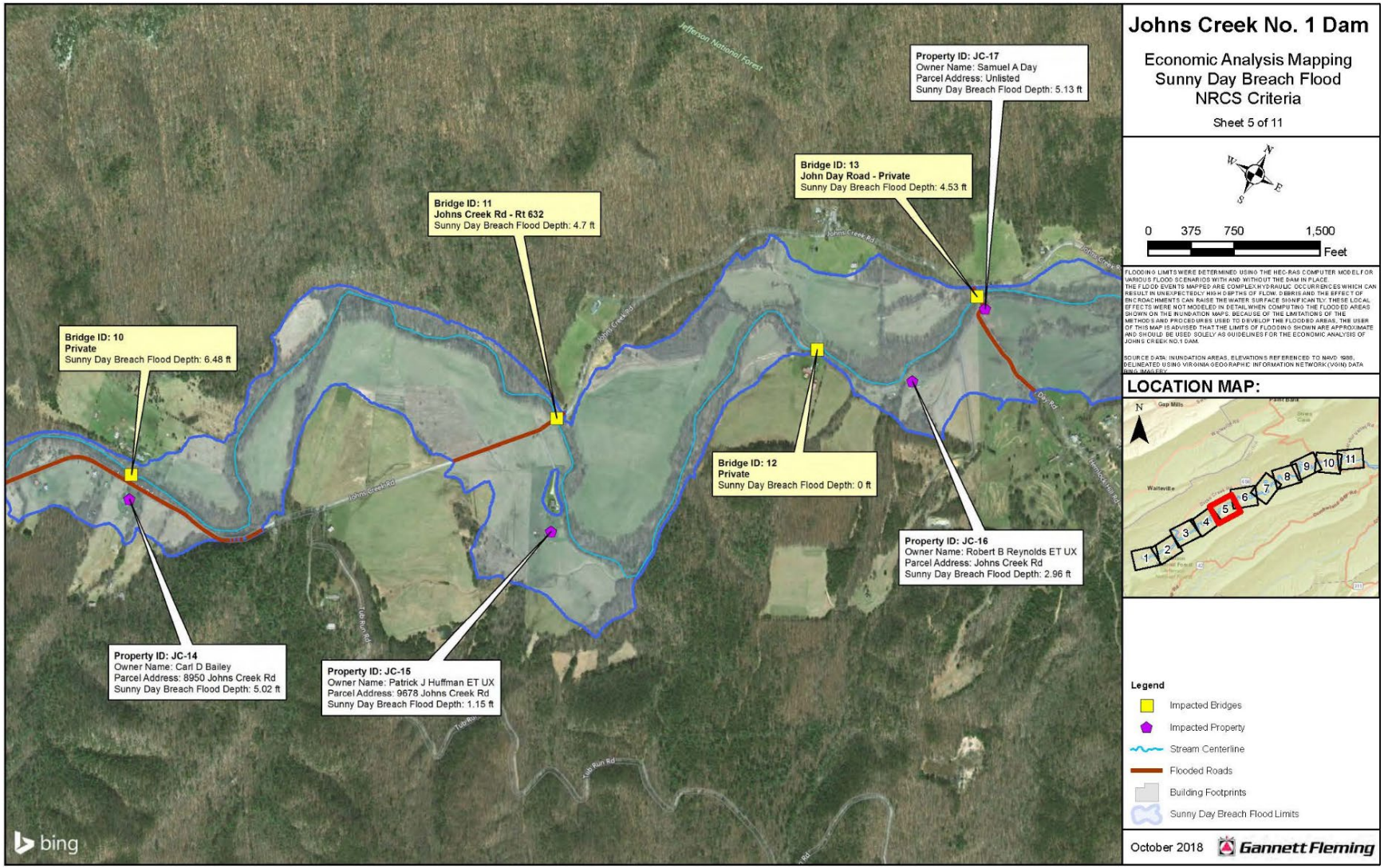


Figure C-21. Sunny Day Breach Inundation Map (Panel 6 of 11)

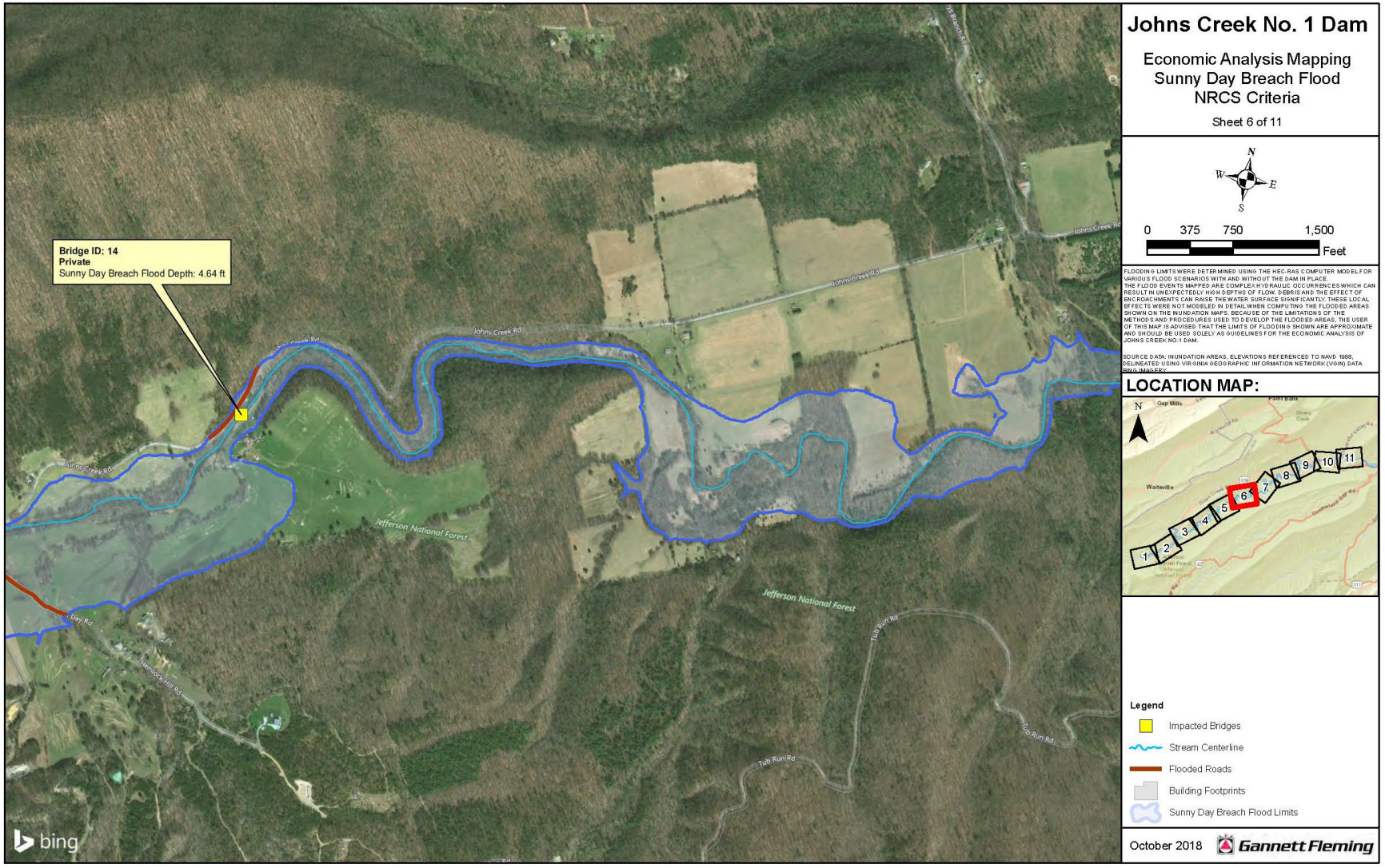


Figure C-22. Sunny Day Breach Inundation Map (Panel 7 of 11)

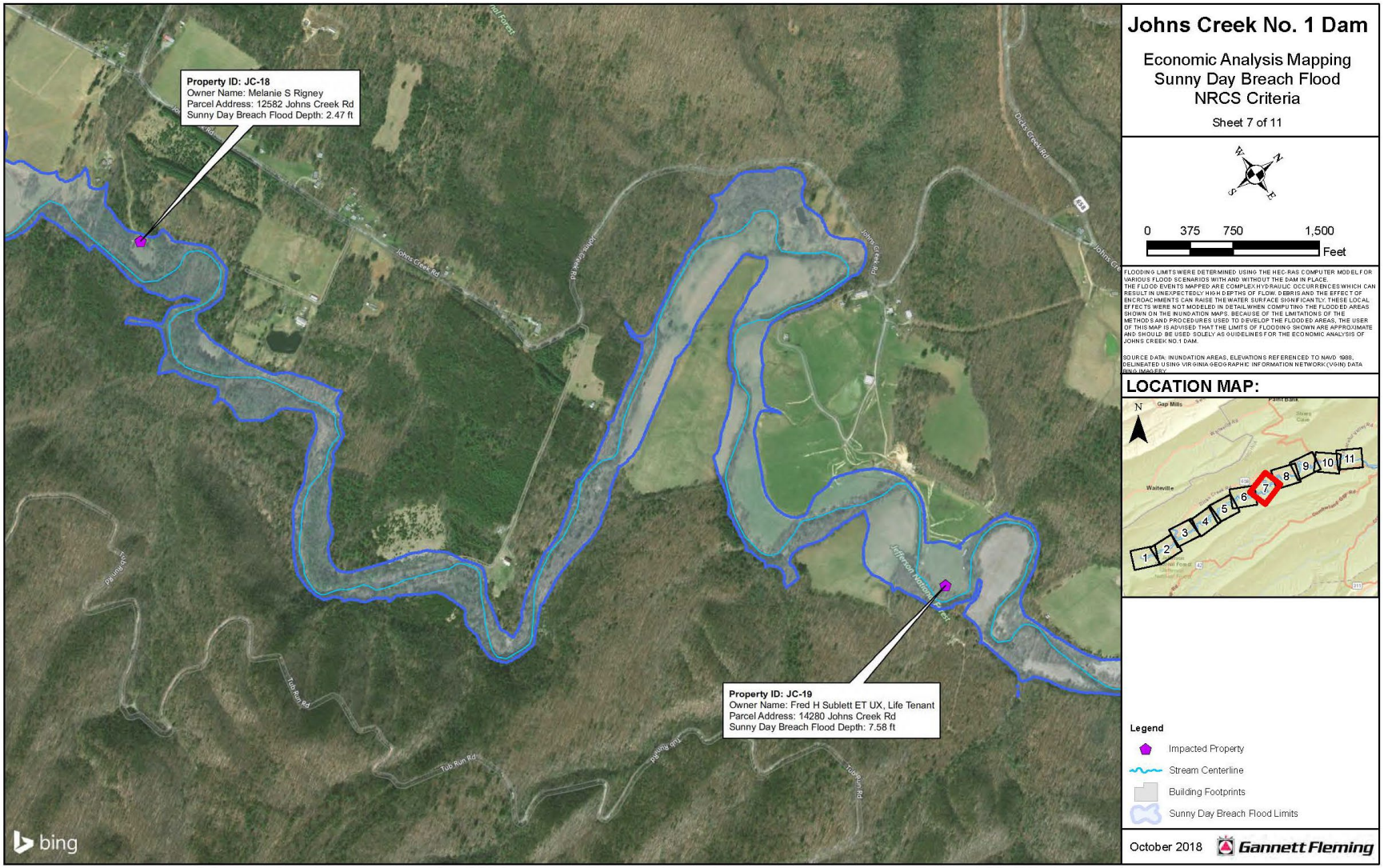


Figure C-23. Sunny Day Breach Inundation Map (Panel 8 of 11)

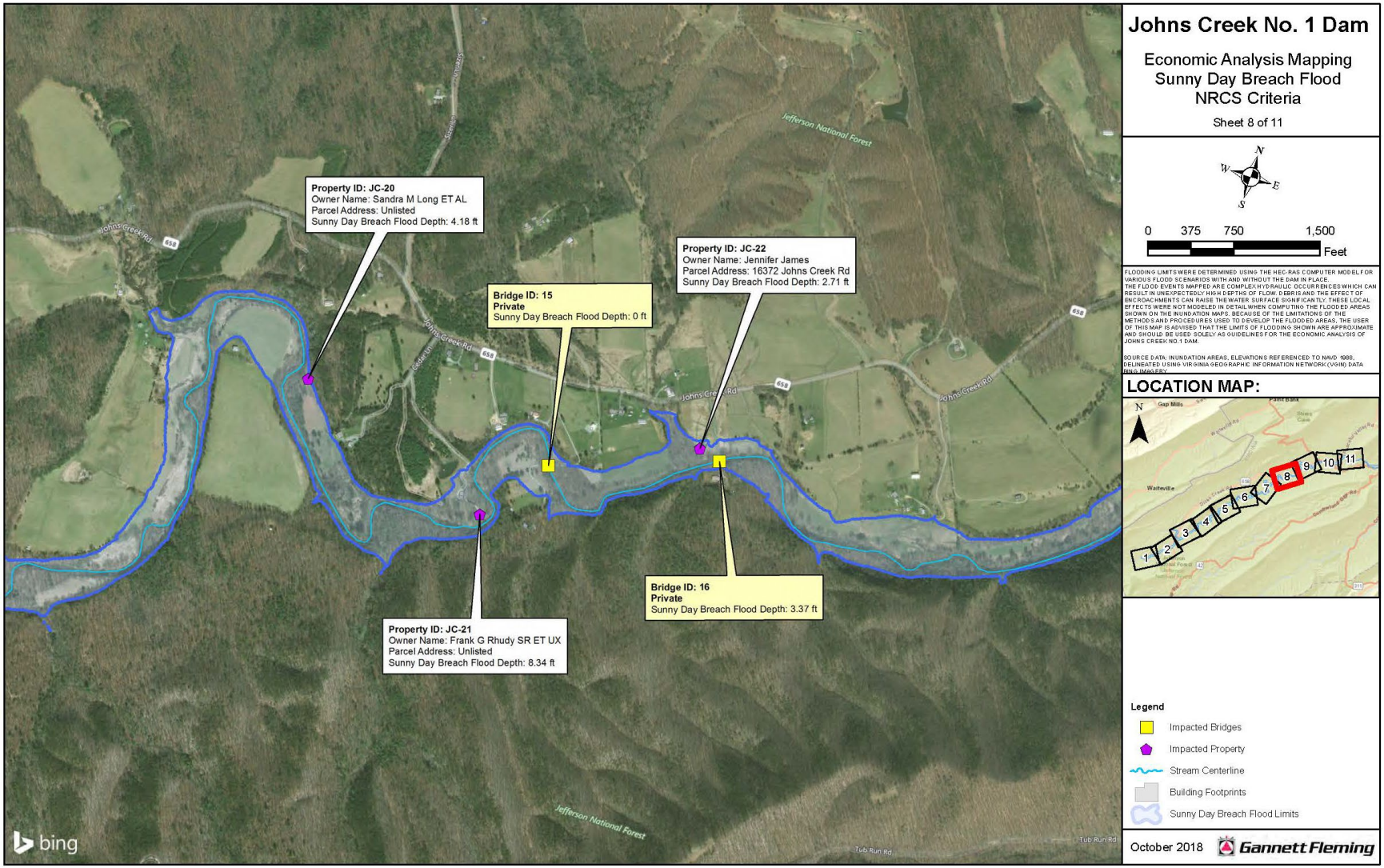


Figure C-24. Sunny Day Breach Inundation Map (Panel 9 of 11)

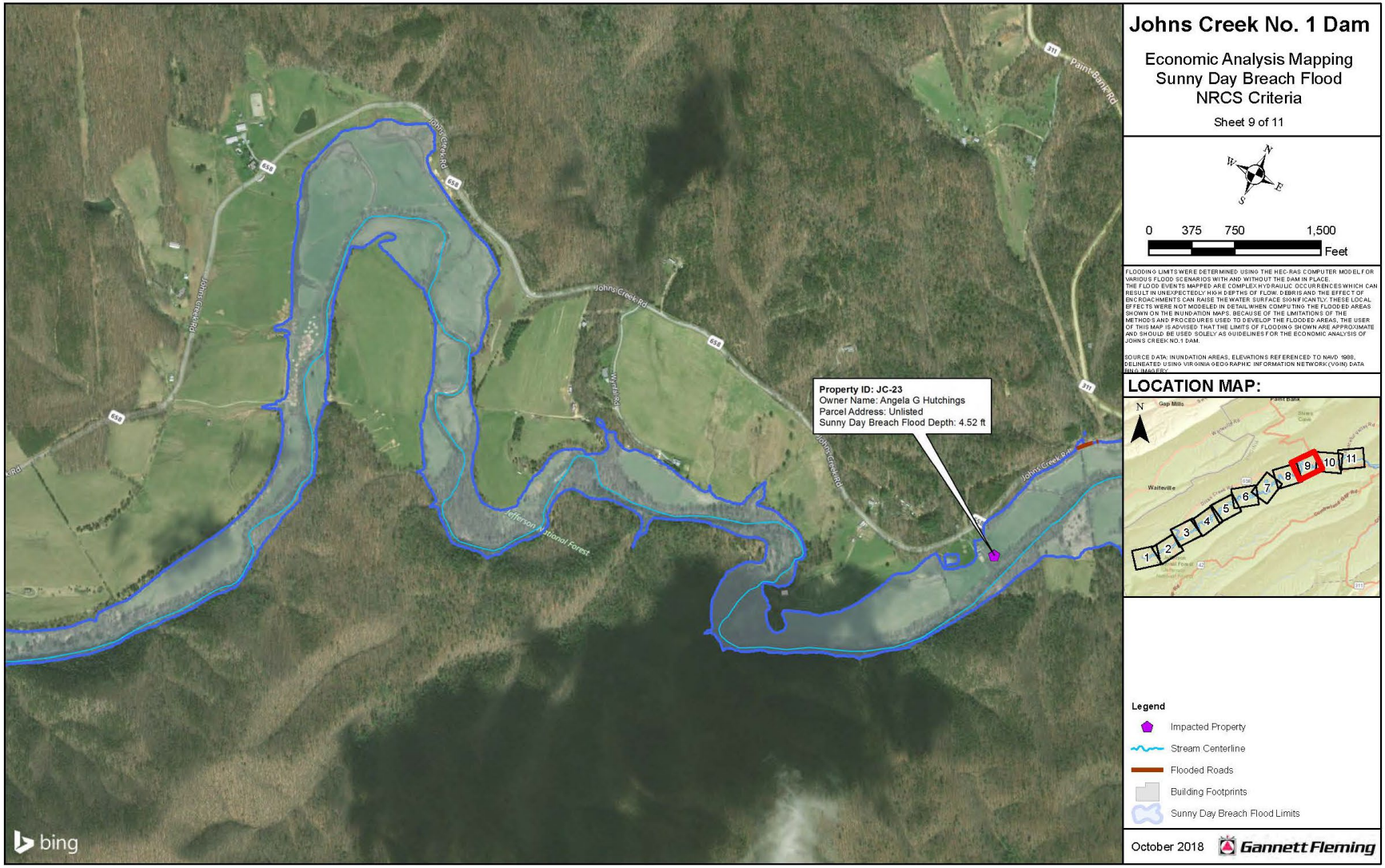


Figure C-25. Sunny Day Breach Inundation Map (Panel 10 of 11)

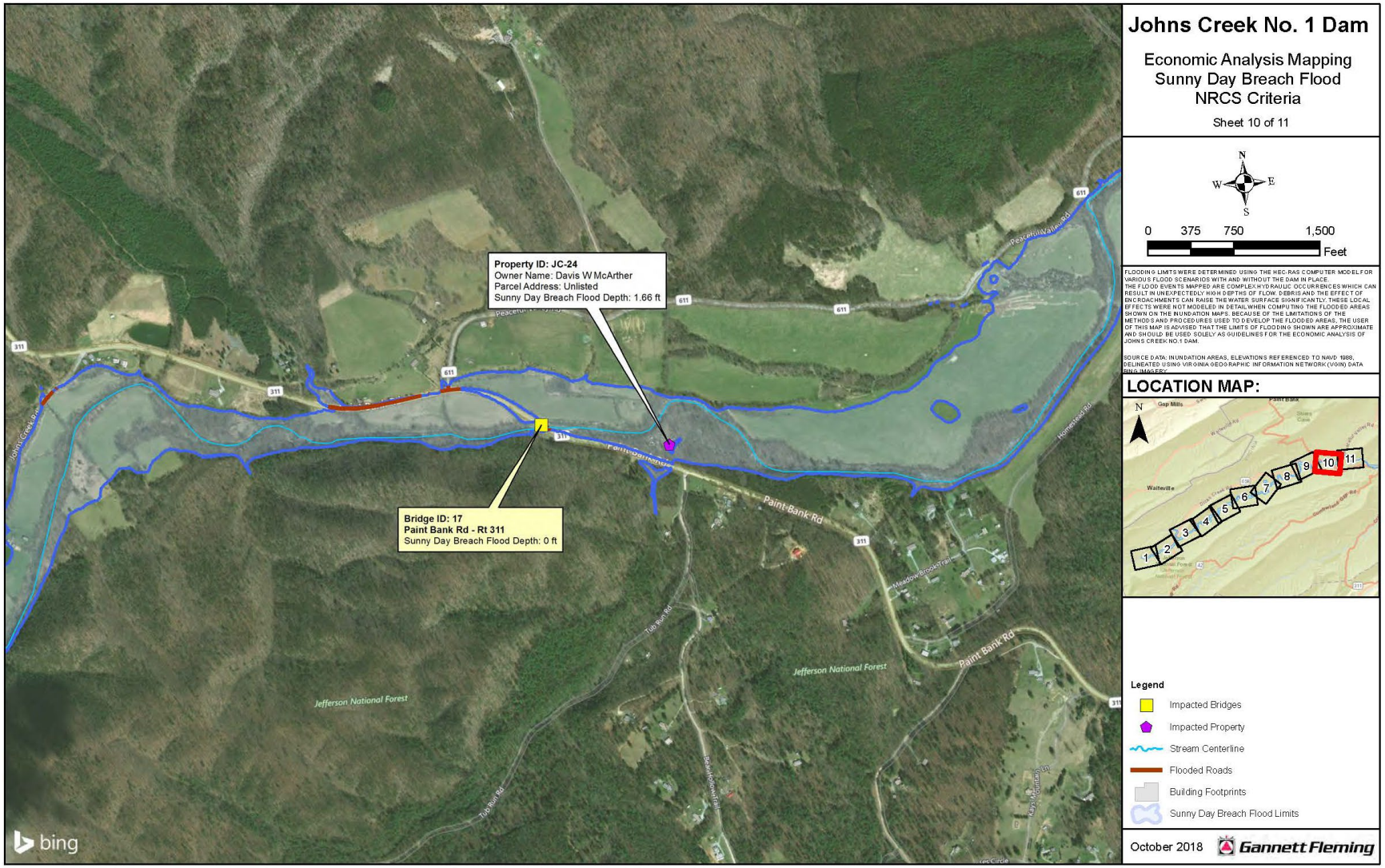


Figure C-26. Sunny Day Breach Inundation Map (Panel 11 of 11)

Figure C-27. FEMA Flood Map (Index)

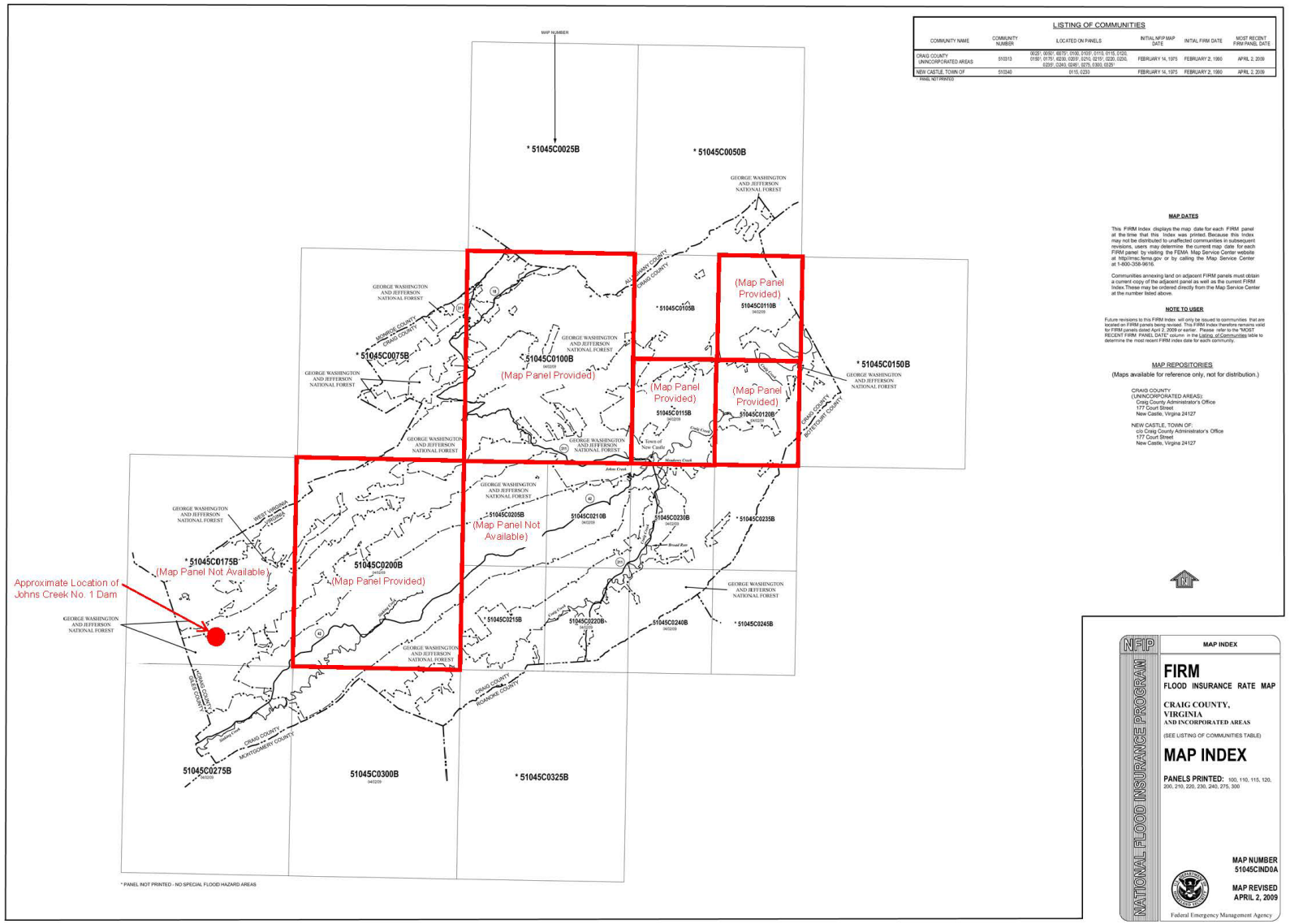


Figure C-28. FEMA Flood Map (Panel 200).

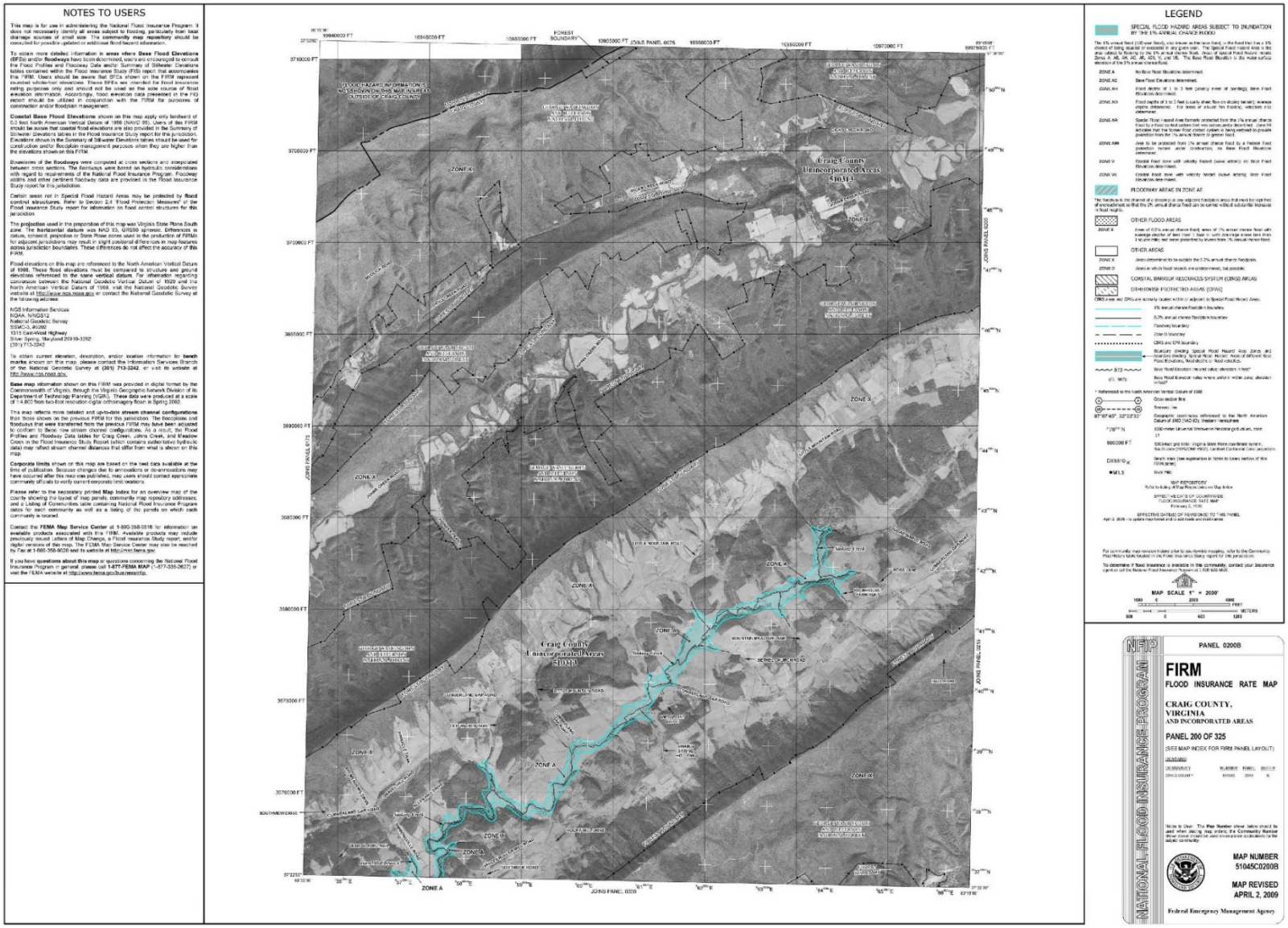


Figure C-29. FEMA Flood Map (Panel 100)

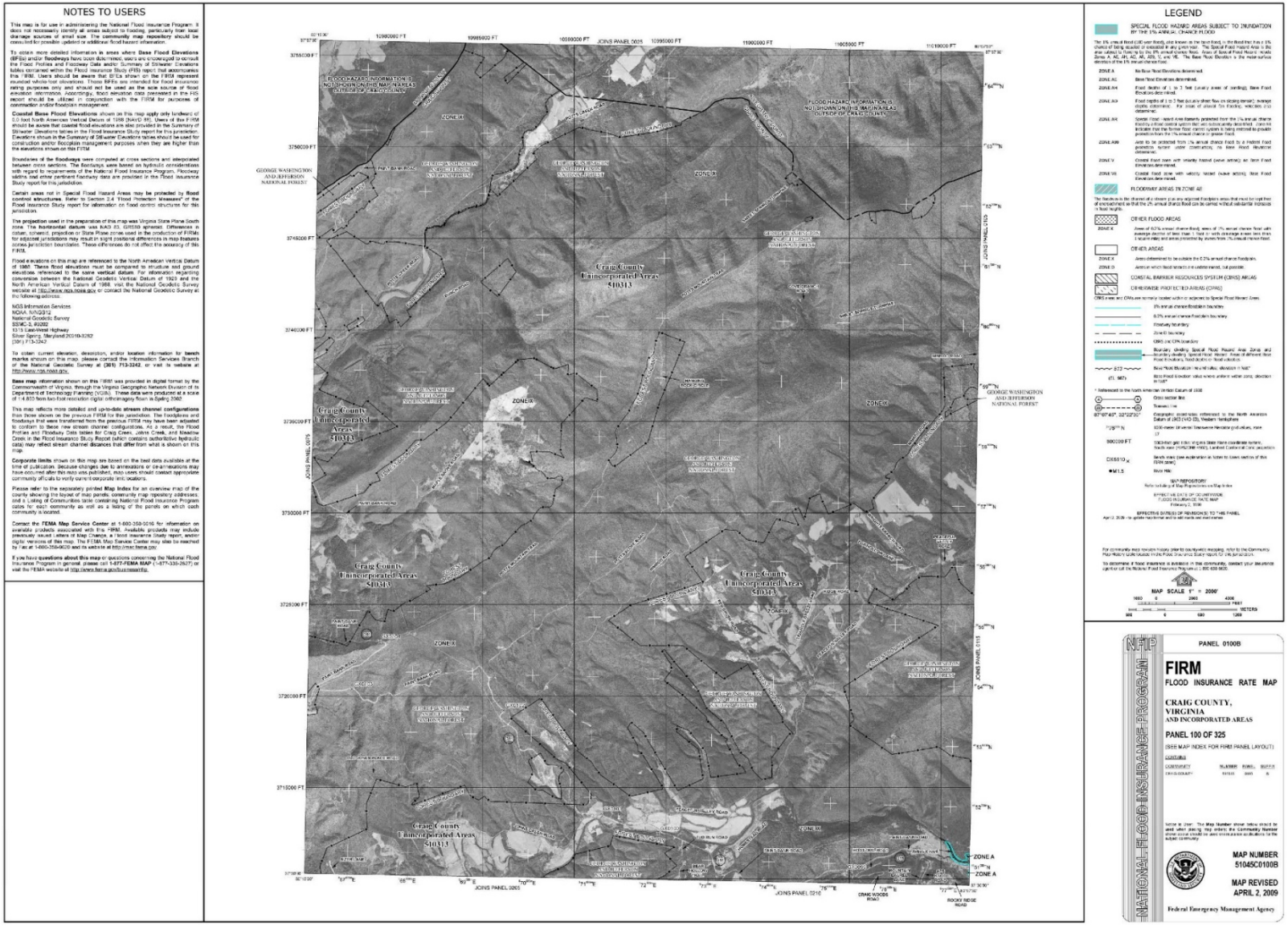


Figure C-30. FEMA Flood Map (Panel 115)

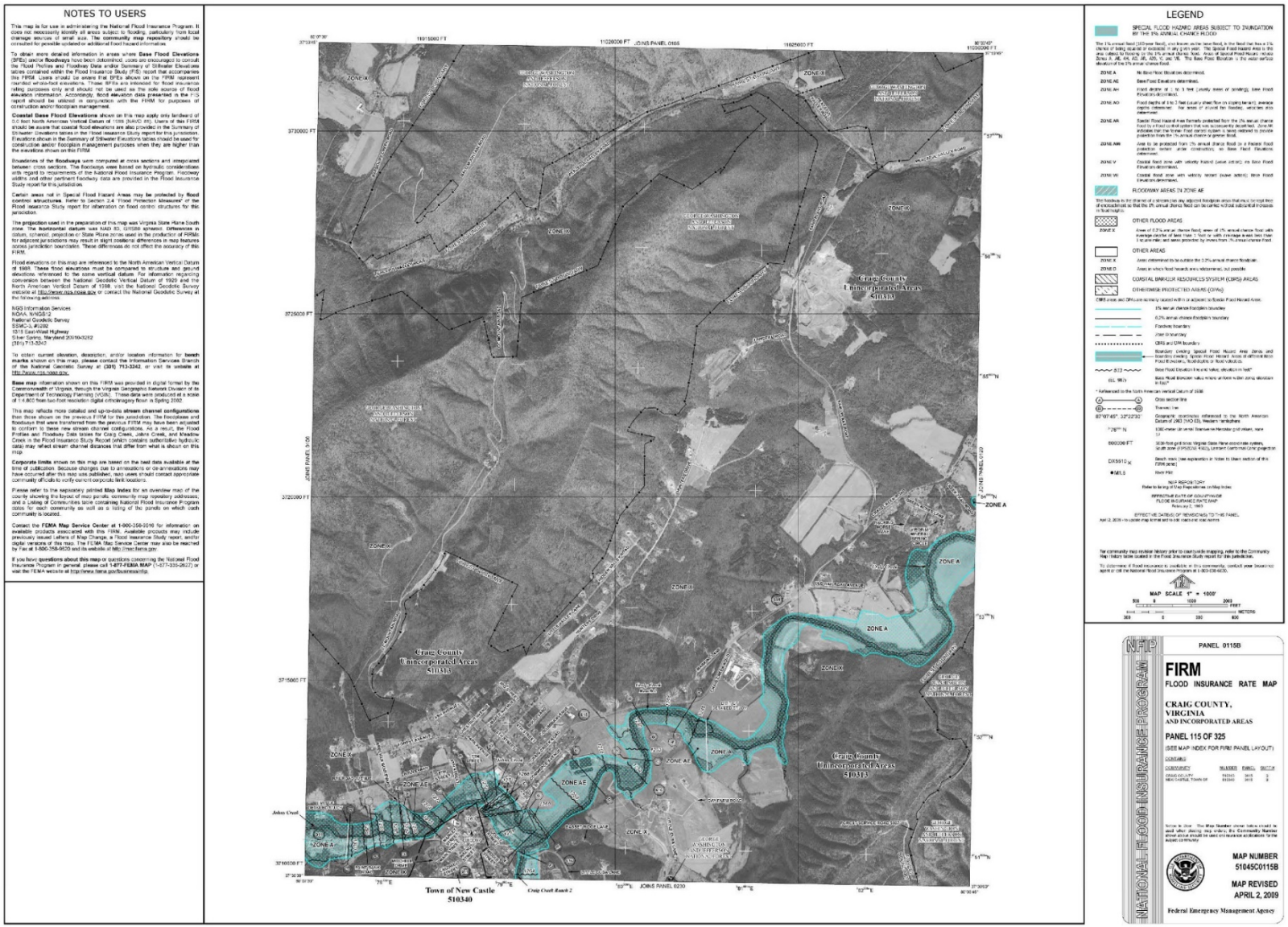


Figure C-31. FEMA Flood Map (Panel 120)

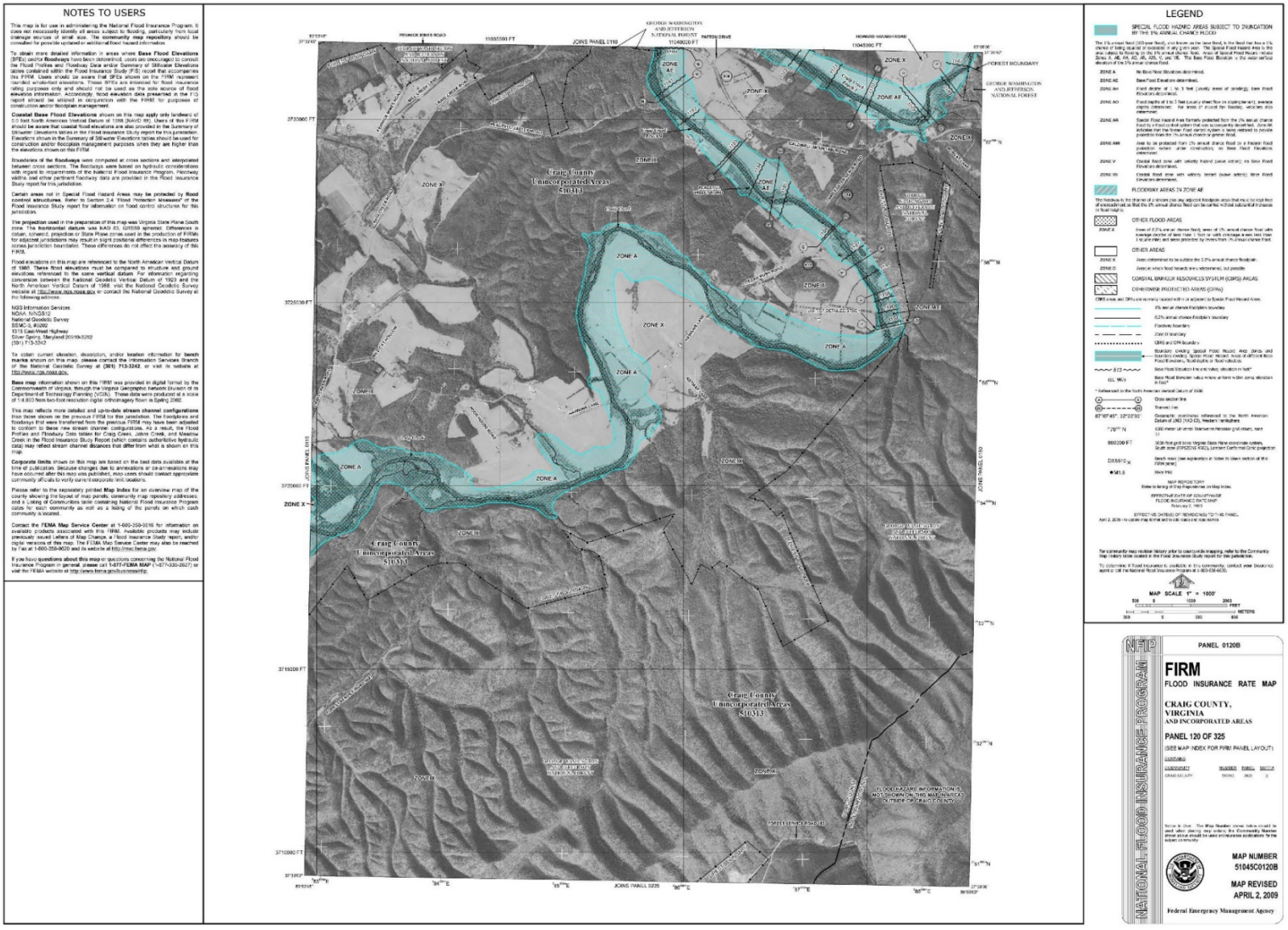
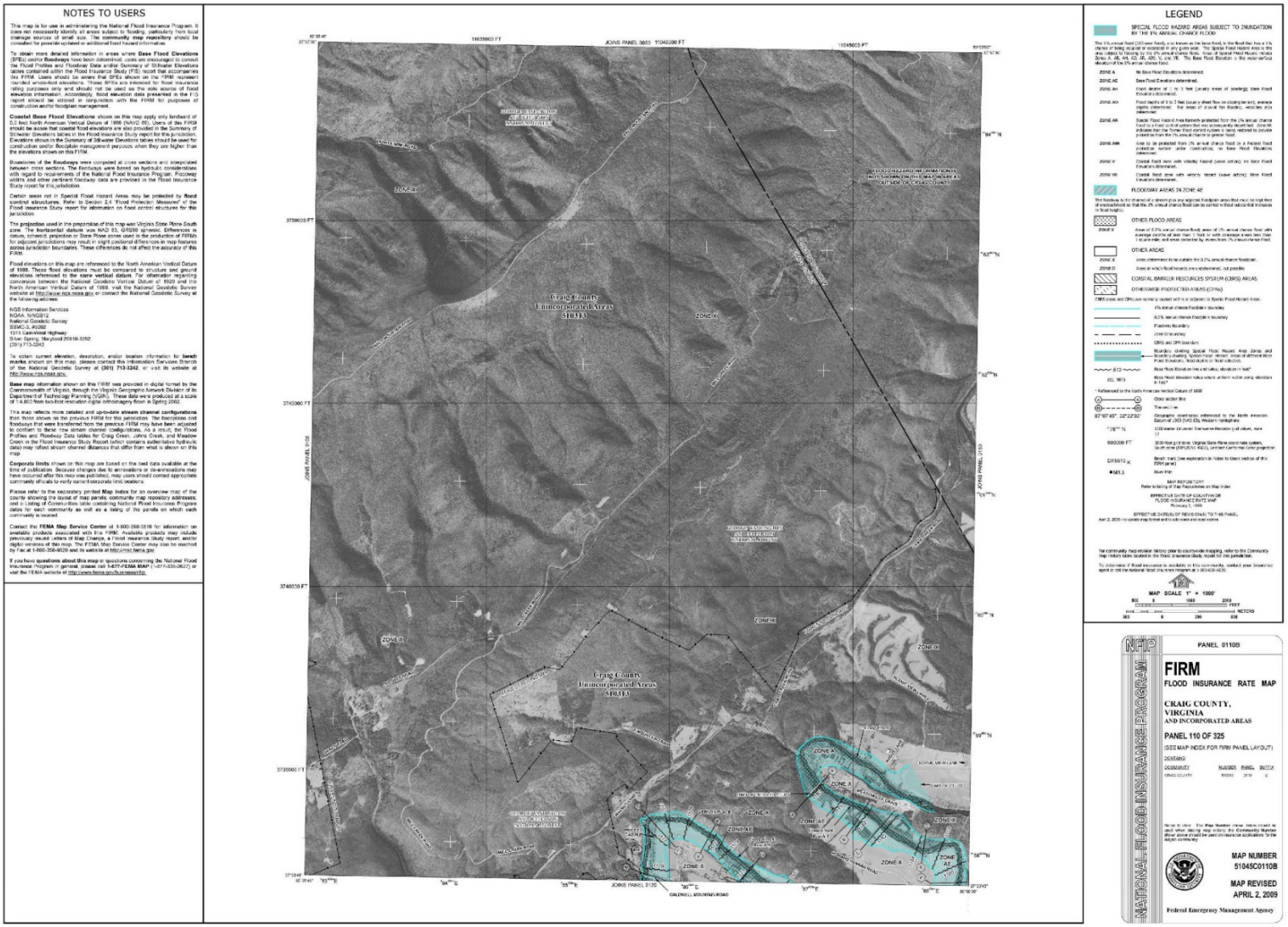


Figure C-32. FEMA Flood Map (Panel 110)



APPENDIX D

INVESTIGATIONS AND ANALYSES REPORT

Investigations and Analyses Used in the Planning for Rehabilitation of Johns Creek Dam Site No. 1 (McDaniel's Lake)

Planning Engineering

Purpose

This Investigations and Analysis Report summarizes the investigations and analysis completed for the dam rehabilitation planning engineering of Johns Creek Dam No. 1. This includes a summary and reference for the existing conditions, breach, deficiencies, alternatives studied and the selected rehabilitation alternative for Johns Creek Dam No. 1. The assumptions, investigations, analysis performed and the conclusions developed are described in detail within a document entitled *Planning Level Technical Memorandum (Phase 1 & 2) for Johns Creek No. 1 Dam,* dated March 2019, as prepared by Gannett Fleming, Inc.

The basis for the planning engineering investigations and analysis are current NRCS criteria and standards, including, but not limited to, the following:

- National Engineering Handbook, Part 630, Hydrology
- Technical Release 60, Earth Dams and Reservoirs, July 2005

Existing Conditions and Deficiencies

NRCS and consulting engineers evaluated the existing condition of the dam and appurtenances. Initial investigations by NRCS included a topographic and bathymetric survey and a sediment survey and report. In 2017, the NRCS commissioned Gannett Fleming to provide engineering assistance with the development of the Johns Creek Dam No. 1 planning study to evaluate the current condition of the dam and to develop alternatives to bring Johns Creek Dam No. 1 up to current dam safety criteria. Work by Gannett Fleming included hydrologic analysis, spillway integrity analysis, spillway capacity analysis, breach inundation mapping, subsurface investigations and geotechnical analysis, visual inspection of the dam and a video inspection of the principal spillway system. Detailed descriptions of the existing dam, reservoir and spillways are located in the *Planning Level Technical Memorandum (Phase 1 & 2) for Johns Creek No. 1 Dam*.

A visual inspection of the dam and a video inspection of the principal spillway (riser, outlet pipe and stilling basin) identified deficiencies requiring maintenance. However, the dam is well maintained and appears structurally sound.

Hydrologic Analysis

A hydrologic and hydraulic analysis of the contributing Johns Creek watershed and of the Johns Creek Dam No. 1 was performed using a HEC-HMS watershed model to establish inflow hydrographs for various storm events using the latest soils and land use maps, drainage area delineations, time of concentrations, and rainfall data. Delineation of the watershed was performed using a GIS-based approach that uses a digital elevation model (DEM). The DEM was developed from 2011 Virginia Geographic Information Network (VGIN) data. The watershed is a narrow valley without any significant topographic variability. Therefore, a single sub-basin was used for the watershed. The Runoff Curve Number (CN) for the Johns Creek Dam No. 1 watershed was

computed within a GIS environment using digital soil and land cover data, in conjunction with the digital watershed delineation. Soils data were obtained from the online NRCS Web Soil Survey application (accessed 2018) and a hydrologic soil group (HSG) was assigned to each geospatial soil map unit within the watershed. Land Use data was gathered from the online USGS National Map Viewer application, which referenced data from the National Land Cover Database of 2011 (NLCD2011). The spatial soil and land cover data were combined and CN values were assigned to each unique combination of soil and land cover codes using a custom CN lookup table. This table was derived from source material in the National Engineering Handbook (NEH). The time of concentration for the Johns Creek Dam No. 1 watershed was determined through the segmental travel time approach consistent with the hydrologic analyses for other nearby NRCS projects and precipitation data was taken from the statewide Probable Maximum Precipitation Study recently adopted by Virginia DCR.

Geotechnical Investigations and Analysis

A subsurface geotechnical investigation was performed consisting of a line of borings on the main embankment located immediately to the left of the principal spillway conduit and borings in the auxiliary spillway. The geotechnical investigations identified deficient pipe perforations and deterioration of the existing corrugated metal toe drain piping system, the absence of a complete filter diaphragm around the principal spillway outlet conduit, and the absence of measures to filter and collect seepage through the embankment. Borings located along the inside edge of the auxiliary spillway confirm at least 18 feet of overburden between the spillway crest and competent rock. These borings confirm information shown on the as-built drawings which depicts the placement of fill within the auxiliary spillway to backfill a historic roadbed and establish the current auxiliary spillway crest elevation. The subsurface data was used to develop the SITES model for the auxiliary spillway integrity and stability analysis.

Hydraulic Analysis

The SITES model was used to evaluate the capacity and integrity of the existing structure and the auxiliary spillway alternatives. Geotechnical information was taken from the subsurface investigations performed as part of this planning study. Reservoir storage was developed using topographic and bathymetric surveys performed by NRCS combined with available LiDAR data. Key elevations were taken from the current NRCS topo survey (NAVD 88) and the as-built drawings (NGVD29 converted to NAVD 88). The 6-hour storm was found to be the critical duration for the Freeboard Hydrograph (FBH). The 6-hr storm was developed using the statewide Probable Maximum Precipitation (PMP) study which was recently adopted by VA DCR in December 2015.

Results show that Johns Creek Dam No. 1 has inadequate capacity, passing approximately 38 percent of the 6-hour PMF event before overtopping of the embankment occurs. The dam does not have the integrity to resist auxiliary spillway erosion during the 6-hour PMF event and does not meet the 10-day drawdown requirement of TR-60. The dam does not meet NRCS capacity or integrity criteria for high hazard dams and the dam does not meet Virginia Division of Dam Safety criteria for a high hazard dam. It also does not meet the criteria for stability.

Seismic Analysis of the Principal Spillway Riser Structure

The principal spillway riser structure was analyzed and computed to be unstable for seismic loads associated with the maximum credible earthquake, which has a return period of 9,950 years. NRCS has determined that the principal spillway riser structure will be replaced.

Reservoir Storage

The sediment survey was conducted on April 20, 2016, using a Trimble R10 GNSS system and a Sonarmite BT Portable Survey System. A sediment thickness survey was conducted using a range pole and the Trimble R10 GNSS system. Depth and location data were compiled and edited in AutoCAD software. A three-dimensional triangular network (TIN) model of the top and bottom layers was created to estimate the storage volume.

Johns Creek Dam No. 1 Storage Capacity

Description	Storage Capacity (As-Built Value)	Storage Capacity (Observed Value – 2016)
Submerged Sediment (Below Normal Pool)	247.2 acre-feet(1)	209.8 acre-feet(2)
Aerated Sediment (Above Normal Pool)	147 acre-feet	143.9 acre-feet(3)
Auxiliary Spillway Crest (Flood Pool)	2,676 acre-feet	2,571 acre-feet(4)
Auxiliary Spillway Crest (Storage Capacity)	3,070 acre-feet	2,925 acre-feet(5)

1. As-built submerged sediment volume taken from NRCS bathymetric survey trip report dated August 2, 2016 (reservoir volume of 209.8 acre-feet plus 37.4 acre-feet of measured sediment).

2. Reservoir volume below El. 1923.4 (normal pool) per NRCS bathymetric survey 2016 is 209.8 acre-feet.

3. Available aerated sediment volume = Design volume of 147 acre-feet minus 3.1 acre-feet of aerated sediment observed during the NRCS 2016 survey = 143.9 acre-feet.

4. Current reservoir storage volume calculated using VGIN data between normal pool (El. 1923.4) and the auxiliary spillway crest (El. 1960.0) is approximately 2,715 acre-feet. Flood pool storage = 2,715 acre-feet minus aerated sediment volume of 143.9 acre-feet = 2,571 acre-feet.

5. Storage Capacity = Flood pool volume plus aerated sediment plus submerged sediment.

Dam Rehabilitation Alternatives

Johns Creek Dam No. 1

Watershed Rehabilitation Alternatives with Rationale for Level of Analysis

Alter-natives	Alternative Description	Cost (millions)	Carried Through	Rationale
No Action/Future Without Federal Project	Future Without Project - No Federal Action Alternative. Sponsors to rehabilitate the dam to meet current safety and performance standards, maintain existing top of dam crest, and maintain existing 200-year level of flood protection for downstream properties. They have decided to fully rehabilitate the dam the same way that the dam would be rehabilitated using federal assistance (see dam rehabilitation preferred alternative below for further details).	$9.9	Yes	No Action
Dam Decommissioning	Decommission the dam - Federal assistance by performing a controlled breach of the structure to reduce dam breaching hazard potential downstream. Removal of the dam would result in increased downstream flooding, requiring flood-proofing and/or relocation of buildings, roadways, bridges and utilities impacted by the without-dam 200-year event.	$11.2	No	Due to the high cost of construction and relocating or floodproofing structures, this alternative was eliminated from further study.
Dam Rehabilitation	Future With Project - Federal assistance to rehabilitate the dam to meet current safety and performance standards, maintain existing top of dam crest, and maintain existing 200-year level of flood protection for downstream properties. Install a 200-foot-wide, six cycle labyrinth spillway over the embankment.	$17.2	Yes	Due to the high cost of construction, this alternative was not selected as the preferred alternative.

Alter-natives	Alternative Description	Cost (millions)	Carried Through	Rationale
Dam Rehabilitation	Future With Project - Federal assistance to rehabilitate the dam to meet current safety and performance standards, maintain existing top of dam crest, and maintain existing 200-year flood protection for downstream properties. Install 550-foot-long Roller-Compacted Concrete (RCC) stepped spillway within embankment.	$12.7	Yes	Due to the high cost of construction, this alternative was not selected as the preferred alternative.
Dam Rehabilitation	Future With Project - Federal assistance to rehabilitate the dam to meet current safety and performance standards, raise top of dam crest by 2-feet, and maintain existing 200-year flood protection for downstream properties. Install 370-foot-long Roller-Compacted Concrete (RCC) stepped spillway within embankment.	$10.4	Yes	Due to the high cost of construction, this alternative was not selected as the preferred alternative.
Dam Rehabilitation	Future With Project - Federal assistance to rehabilitate the dam to meet current safety and performance standards, raise top of dam crest by 4-feet, and maintain existing 200-year flood protection for downstream properties. Install 270-foot-long Roller-Compacted Concrete (RCC) stepped spillway within embankment.	$9.9	Yes	Preferred Alternative

SOCIAL AND ECONOMIC CONDITIONS

Economic Analysis

The NRCS National Watershed Manual was used as a reference for the economic analysis along with three economic analysis guidance documents: "Principles and Guidelines for Water and Land Related Resources Implementation Studies (P&G), December 1983, and the "Economics Handbook, Part II for Water Resources", USDA/Natural Resources Conservation Service, July 1998. In addition, Principles, Requirements and Guidelines (PR&G) for Federal Investments in Water Resources, March 2013, will soon be officially approved for use within the NRCS. These guidance documents were used to evaluate potential flood damages and estimate project benefits and associated costs. P&G and PR&G were developed to define a consistent set of project formulation and evaluation instructions for all federal agencies that carry out water and related land resource implementation studies. These guidance documents direct how to evaluate alternative project actions and determine whether or not benefits from the proposed actions exceed project costs.

P&G, as well as PR&G, allow for abbreviated procedures commensurate with the planning and policy context to be used (P&G section 1.7.2 (a) (4) (ii) and PR&G section Chapter 2, 2.1B, pages 7-8), when more detailed analysis will not alter identification of the recommended National Economic Development alternative. In this case, the future without federal project and the future with federal project involve the same least-cost alternative with comparable scope, effects, benefits and costs. No net change in benefits occurs when comparing the two candidate plans to each other.

Per use of abbreviated procedures allowed by P&G, PR&G and NRCS policy, avoidance of the local cost is claimed as the benefits of the federally-led dam rehabilitation. The federally assisted alternative as displayed credits local costs avoided (Total Adverse Annualized for the Future Without Federal Project scenario) as adverse beneficial effects (Total Beneficial Annualized) consistent with P&G 1.7.2(b)(3). Thus, although the average annual benefits of rehabilitation are $349,800, net benefits are zero because the total project cost is equal to the claimed benefits and the resulting B/C ratio is 1:1.

In addition, one other overarching concern associated with dam rehabilitation analyses is the intent of the program to minimize threat to human life. Threat to human life is central to the dam rehabilitation program. Agency policy allows for use of the other social effects goal (account in P&G terms) to make the case for rehabilitating any given floodwater detention structure, even if the associated B/C ratio were less than 1:1. This is due to a priority placed on protecting lives. Also, trying to monetize the value of life, or in the case of dams, avoidance of loss of life, is fraught with subjective value judgements. Threat to human life can therefore be used to supersede purely economic considerations when deemed appropriate.

Flood damages. Assessed values for all homes and other properties within the breach inundation zone and the 100-year, 200-year, and 500-year flood zones were obtained from local government sources within the watershed and used to estimate damages from a possible catastrophic breach. Estimated flood damages were based on the results of the hydrology and hydraulics (H&H) simulation modeling indicating that a maximum peak discharge average depth of 6.8 feet would be experienced outside of the stream channel should a breach event occur. The depth of flood water data from the H&H analyses was then used with water depth to damage functions developed by the Federal Emergency Management Agency (FEMA) to estimate structural damages. Content

values were then estimated as a function of assessed property values. All estimated values and damages were assessed within a customized Excel template prepared for this purpose.

Period of Analysis Determination. Fifty, 75 and 100 year expected useful lives were evaluated (52, 77 and 102-year periods of analysis including 1 year for design and 1 year for construction). A net present value analysis was conducted comparing the three alternative periods of analysis. Average annual values were also estimated. The added cost to replace the principal spillway riser and components (the trash-rack and gate valves), as well as to slip-line the principal spillway in year 50, were used to assess net benefits for the 75 and 100-year project investments. All costs of installation, operation and maintenance were based on 2019 prices. The costs associated with designing and implementing all structural measures were assumed to be implemented over the aforementioned two-year period. The federal action with a 52-year period of analysis yielded the highest net benefits using the mandated 2.875% discount rate for all federal water resource projects for FY19 to discount and amortize the anticipated streams of costs and benefits.

Johns Creek Dam 1 Period of Analysis Determination

Johns Creek Site 1 Period of Analysis Determination												
Discount rate:	2.875%	Design and replacement of principal spillway metalwork and gate assumed to be needed in year 50:										$35,000
		Principal spillway is assumed to be slip-lined in year 50:										$230,400
												$0
Alt.	50-year Investment			75-year Investment			90-year Investment			100-year Investment		
NPV:	$0			($64,329)			($64,329)			($64,314)		
AAV:	$0			($2,100)			($2,006)			($1,964)		
Year	Benefits	Costs	Present Values	Benefits	Costs	Present Values	Benefits	Costs	Present Values	Benefits	Costs	Present Values
-2	$638,017	$638,017	$0	$638,017	$638,017	$0	$638,017	$638,017	$0	$638,017	$638,017	$0
-1	$9,140,063	$9,140,063	$0	$9,140,063	$9,140,063	$0	$9,140,063	$9,140,063	$0	$9,140,063	$9,140,063	$0
1	$5,000	$5,000	$0	$5,000	$5,000	$0	$5,000	$5,000	$0	$5,000	$5,000	$0
49	$5,000	$5,000	$0	$5,000	$5,000	$0	$5,000	$5,000	$0	$5,000	$5,000	$0
50	$5,000	$5,000	$0	$5,000	$270,400	($64,329)	$5,000	$270,400	($64,329)	$5,000	$270,400	($64,329)
51	$0	$0	$0	$5,000	$5,000	$0	$5,000	$5,000	$0	$5,000	$5,000	$0
74	$0	$0	$0	$5,000	$5,000	$0	$5,000	$5,000	$0	$5,000	$5,000	$0
75	$0	$0	$0	$5,000	$5,000	$0	$5,000	$5,000	$0	$5,000	$5,000	$0
76	$0	$0	$0	$0	$0	$0	$5,000	$5,000	$0	$5,000	$5,000	$0
89	$0	$0	$0	$0	$0	$0	$5,000	$5,000	$0	$5,000	$5,000	$0
90	$0	$0	$0	$0	$0	$0	$5,000	$5,000	$0	$5,000	$5,000	$0.04
91	$0	$0	$0	$0	$0	$0	$0	$0	$0	$5,000	$5,000	$0
92	$0	$0	$0	$0	$0	$0	$0	$0	$0	$5,000	$5,000	$0
93	$0	$0	$0	$0	$0	$0	$0	$0	$0	$5,000	$5,000	$0
94	$0	$0	$0	$0	$0	$0	$0	$0	$0	$5,000	$5,000	$0
95	$0	$0	$0	$0	$0	$0	$0	$0	$0	$5,000	$5,000	$0
96	$0	$0	$0	$0	$0	$0	$0	$0	$0	$5,000	$5,000	$0
97	$0	$0	$0	$0	$0	$0	$0	$0	$0	$5,000	$5,000	$0
98	$0	$0	$0	$0	$0	$0	$0	$0	$0	$5,000	$5,000	$0
99	$0	$0	$0	$0	$0	$0	$0	$0	$0	$5,000	$5,000	$0
100	$0	$0	$0	$0	$0	$0	$0	$0	$0	$5,000	$5,000	$0

Note: this is a compressed jpeg image of the actual Excel spreadsheet; intervening years between years 1 and 49, 51 and 74 have been hidden solely for the purpose of truncating the table for presentation purposes; and all of the hidden cells contain contents equal to the un-hidden row above them.

Recreational activities around and on the reservoir will be impacted during construction but are expected to return to before construction levels once the rehabilitation is completed. No new investments in recreational facilities are planned and recreation benefits are not claimed as a part of project benefits. Therefore, incidental recreation occurring as part of the site is expected to continue but was not evaluated and no recreation benefits are included in the economics tables. Since recreation is not a planned purpose for this project, all costs for incidental recreation will be paid with non-federal funds.

Flood-pool Risk Analysis

Planning principles were used to conduct an analysis of the risk associated with induced flooding due to flood-pool water levels above the crest of the auxiliary spillway and the potential cost of meeting current top of dam easement policy. The difference between the crest of the auxiliary spillway elevation (1960.0 feet) and the elevation of the flood-pool associated with a PMP event (1970.5 feet), as compared to the top of dam elevation of 1966.5 feet, was used to estimate potential structure and content damages to the existing ten properties upstream of the dam potentially in harm's way (with points of water entry below the top of dam). A set of assumptions were used to estimate: 1) the cost of easements for the added 11.1 acres of land (easement encumbrance costs and legal fees for each parcel owner); 2) the value of residences and associated contents on the 9 identified parcels; and 3) estimated damages from all storm events (as represented by the following specific modeled storms: 100, 200, 500, 1,000 year and PMP event for the with rehabilitation conditions) based upon an average flood depth of 3.0 feet for the PMP event.

The associated average annual damages for all storm events were estimated to be $190. The estimated average annual cost for acquiring additional easements to the top of dam, including administrative costs (legal and deed restriction recording fees) were estimated to be $33,750 (excludes any estimates for litigation.). The resulting benefit/cost ratio comparing average annual costs for all storm events induced from flood-pool damages (average annual value of flood-pool damages avoided) vs. average annual cost for establishment of the added easements (cost to avoid possible damages); mathematically: average annual cost of the potential flood-pool damages without easements divided by the average annual cost of establishing the easements) came out to 0.20:1; a very low B/C ratio, especially considering that the site is a very low risk site for development and build-out. Alternatively expressed, for every $1 in benefits (damages avoided), over $5 would have to be expended to acquire full extension of easements to the top of the dam.

This analysis along with alternatives for managing flood-pool risk were presented to the local sponsors. The alternatives presented in no particular order were: 1) do nothing, i.e., accept the potential risk and possible associated implications whatever they might be including the risk of litigation; 2) acquire easements to the top of the dam; 3) Procure an insurance policy explicitly for the flood-pool risk; 4) attempt to acquire a waiver of the risk from all landowners for the 70 existing parcels with property below the top of dam; and/or 5) pass a setback ordinance preventing future development below the top of dam.

The local sponsors unequivocally prefer to live with the existing easement and its associated risk for potential damages. The local sponsors accepted and have lived for almost 50 years with the existing easement and its associated potential for risk of flood damages. The Sponsors have determined that acquisition of additional easement area to meet current NRCS policy to the top of dam would require a significant added cost without an equally significant benefit. Therefore, they have committed to attempt to acquire a waiver of the flood pool risks from all nine landowners that have land below the new top of dam elevation; Craig County will enact a land use ordinance that prevents future development below the new top of dam elevation; and to revise the existing USFS Special Use Permit to allow the added flood-pool flooding on USFS land that arises from the top of dam raise.

ENVIRONMENTAL CONDITIONS

Threatened and Endangered Species

NRCS obtained the Official Species List from the USFWS in April 2019 via the online Information, Planning and Conservation (IPaC) system, https://ecos.fws.gov/ipac/. Two Federally endangered species, the Indiana bat (*Myotis Sodalis*), and the James spinymussel (*Pleurobema collina*) as well as two Federally threatened species, the northern long-eared bat (*Myotis septentrionalis*), and the yellow lance (*Elliptio lanceolate*) were identified as potentially present.

Based upon the IPaC results, the NRCS followed up with a search of the Virginia Department of Game and Inland Fisheries' (VDGIF) on-line Northern Long-eared Bat (NLEB) Winter Habitat and Roost Tree ARC GIS System, http://dgif-virginia.maps.arcgis.com/apps/webappviewer/index.html?id=32ea4ee4935942c092e41ddcd19e5ec5. Using the search tool, NRCS found the proposed action's affected environment to be outside of the half-mile buffer of recorded NLEB winter hibernaculum but within the 5.5-mile buffer, approximately 3.23 miles away.

Water Quality

Water quality data was taken from the Final 2016 Virginia 305(b)/303(d) Water Quality Assessment Integrated Report, released in April of 2018.

Wetlands

A wetland investigation for Johns Creek Dam 1 was completed during the growing season of 2018. Prior to conducting fieldwork, an off-site evaluation was completed. NRCS consulted the USGS 7.5 minute Topographical Quadrangle Map, the National Wetlands Inventory Interactive Mapper (NWI) website administered by the USFWS, and soil survey information provided by NRCS. Fieldwork was conducted using methods as outlined in the *1987 Corps of Engineers Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)*.