

Draft Supplemental Watershed Plan – Environmental Assessment for the Rehabilitation of New Creek Site 1 Watershed Dam

Mineral County, West Virginia



July 2023

Prepared for:

Natural Resources Conservation Service
West Virginia State Office
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Morgantown, WV 26505

West Virginia Conservation Agency
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Project No. 061371



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Supplemental Watershed Plan & Environmental Assessment

Rehabilitation of New Creek Site 1 of the New Creek-Whites Run Subwatersheds of the Upper Potomac River Watershed, Mineral County, West Virginia State

Prepared By:

Federal Lead Agency: U.S. Department of Agriculture, Natural Resources Conservation Service, and the

Cooperating Agency: West Virginia Conservation Agency

In Coordination With:

the Potomac Valley Conservation District and the City of Keyser

AUTHORITY

The original watershed work plan was prepared, and works of improvement have been installed, under the authority of the Flood Control Act of 1944 (Public Law 78-534) as amended. The rehabilitation of floodwater retarding structure New Creek Site 1 is authorized under Public Law 83-566 (as amended), and as further amended by Section 313 of Public Law 106-472.

ABSTRACT

New Creek Site 1 (Site 1) was constructed in 1957 as part of a series of nine floodwater retarding dams in the New Creek-White's Run Sub-Watersheds of the Upper Potomac River Watershed, Mineral and Grant Counties, West Virginia. Site 1 was constructed as a single purpose high-hazard structure and is currently classified as a high-hazard, flood protection dam that impounds a tributary to New Creek and serves a drainage area of approximately 213 acres (0.33 square miles).

A 2011 dam assessment noted several deficiencies of safety concern and the results of investigations have confirmed these deficiencies, which include the lack of sound defensive measures to reduce, filter, and discharge seepage; inadequate slope stability factors of safety; concerns regarding the design of the principal spillway riser, modifications to the principal spillway outlet conduit and plunge pool, and concerns related to the alignment of the auxiliary spillway exit channel and downstream development constructed since completion of the dam. Consequently the dam does not meet current Natural Resources Conservation Service (NRCS) or West Virginia Department of Environmental Protection (WVDEP) dam design safety and engineering criteria and performance standards for a High Hazard dam.

The preferred alternative is to rehabilitate the dam to address the identified safety deficiencies and maintain the current level of flood protection for the City of Keyser. Rehabilitation of Site 1 will require the following modifications to the dam structure: (1) addition of an embankment toe drain to filter, collect and discharge seepage through the embankment, (2) flatten the downstream embankment slope to increase slope stability factors of safety, (3) replacement of the principal spillway riser structure, (4) abandonment of the existing auxiliary spillway and relocation via construction of an RCC spillway over the dam embankment, (5) reconstruction of the downstream end of the principal spillway outlet conduit including filter diaphragm and energy dissipation features, (6) and maintenance activities to remove existing obstructions. To implement the preferred alternative, displacement of two residential properties would be required.

Total project installation cost is estimated to be \$7,161,100, of which \$4,620,600 will be paid from the Small Watershed Rehabilitation funds and \$2,540,500 from Sponsor funds.

Comments and inquiries must be received by September 1, 2023.

Submit comments and inquiries to: Erin O'Leary, Civil Engineer
United States Department of Agriculture
Natural Resources Conservation Service
West Virginia State Office
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Supplemental Subwatershed Work Plan Agreement Number 6

**Between the Potomac Valley Conservation District, the City of Keyser, and
the West Virginia State Conservation Agency
(Referred to herein as Sponsors)
State of West Virginia**

and the

**United States Department of Agriculture
Natural Resources Conservation Service
(Referred to herein as NRCS)**

Whereas, the work plan for the New Creek-Whites Run Subwatersheds of the Upper Potomac River Watershed, State of West Virginia, was executed by the sponsors named therein and the Soil Conservation Service (SCS, now NRCS), became effective on the 11th day of March, 1957; and

Whereas, the Supplemental Subwatershed Plan Agreement Number 1 for the New Creek-Whites Run Subwatersheds of the Upper Potomac River Watershed, State of West Virginia, executed by the Sponsors named therein and the NRCS, became effective on the 16th day of December, 1959; and

Whereas, the Supplemental Subwatershed Plan Agreement Number 2 for the New Creek-Whites Run Subwatersheds of the Upper Potomac River Watershed, State of West Virginia, executed by the Sponsors named therein and the NRCS, became effective on the 17th day of January, 1961; and

Whereas, the Supplemental Subwatershed Plan Agreement Number 3 for the New Creek-Whites Run Subwatersheds of the Upper Potomac River Watershed, State of West Virginia, executed by the Sponsors named therein and the NRCS, became effective on the 3rd day of October, 1961; and

Whereas, the Supplemental Subwatershed Plan Agreement Number 4 for the New Creek-Whites Run Subwatersheds of the Upper Potomac River Watershed, State of West Virginia, executed by the Sponsors named therein and the NRCS, became effective on the 23rd day of August, 1991; and

Whereas, the Supplemental Subwatershed Plan Agreement Number 5 (Rehabilitation of Site 17) for the New Creek-White's Run Subwatershed of the Upper Potomac River Watershed, State of West Virginia, executed by the Sponsor's named therein and the NRCS, became effective on the 6th day of May, 2021;

Whereas, in order to rehabilitate Site 1 of said subwatershed, it has become necessary to modify said agreement; and

Whereas, the rehabilitation of Site 1 has been authorized under the authority of Public Law 83-566, as amended, the Watershed Protection and Flood Prevention Act of 1954; and as further amended by Section 313 of Public Law 106-472; and

Whereas, the responsibility for administration of the Flood Prevention Program authorized by Watershed Protection and Flood Prevention Act (Public Law 83-566), as amended, has been assigned by the Secretary of Agriculture to the NRCS; and

Whereas, a Supplemental Subwatershed Work Plan has been developed through the cooperative efforts of the sponsors and NRCS, said Supplement provides for works of improvement for Site 1 and is annexed to, and made part of, this agreement. The following paragraphs have been added to or modified in said agreement:

1. **Real Property.** The sponsors will acquire such real property as will be needed in connection with the works of improvement.
2. **Floodplain Management.** The sponsors agree to participate in and comply with applicable federal floodplain management and flood insurance programs.
3. **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. Section 4601 et.seq. as further implemented through regulations in 49 CFR Part 24 and 7 CFR Part 21) when acquiring real property interests for this federally assisted project. If the sponsors 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.
4. **Water and Mineral Rights.** The sponsors will acquire or provide assurance that landowners or resource users have acquired such water, mineral, or other resource 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.
5. **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.
6. **Cost-share for Watershed Project Plans.** The estimated total rehabilitation costs to be paid by the sponsors and by NRCS are as follows:

Works of Improvement	NRCS	Sponsors	Total
Cost Sharable Items			
Rehabilitation of dam (Construction Costs)	\$2,970,400	\$1,261,000	\$4,231,400
Relocation, Replacement in-kind	\$0	\$0	\$0
Relocation, Required Decent, Safe, Sanitary	\$0	\$0	\$0
Sponsors Planning Costs	NA	\$0	\$0
Sponsors Engineering Costs	NA	\$42,300	\$42,300
Sponsors Project Administration	NA	\$296,200	\$296,200
Subtotal: Cost-Share Costs	\$2,970,400	\$1,599,500	\$4,569,900
Cost Share Percentages ^a	65%	35%	100%
Non Cost-Sharable Items^b			
Land Rights Acquisition Cost	NA	\$909,800	\$909,800
NRCS Engineering & Project Administration	\$1,650,200	NA	\$1,650,200
Natural Resources Rights	NA	\$0	\$0
Federal, State, and Local Permits	NA	\$31,200	\$31,200
Relocation, Beyond Required decent, safe, sentry	NA	\$0	\$0
Subtotal: Non Cost-Share Costs	\$1,650,200	\$941,000	\$2,591,200

^a Maximum NRCS cost-share is 65% of Cost-Sharable Items not to exceed 100% of construction cost (including Replacement-in-kind; Required Decent, Safe, Sanitary; and flood proofing downstream properties).

^b If actual Non Cost-Sharable Items expenditures vary from these figures, the responsible party will bear the change.

7. **Emergency Action Plan.** Prior to construction, the sponsors must prepare an Emergency Action Plan (EAP) for each dam or similar structure where failure may cause loss of life or 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. The NRCS will determine that an EAP is prepared prior to the execution of funding obligating documents for construction of the structure. EAPs must be reviewed and updated by the sponsors annually.
8. **Operation and Maintenance (O&M).** The sponsors 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 Operation and Maintenance Agreement. An Operation and Maintenance agreement will be entered into before Federal funds are obligated and will continue for 50 years, after which the agreement would be renewed, or a new agreement would be developed for the remaining service life of the project. 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.
9. **Costs.** The costs shown in this agreement are preliminary estimates. Final costs to be borne by the parties hereto will be based on actual costs incurred in the installation of the works of improvement.

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. **Term.** The term of this agreement is for the installation period and evaluated life of the project (102 years) and does not commit NRCS to assistance of any kind beyond the end of the evaluated life.
12. **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.
13. **Amendments.** This Rehabilitation 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 if 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 the 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.
14. **Prohibitions.** No member of, or delegate to Congress, or resident commissioner, may be admitted to any share of this plan, or to any benefit that may arise there from; but, this provision may not be construed to extend to this agreement if made with a corporation for its general benefit.
15. **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 Nos. A-87, A-102, A-120, and A-133; and 7 CFR Parts 3015, 3016, 3017, 3018, 3021, and 3052.

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

16. **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.

**600.112 Special Provisions
for
Grants and Cooperative Agreements Act of 1977**

The recipient agrees to comply with the following special provisions which are hereby attached to this agreement.

I. Drug-Free Workplace.

CERTIFICATION REGARDING DRUG-FREE WORKPLACE REQUIREMENTS (7 C.F.R. 3017)
INSTRUCTIONS FOR CERTIFICATION

1. By signing and/or submitting this application or grant agreement, the grantee is providing the certification set out below.
2. The certification set out below is a material representation of fact upon which reliance is placed when the agency awards the grant. If it is later determined that the grantee knowingly rendered a false certification or otherwise violates the requirements of the Drug-Free Workplace Act, the agency, in addition to any other remedies available to the Federal government, may take action authorized under the Drug-Free Workplace Act.
3. For grantees other than individuals, Alternative I applies.
4. For grantees who are individuals, Alternative II applies.
5. Workplaces under grants, for grantees other than individuals, need not be identified on the certification. If known, they may be identified in the grant application. If the grantee does not identify the workplaces at the time of application, or upon award, if there is no application, the grantee must keep the identity of the workplace(s) on file in its office and make the information available for Federal inspection. Failure to identify all known workplaces constitutes a violation of the grantee's drug-free workplace requirements.
6. Workplace identifications must include the actual address of buildings (or parts of buildings) or other sites where work under the grant takes place. Categorical descriptions may be used (e.g., all vehicles of a mass transit authority or State highway department while in operation, State employees in each local unemployment office, and performers in concert halls or radio studios).
7. If the workplace identified to the agency changes during the performance of the grant, the grantee shall inform the agency of the change(s), if it previously identified the workplaces in question (See paragraph 5).
8. Definitions of terms in the Non-procurement Suspension and Debarment common rule and Drug-Free Workplace common rule apply to this certification.,
9. Grantees' attention is called, in particular, to the following definitions from these rules:

Controlled substance means a controlled substance in Schedules I through V of the Controlled Substances Act (21 U.S.C. 812) and as further defined by regulation (21 CFR 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 manufacture, 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 grantee's payroll; or employees of sub-recipients or subcontractors in covered workplaces).

CERTIFICATION REGARDING DRUG-FREE WORKPLACE REQUIREMENTS (7 CFR 3017)
ALTERNATIVE I. (GRANTEES OTHER THAN INDIVIDUALS)

A. The grantee certifies that it will or will continue to provide a drug-free workplace by—

- (a) 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;
- (b) Establishing an ongoing drug-free awareness program to inform employees about—
 - (1) The dangers of drug abuse in the workplace;
 - (2) The grantee's policy of maintaining a drug-free workplace;
 - (3) Any available drug counseling, rehabilitation, and employee assistance programs; and
 - (4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

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

(d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will—

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

(2) 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;

(e) Notifying the agency in writing, within 10 calendar days after receiving notice under paragraph (d) (2) 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 shall include the identification number(s) of each affected grant;

(f) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (d) (2), with respect to any employee who is so convicted—

(1) 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

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

(g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (d), (e) and (f).

B. The grantee may insert in the space provided below the site(s) for the performance of work done in connection with the specific grant:

Place of Performance (street address, city, county, state, zip code) _____

Check ☐ if there are workplaces on file that are not identified here.

ALTERNATIVE II. (GRANTEES WHO ARE INDIVIDUALS)

(a) The grantee certifies that, as a condition of the grant, he or she will not engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance in conducting any activity with the grant.

(b) If convicted of a criminal drug offense resulting from a violation occurring during the conduct of any grant activity, he or she will report the conviction, in writing, within 10 calendar days of the conviction, to every grant officer or other designee, unless the Federal agency designates a central point for the receipt of such notices. When notice is made to such a central point, it shall include the identification number(s) of each affected grant.

II. Disclosure of Lobbying Activities (7 CFR 3018)(Applicable if agreement exceeds \$100,000)

UNITED STATES DEPARTMENT OF AGRICULTURE CERTIFICATION REGARDING LOBBYING, CONTRACTS, GRANTS, LOANS AND COOPERATIVE AGREEMENTS

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, 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 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 shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions;

(3) The undersigned shall 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 shall certify and disclose accordingly.

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, 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.

Organization Name, Award Number, or Project Name

Name and Title of Authorized Representative

Signature Date

III. Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions, (7 C.F.R. 3017)

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS - PRIMARY COVERED TRANSACTIONS (7 C.F.R. 3017)

INSTRUCTIONS FOR CERTIFICATION

10. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.
11. The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such person from participation in this transaction.
12. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.
13. The prospective primary participant shall provide immediate written notice to the department or agency to which this proposal is submitted if at any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
14. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is being submitted for assistance in obtaining a copy of those regulations.

15. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is proposed for debarment under 48 CFR part 9, subpart 9.4, debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
16. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled 'Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction,' provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
17. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not proposed for debarment under 48 CFR part 9, subpart 9.4, debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the List of Parties Excluded from Federal Procurement and Non-procurement Programs.
18. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
19. Except for transactions authorized under paragraph 6 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is proposed for debarment under 48 CFR part 9, subpart 9.4, suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER
RESPONSIBILITY MATTERS - PRIMARY COVERED TRANSACTIONS

- (1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:
 - a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded by any Federal department or agency;
 - b. 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;

- c. 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 (1)(b) of this certification; and
 - d. 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.
- (2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

IV. Clean Air and Water Act

Clean Air and Water Act Certification (applicable if agreement exceeds \$100,000 or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-8(c) (1)) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) and is listed by EPA, or is not otherwise exempt.)

The recipient signatory to this agreement certifies as follows:

- (a) Any facility to be utilized in the performance of this proposed agreement is _____, is not _____, listed on the Environmental Protection Agency List of Violating Facilities.
- (b) To promptly notify the State or Regional Conservationist 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 he/she proposes to use for the performance of the agreement is under consideration to be listed on the Environmental Protection Agency List of Violating Facilities.
- (c) To include substantially this certification, including this subparagraph (c), in every nonexempt sub-agreement.

Clean Air and Water Clause

(Applicable only if the agreement exceeds \$100,000, or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-8(c) (1)) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) and is listed by EPA or the agreement is not otherwise exempt.)

A. The recipient agrees as follows:

- (1) To comply with all the requirements of section 114 of the Clean Air Act as amended (42 U.S.C. 1857, et seq., as amended by Public Law 91-604) and section 308 of the Federal Water Pollution Control Act (33 U.S.C. 1251 et. sq., as amended by Public Law 92-500), 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, respectively, and all regulations and guidelines issued thereunder before the signing of this agreement by NRCS.

- (2) That no portion of the work required by this agreement will be performed in a facility listed on the Environmental Protection Agency 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 sub-agreement, including this subparagraph A. (4).

B. 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. 1857 et seq., as amended by Public Law 91-604).
- (2) The term "Water Act" means Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Public Law 92-55).
- (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(d) of the Clean Air Act (42 U.S.C. 1857c-5(d)), and approved implementation procedure or plan under section 111(c) or section 111(d), respectively, of the Air Act (42 U.S.C. 1857c- 6(c) or (d)), or an approved implementation procedure under section 112(d) of the Air Act (42 U.S.C. 1857c-7(d)).
- (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 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. 1342), or by a local government to ensure compliance with pretreatment regulations as required by section 307 of the Water Act (3 U.S.C. 1317).
- (5) The term "compliance" means compliance with clean air or water standards. Compliance shall also mean compliance with a schedule or plan ordered or approved by a court of competent jurisdiction, the Environmental Protection Agency, or an air or water pollution control agency in accordance with the Air Act or Water Act and regulations issued pursuant thereto.
- (6) 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 sub-agreement. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location shall be deemed

to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are collated in one geographical area.

The Sponsors and NRCS further agree to all other terms, conditions, and stipulations of said watershed agreement not modified herein.

POTOMAC VALLEY CONSERVATION DISTRICT

500 East Main Street

Romney, WV 26757-5174

By: _____

Title: Chairman

Date: _____

The signing of this agreement was authorized by a resolution of the governing body of the Potomac Valley Conservation District adopted at a meeting held on _____.

By: _____

Date: _____

WEST VIRGINIA STATE CONSERVATION AGENCY

Guthrie Agricultural Center

Charleston, WV 25305

By: _____

Title: Chairman

Date: _____

The signing of this agreement was authorized by a resolution of the governing body of the West Virginia State Conservation Agency adopted at a meeting held on _____.

By: _____

Date: _____

Natural Resources Conservation Service
UNITED STATES DEPARTMENT OF AGRICULTURE

Approved By:

JON BOURDON
State Conservationist

Date: _____

SUMMARY

Summary

**Supplemental Watershed Plan-Environmental Assessment
for
New Creek Site 1
New Creek-Whites Run Watershed, Mineral County, West Virginia
First Congressional District**

Authorization for Original Work Plan: Public Law 78-534 (The Flood Control Act of 1944), as amended

Authorization for Rehabilitation/Supplemental Work Plan: Public Law 83-566 Stat. 666 as amended (16 U.S.C. Section 1001 et. seq.) by Section 313 of Public Law 106-472

Sponsors: Potomac Valley Conservation District, City of Keyser, West Virginia State Conservation Agency

Proposed Action: Rehabilitation of New Creek Site 1 (Site 1) using federal assistance

Purpose and Need for Action: The purpose of the federal action is to address the public safety concern presented by Site 1's multiple deficiencies that do not meet current NRCS and WVDEP dam safety criteria and to maintain flood prevention downstream of the current dam site for the City of Keyser.

There is a need to correct safety deficiencies to reduce the potential for dam failure that could jeopardize downstream dwellings and infrastructure. A total of approximately 19 dwellings and 57 persons (the population at risk) would experience flooding at a depth of more than 3 feet from a dam failure. Many other structures, including 31 commercial buildings, 5 apartment buildings, and 116 additional dwellings would be impacted by a flood wave that overflowed the channel banks. Thirty-five of these dwellings are less than 1,500 feet from the toe of the dam. An additional 651 persons would be adversely affected by the breach flow.

Site 1 currently provides flood protection up to and exceeding the 500-year event. U.S Route 220, a critical facility per 7 CFR 650.25, is located approximately 0.4 mile downstream of Site 1. With the dam in place, Route 220 does not experience flooding in the 100- and 500-year flood events. In the absence of the dam, flooding over the road would be on the range of 0.4-0.5 feet for the 100-year and 500-year events. A Potomac Valley Hospital medical office building (hospice/lab services facility at 433 South Mineral Street, Keyser WV), a critical facility per 7 CFR 650.25, is located 0.6 mile downstream of Site 1. In the absence of the dam or other flood prevention measures, the 100-year and 500-year flood event would cause the medical building parking lot to flood, potentially restricting access to the facility.

In addition, in excess of 158 structures are located in the existing downstream 500-year floodplain. Structure types include residential and commercial buildings and associated outbuildings. Other private property subject to flooding includes roads, bridges, fences, landscaping, and miscellaneous improvements. Based on HEC-RAS modeling, it was determined that these 158 properties in the 500-year floodplain are receiving flood control benefits from the presence of the dam. If the dam were removed and no other flood prevention measures provided,

129 of these properties would experience flooding in the 500-year event (average depth of 0.5 feet), and 127 of these properties would also experience flooding in the 100-year event and events smaller than the 100-year.

Preferred Alternative: The Preferred Alternative involves rehabilitation of Site 1, with federal assistance, to meet current dam design safety and engineering criteria and performance standards. Observed deficiencies of Site 1 include the lack of sound defensive measures to reduce, filter and discharge seepage; inadequate slope stability factors of safety, a substandard principal spillway riser structure, significant substandard modifications to the principal spillway outlet conduit and channel, removal of the plunge pool, substandard alignment of the auxiliary spillway potentially contributing to embankment erosion and impact on private residences, and deferred maintenance concerns.

Measures to be implemented consist of construction of a blanket and toe drain system near the downstream embankment toe; flattening of the downstream embankment slope; replacement of the principal spillway riser structure; relocation of the auxiliary spillway; reconstruction of the downstream end of the principal spillway outlet conduit; and performance of maintenance activities. To implement the preferred alternative, displacement of two residential properties would be required.

Resource Information:

- ▶ Latitude and Longitude: 39.434889 N; 78.994009 W
- ▶ Eight-Digit Hydrologic Unit Number: 02070002 (North Branch Potomac)
- ▶ Climate and topography: Humid continental climate with rolling topography
- ▶ Watershed size of (acres): 213 acres (0.3 sq. mile), Entire New Creek-Whites Run Watershed size - 36,208 acres (56.6 sq. miles)
- ▶ Land uses: 81.4% forest, 9.4% pasture/hay, 7.4% developed/vacant, 1.8% open water
- ▶ Land ownership: Within the Site 1 site, all land is private ownership with Sponsor easement for operation and maintenance of the dam.
- ▶ Population and demographics:

Demographics (ACS 2011-2015)	Local Area (Mineral County Census Tract 106, Block Group 3)	Mineral County	Note
Population	2,069	26,940	Local area accounts for 8.0% of county population
Percent minority	13.4%	5.4%	State is 6.5% minority in comparison.
Median household income	\$47,010	\$46,354	State is \$44,921 in comparison
Poverty	16.6%	14.5%	State is 17.8% in comparison

Scoping Concerns: Issues identified through the scoping process centered on the potential need for a Section 404 Clean Water Act permit in the event of work proposed in streams or wetlands, the evaluation of the dam and potentially impacted structures under Section 106 of the National Historic Preservation Act, and the consideration of a decommissioning alternative to remove fish passage impediments and eliminate the aquatic warming effects of the reservoir. Additional concerns identified centered on the urban development adjacent to the downstream embankment and within the downstream inundation areas and unauthorized modifications made to the principal spillway outlet conduit.

Alternative Plans Considered:

No Action: Under a No Action alternative, there would be no formal action by either the NRCS or the Sponsors and Site 1 would remain deficient in terms of meeting current design criteria and performance standards. Existing deficiencies would not be addressed, resulting in an unacceptable level of risk to Sponsors and the public. This alternative does not meet the purpose and need and was therefore eliminated from further consideration.

No Federal Action: This alternative is equivalent to the Sponsors' Rehabilitation alternative and the Future Without Project condition. Federal funds would not be expended with this alternative. Sponsors would rehabilitate Site 1 using state and/or local funding to comply with WVDEP and NRCS dam safety regulations for a high hazard dam. The cost of this alternative is identical to the Preferred Alternative.

Decommissioning: Decommissioning would involve removal of the flood detention capacity of Site 1 by removing a portion or all of the embankment and restoring the function of the stream channel and 100-year floodplain. Costs for the decommissioning alternative would include construction (\$1,000,000), floodproofing of downstream properties (\$16,770,000), and additional unquantified costs to floodproof Route 220 (elevate or resize culverts) and portions of a Potomac Valley Hospital medical office building (a hospice/lab services facility at 433 South Mineral Street, Keyser), critical facilities per 7 CFR 650.25. It was determined that this alternative was not cost effective in comparison with other available alternatives. The total construction cost of the decommissioning alternative is in excess of \$17,770,000 in comparison to a construction cost of \$4,231,400 for the rehabilitation alternative.

Rehabilitation with Federal Assistance (Preferred Alternative): Federal and non-federal funds would be expended to rehabilitate Site 1 and meet the purpose and need for the project. Rehabilitation measures include constructing a blanket and toe drain system near the downstream embankment toe; flattening the downstream embankment slope; replacement of the principal spillway riser structure; relocation of the auxiliary spillway; reconstruction of the downstream end of the principal spillway outlet conduit; and performance of maintenance activities.

Rehabilitation costs are:

Public Law 83-566 Funds	Percentage	Other Funds	Percentage	Total
\$4,620,600	65%	\$2,540,500	35%	\$7,161,100

Project Costs	Federal Assistance	Other Funds	Total
Construction	\$2,970,400	\$1,261,000	\$4,231,400
Engineering	\$1,354,000	\$42,300	\$1,396,300
Project Administration	\$296,200	\$296,200	\$592,400
Required Permits	\$0	\$31,200	\$31,200
Land Acquisition	\$0	\$909,800	\$909,800
Total	\$4,620,600	\$2,540,500	\$7,161,100

Benefits:

Benefits of the proposed rehabilitation action include:

- ▶ Reduction in the potential for loss of life by reducing the possibility of dam failure
- ▶ Reduction in the sponsor's liability associated with the operation of a flood retarding structure which does not meet current dam safety engineering and performance criteria
- ▶ Preservation of the 500-year+ level of flood protection for residents, businesses, community and civic facilities, and infrastructure downstream of Site 1 (auxiliary spillway activated by a 2,000+/- year event)
- ▶ Protection of real estate values downstream of Site 1
- ▶ Provides a new service life of 100 years

Benefit Cost Ratio: 1.0 to 1.0

Net Beneficial Effects: \$208,800 annually

Period of analysis: 102 years (100 year evaluated life of the project plus 2 year installation period)

Project life: 100 years

Funding Schedule: Estimated 2023. Estimating construction for 2025, and estimated for one construction season.

Environmental Effects: Permanent impacts to 38 linear feet of perennial stream (tributary to New Creek) for extension of principal spillway conduit and reconstruction of plunge pool. Contribution to WVDEP In Lieu Fee Stream and Wetland Mitigation Program is anticipated to mitigate for stream impacts. Temporary displacement of wildlife during construction due to activity and noise; species anticipated to return following construction. Best Management Practices will be implemented to reduce transport and introduction of invasive plant species and reduce erosion and sedimentation of New Creek. Two residential displacements are required for proposed rehabilitation installation. It is recommended that seven additional residential properties along the toe of the downstream slope be considered for acquisition.

Controversial Issues: No issues of controversy identified to date.

Issues to be resolved: None

Evidence of Unusual Congressional or Local Interest: None

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

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1.0 INTRODUCTION

1.1 Background

The New Creek Site 1 watershed dam (referred to hereafter as Site 1 or the dam) is one of nine watershed dams built between 1957 and 1968 in the New Creek-White's Run watershed of Grant and Mineral counties, West Virginia. These dams were authorized to primarily provide flood prevention (flood damage reduction) benefits in the approximately 56 square-mile New Creek-White's Run watershed through the 1956 Watershed Work Plan for New Creek-White's Run Sub-Watersheds of the Upper Potomac River Watershed, Mineral and Grant Counties, West Virginia (final NRCS authorization provided on March 11, 1957) and five supplemental plans prepared by the Potomac Valley Conservation District and the City of Keyser, in cooperation with the U.S. Department of Agriculture(USDA), Natural Resources Conservation Service (NRCS).

Planning for Site 1 was finalized through the original 1956 Watershed Work Plan and the dam was constructed in 1957.

Site 1 impounds an unnamed tributary to New Creek, approximately 1.0 mile from the downtown center of the City of Keyser. Current Sponsors of Site 1 include the Potomac Valley Conservation District, the West Virginia Conservation Agency (WVCA), and the City of Keyser. Operation and maintenance of Site 1 is the responsibility of the Potomac Valley Conservation District, in cooperation with the WVCA.

1.2 Changes Requiring the Preparation of a Supplemental Watershed Plan

Site 1 was originally classified and designed to High Hazard (Class C) criteria applicable in 1956. The USDA NRCS performed an assessment of Site 1 in 2011 which concluded that the dam does not meet current NRCS and West Virginia State Department of Environmental Protection (WVDEP) dam design safety and engineering criteria and performance standards (NRCS, 2011). Results of additional detailed planning level investigations that are documented in this Watershed Plan- Environmental Assessment (Plan-EA) have confirmed the presence of these deficiencies which include the lack of sound defensive measures to reduce, filter and discharge seepage; inadequate slope stability factors of safety, a substandard principal spillway riser structure, significant substandard modifications to the principal spillway outlet conduit and channel, removal of the plunge pool, substandard alignment of the auxiliary spillway potentially contributing to embankment erosion and impact on private residences, and deferred maintenance concerns.

To bring the dam up to current regulations and engineering standards, modification measures and cost-sharing are required.

An amendment to PL 83-566, the Watershed Rehabilitation Amendments of 2000 (PL 106-472), Section 313, authorizes financial and technical assistance to rehabilitate dams under the USDA Watershed Rehabilitation Program. The rehabilitation of Site 1 is authorized under this amendment.

1.3 Purpose and Need Statement

The purpose of the federal action is to address the public safety concern presented by Site 1's multiple deficiencies that do not meet current NRCS and WVDEP dam safety criteria and to maintain flood prevention downstream of the current dam site for the City of Keyser.

The project purpose is based on the need to address the following watershed concerns:

Safety: The existing dam structure is classified as a High Hazard dam. This hazard classification is based on the prevalence of population, bridges, roads and buildings located within the downstream dam breach inundation zone that would be exposed to potential loss of life in the unlikely event of dam failure. Based on the latest dam failure hydraulic analysis, 19 dwellings and 57 persons are judged to be at risk. Deficiencies present include the lack of sound defensive measures to reduce, filter, and discharge seepage; inadequate slope stability factors of safety, a substandard principal spillway riser structure, substandard modifications to the principal spillway outlet conduit and channel including removal of the plunge pool, and concerns regarding the alignment of the auxiliary spillway.

Flood Protection: Reduction in downstream flood damages to private and public facilities and infrastructure from the 500-year+ flood event and smaller events continues to be a need for the local community. The existing dam structure and reservoir were constructed in 1957 with a design life of 50 years.

U.S Route 220, a critical facility per 7 CFR 650.25, is located approximately 0.4 mile downstream of Site 1. With the dam in place, Route 220 does not experience flooding in the 100- and 500-year flood events. In the absence of the dam or other flood prevention measures, flooding over the road would be on the range of 0.4-0.5 feet for the 100-year and 500-year event. A Potomac Valley Hospital medical office building (a hospice/lab services facility) at 433 South Mineral Street, Keyser WV, a critical facility per 7 CFR 650.25, is located 0.6 mile downstream of Site 1. In the absence of the dam or other flood prevention measures, the 100-year and 500-year flood event would cause the medical building parking lot to flood, potentially restricting access to the facility.

In addition, in excess of 158 structures are located in the without-dam downstream 500-year floodplain (see *Appendix C, Flood Boundary Comparison Maps*). Structure types include residential and commercial buildings and associated outbuildings. Other private property subject to flooding includes roads, bridges, fences, landscaping, and miscellaneous improvements. Based on hydraulic modeling, it was determined that these 158 properties in the 500-year floodplain are receiving flood control benefits from the presence of the dam. If the dam were removed and no other flood prevention measures provided, these properties would experience flooding in the 100- and 500-year events, and more than 100 of these properties would also experience flooding in events smaller than the 100-year.

1.4 Project Development

The Plan-EA documents the planning process by which the NRCS, in cooperation with the WVCA, provided technical assistance to the local Sponsors, technical advisors, and the public in addressing resource issues and concerns within the New Creek watershed. Gannett Fleming, Inc. was retained by WVCA to provide engineering and environmental services in support of the development of the Plan-EA. The purpose of the Plan-EA is to present information regarding alternatives that have been evaluated to address the identified deficiencies of Site 1.

2.0 SCOPING PROCESS

2.1 Scoping Process

Scoping is a systematic process used to obtain the input of watershed stakeholders regarding the most relevant resource issues that need to be considered. Objectives of the scoping process include: identifying concerns; clearly defining environmental issues; identifying relevant laws, regulations, and orders applicable to the project; and identifying requirements to be addressed for regulatory compliance. The scoping process for Site 1 involved site investigations, a public meeting, and consultations with resource and jurisdictional agencies (**Appendix A**).

2.2 Scoping Activities

Scoping letters were sent to public officials, resource agencies and local stakeholders informing them of the proposed project, requesting their input on relevant concerns, and inviting them to a project scoping meeting.

A public notice was published in the News-Tribune newspaper on Friday, January 27, 2017, announcing the project and the upcoming public scoping meeting. The advertisement included information about the project, time and location of the public scoping meeting, and contact information.

A scoping meeting was held on February 16, 2017 at the Davis Conference Center of Potomac State College in Keyser, WV. Input on the project was provided by the NRCS, the Potomac Valley Conservation District, and the WVDEP.

2.3 Summary of Resource Concerns

A summary of the concerns highlighted during the scoping process for the Site 1 rehabilitation project can be found in **Exhibit 2.1**.

Exhibit 2.1 - Summary of Resource Concerns

Resource Concern	Relevant to Proposed Action?		Rationale
	Yes	No	
SOILS			
Upland Erosion	X		Trees, animal burrows, small garden and a municipal water line within the auxiliary spillway can accelerate erosion of the auxiliary spillway.
Stream Bank Erosion	X		Downstream embankment has a steep slope (2H:1V) which increases potential for erosion. The slope downstream is very irregular leading to possible creep of the downstream slope.
Sedimentation	X		Estimated sediment accumulation (based on 2016 bathymetric survey) in the Site 1 reservoir of significantly less than original design estimate.
Prime and Unique Farmland	X		Farmland soils of local importance are found adjacent to the dam and reservoir. Consider compliance with the Federal Farmland Protection Policy Act.
WATER			
Surface Water Quality	X		A Wetland and Waterways Identification and Delineation was conducted within the Site 1 study area and waterways were identified. Two perennial streams effect the hydrology of Site 1.
Ground Water Quality	X		Site 1 is located within the “Zone of Critical Concern” for the City of Keyser’s public water system wellhead protection area. No U.S. EPA-designated sole source aquifers are located in the Site 1 study area.
Clean Water Act	X		Project activities will likely require a Section 404, Clean Water Act permit.
Regional Water Mgt. Plans and Coastal Zone Management Areas.		X	Site 1 is not part of a regional surface water management plan or a NOAA-designed Coastal Zone Management Area.
Floodplain Management	X		Certain rehabilitation alternatives, such as decommissioning, would impact management / zoning upstream and downstream of the dam.
Wetlands	X		A Wetland and Waterways Identification and Delineation was conducted within the Site 1 study area and wetlands were identified. Three wetland areas totaling 0.69 acres were delineated. Consider Clean Water Act, Section 404 impacts.
Wild and Scenic Rivers		X	New Creek (and its tributaries) is not listed on the Nationwide Rivers Inventory or the national list of study rivers.
AIR			
Air Quality (Clean Air Act)		X	Possible temporary increase in PM10 emissions during construction activities. No permanent impact on air quality. Mineral County is not included within any EPA air quality nonattainment areas.

continued on following page

Exhibit 2.1 - Summary of Resource Concerns (continued)

Resource Concern	Relevant to Proposed Action?		Rationale
	Yes	No	
PLANTS			
Endangered and Threatened Species		X	The US Fish and Wildlife Service (USFWS) and West Virginia Department of Natural Resources (WVDNR) determined that there are no known records of rare, threatened, or endangered plant species within the study area.
Essential Fish Habitat		X	There is no NOAA-designated Essential Fish Habitat within the project area.
Invasive Species	X		Three vegetative invasive species were identified during field reconnaissance of Site 1: multi-flora rose; Morrow's honeysuckle; and Japanese honeysuckle. The introduction or spread of invasive species could be enhanced during construction. Best Management Practices will be utilized to minimize the introduction or spread of invasive plant species.
Natural Areas		X	Project area is not within a WVDNR designated natural area.
Riparian Areas	X		Riparian zones associated with the two perennial streams may be temporarily impacted during construction. Habitats will be re-established after the project is completed.
Forest Resources	X		Mixed hardwood forest lands are the dominant land cover within the watershed.
Ecologically Critical Areas		X	No ecologically critical habitat for plant species exists within the Site 1 study area.
ANIMALS			
Fish and Wildlife	X		A primary function of wetlands within the Site 1 study area include wildlife habitat. Common wildlife species expected to inhabit the reservoir include warm water fish species such as bass, sunfish, catfish, perch, carp, and minnows.
Coral Reefs		X	No coral reefs or associated water bodies are present in or near the project area.
Endangered and Threatened Species		X	USFWS noted that the project would have no effect on Indiana bat (endangered) and Northern long-eared bat (threatened). WVDNR determined that there are no known records of rare, threatened, or endangered animal species within the study area.
Invasive Species	X		No non-vegetative invasive species were observed within the study area during field reconnaissance.

continued on following page

Exhibit 2.1 - Summary of Resource Concerns (continued)

Resource Concern	Relevant to Proposed Action?		Rationale
	Yes	No	
Migratory Birds / Bald and Golden Eagles	X		Migratory waterfowl and songbirds likely utilize the reservoir and surrounding area for breeding, nesting, and wintering. No bald eagle or raptor nest are known in the area and Site 1 is unlikely to support these species due to the small size of the reservoir.
HUMANS			
Flood Damages	X		Site 1 provides \$139,400 in annual flood damage avoidance benefits. Discontinuance of flood protection would result in increased flooding damages to downstream properties and US Route 220.
Cost, Sponsor	X		Alternatives for meeting the purpose and need must meet the economic capacity of the WVCA and address mission and needs of the agency.
Cost, National Economic Development (NED)	X		Identification of the NED must consider the full range of costs and benefits of project alternatives.
Historic Properties	X		Coordination with the West Virginia State Historic Preservation Office determined that no recorded archaeological resources are present. Completion of an Historic Property Inventory form for the Site 1 dam recommended that the structure is not eligible for inclusion in the National Register of Historic Places. Tribal Ancestral Lands Consultation was conducted by NRCS. Responses received indicated that the project area is not within ancestral land areas of interest for the Osage or Seneca Nations.
Environmental Justice		X	The local area exhibits a higher minority population in comparison with Mineral County and the state. Also, the local area exhibits similar levels of poverty in comparison with both Mineral County and the state. No disproportionate impacts are anticipated - benefits would occur for all downstream properties within flood plain.
Land Use	X		City of Keyser has no zoning regulations controlling land development. Residential development post-construction of Site 1 has introduced concerns related to flood-stage effects on adjacent homes. Development has also compromised the integrity of the principal spillway outlet channel through unapproved encroachment and physical alteration by homeowners.
Local and Regional Economy	X		Potential for residential displacements adjacent to toe of downstream embankment. Residential displacements not anticipated to affect overall population dynamics or community cohesion. No business displacements or direct impact on local/regional economy.
Public Health and Safety	X		Breach of the dam is estimated to directly impact 57 persons considered at risk. Flooding (of greater than 3 feet in depth) is estimated to impact 19 dwellings.
Recreation and Parklands		X	Site 1 is not a designated park or recreation area. Other than perhaps passive recreational use by local residents, Site 1 does not provide any recreation benefits.
Aesthetics	X		Flattening of the downstream dam slope or changes to the auxiliary spillway would not create a significant impact on the scenic characteristics of the dam setting.
Scientific Resources		X	No scientific resources present in study area.

3.0 AFFECTED ENVIRONMENT

Resource features of the Site 1 watershed were inventoried to establish the current resource setting and context within which the project is proposed, and to provide a base line for the assessment of environmental impacts in accordance with the National Environmental Policy Act (NEPA) and relevant NRCS Watershed Planning and West Virginia Dam Safety regulations and guidance.

Detailed field investigations were completed within a natural resources study area which was defined based on the hydrologic and hydraulic modeling for the project to encompass the area of potential impact associated with the proposed project. The natural resources study area totals approximately 12.4 acres immediately surrounding Site 1, with the open water reservoir encompassing approximately 3.2 acres. The remaining 9.2 acres of land are dominated by mowed lawn around the dam and mowed and fallow fields around the perimeter of the reservoir. Forested lands were located along the west and north edge of the study area. Residential properties are located along the toe of the dam and at the end of the auxiliary spillway.

Field investigations focusing on the identification and characterization of natural resources in the study area were completed in June 2016. Summary information and results of the field work are included in **Appendix D** within the Natural Resources summary.

The Area of Potential Effect (APE) for direct effects to cultural resources consists of the existing dam and related structures, as well as the adjacent residential area near the toe/spillway located outside the existing footprint of ground disturbance associated with the construction and operation of Site 1.

3.1 Topography, Soils and Geology

3.1.1 Topography

The terrain of the study area is moderately sloping, with elevations ranging from approximately 980 feet (NAVD88) along the northwestern limit of the study area to approximately 890 feet (NAVD88) along the downstream toe of the dam embankment based on USGS modeling.

3.1.2 Soils

Dominant soils in the study area include the Berks series (BkD) and Udorthents Series (Ud) (**Figure C-1**):

- ▶ Berks series consists of well drained, very rocky channery silt loam. They are formed from weathered shale and siltstone or fine grained sandstone. This series primarily underlies areas surrounding the dam and reservoir except for the dam embankment.
- ▶ Udorthents Series is not a prime farmland and is an unranked hydric soil. Typically, Udorthents soils are considered disturbed urban-land complexes. Within the study area, the soils making up the dam embankment are classified as Udorthents soils.

The West Virginia Watershed Atlas shows that the study area is located within a soil drainage area that borders on well drained and somewhat excessively drained (WVDEP, 2013a).

Six specific soil types underlie the study area including; Berks channery silt loam, 3 to 8 percent slopes (BkB); Berks channery silt loam, 8 to 15 percent slopes severely eroded (BkC3); Berks channery silt loam, 8 to 15 percent

Exhibit 3.1 - Soils

Hampshire and Mineral Counties, West Virginia (WV608)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BcC3	Berks channery silt loam, 8 to 15 percent slopes, severely eroded	0.4	3.2%
BkD	Berks channery silt loam, 15 to 25 percent slopes	5.3	42.7%
Ud	Udorthents	2.2	17.8%
W	Water (open water and saturated soil areas)	3.9	31.5%
WkE	Weikert-Berks channery silt loams, 25 to 35 percent slopes	0.6	4.8%
Totals for Area of Interest		12.4	100.0%

Source: NRCS Custom Soil Resource Report for Hampshire and Mineral Counties, West Virginia. August 8, 2017.

slopes (BkD), Udorthents (Ud); Weikert-Berks channery silt loam, 25-25 percent slopes (WkE); and Water (W) (Soil Survey Staff, 2016a) (**Exhibit 3.1**).

None of these soils are listed as nationally hydric. Soils with hydric components are BkB, BkD, and WkE (NRCS, 2016a).

According to the Soil Survey Map (**Figure C-1**), the dam embankment and spillways are underlain by Udorthents Series soils.

Berks series soils surrounding the dam and reservoir are considered “farmland of local importance” Udorthents and Weikert-Berks series soils are not considered as prime or important farmland soils (Soil Survey Staff, 2016b).

Observed soil erosion from upland sources affecting the Site 1 dam storage capacity is less than originally estimated. The original 50-year design anticipated approximately 11 acre-feet of soil (0.2 acre-feet per year) to have accumulated within the reservoir. Measured 2016 accumulation was estimated as 4.0 acre-feet of sediment, a rate of approximately 0.07 acre-feet per year.

3.1.3 Geology

According to the West Virginia Geological and Economic Survey (WVGES), the study area is located just east of the border of the Allegheny Mountain section and the Valley and Ridge section Physiographic Provinces of West Virginia (WVGES, 2015). The study area was mapped as underlain with sedimentary shale and sandstone from the Devonian period within the Marcellus Formation and Needmore Shale and Oriskany Sandstone Formations, respectively (WVGES, 1968). (**Figure C-3**). Geotechnical analysis of the dam embankment and spillways determined that these areas are underlain by soft shale bedrock. Refer to section 3.12.2 for additional discussion of soil parameters within the auxiliary spillway.

3.2 Water Resources

The Site 1 drainage area and its contributing tributaries are located in the New Creek-North Branch Potomac River Watershed (HUC10) and North Branch Potomac Watershed (HUC8) (WVDEP, 2013a). New Creek (HUC ID: 020700020401) and its tributaries flow into North Branch Potomac River which then flows north into the Potomac River.

3.2.1 Surface Water and Water Quality

The Site 1 reservoir is approximately 3.2 acres in size at normal pool elevation and is surrounded by fringe wetlands.

An unnamed tributary to New Creek, feeding the Site 1 reservoir, is listed as impaired on the 2016 *West Virginia Integrated Water Quality Monitoring and Assessment Report*, Section 303(d) List (WVDEP, 2018). The tributary (designated as UNT/New Creek RM 1.30) is included in the Total Maximum Daily Load (TMDL) plan for Selected Streams in the North Branch Potomac River Watershed (WVDEP, 2011) which addresses elevated fecal coliform contamination found within the New Creek watershed. Fecal coliform are indicators of possible human sewage contamination within surface waters and potential related human health risks. Elevated fecal coliform conditions can also contribute to biological impairments such as increased oxygen demand which hinders the health of aquatic organisms. Fecal coliform source categories within the unnamed tributary of New Creek are generally loads from non-point sources that include pasture/cropland, on-site sewage systems, residential runoff, and natural background and other non-point sources. Designated uses include agricultural, public water supply, warm water fishery, water contact recreation, and industrial water supply, all in good status. There were no reported causes of impairment, no probable source, and no TMDLs listed for this waterbody.

New Creek Site 1 is located within the “Zone of Critical Concern” for the City of Keyser’s public water system surface source protection area (WV3302915) (WVDHHR, 2003). The zone of critical concern is designated as a 1,000-foot buffer from each bank of principal streams in the watershed. These areas warrant additional management considerations due to their proximity to water source/surface intake, and susceptibility to transport sediment and other contaminants. The City of Keyser water intake is located along New Creek approximately 0.5 mile south of the principal spillway outlet conduit.

There are seven public water supply (PWS) facilities that draw from surface water sources within the North Branch-Potomac River watershed where Site 1 is located. Two Large Quantity Users, Frankfort Public Service District and the City of Keyser, locally withdraw the most surface water from the North Branch-Potomac River watershed. The seven PWS facilities provide over 743 million gallons of water on a 3-year annual average. Within the North Branch Potomac Watershed, 100% of the water withdrawn is from surface water sources (WVDEP, 2013b).

Public water supply is not a designated, or future proposed, use for Site 1.

There are no designated or study river segments of the National Wild and Scenic Rivers System within or immediately adjacent to the study area (NPS, 2016).

3.2.2 Streams

The drainage area of the Site 1 reservoir is approximately 0.33 square miles.

There are two perennial streams (unnamed tributaries to New Creek) which connect with the Site 1 reservoir. The stream inletting into the Site 1 reservoir is a narrow (approximately 3.0 feet in width) watercourse with a streambed substrate composed of predominately gravel with cobble, clay, sand and silt.

The stream out-letting from the Site 1 reservoir is also a narrow watercourse (approximately 4.0 feet in width) with a streambed comprised of a silt-laden concrete channel adjacent to single-family residential development.

3.2.3 Groundwater

The study area is underlain by the Devonian and Silurian sedimentary bedrock aquifers (Kozar, 2001) within the Valley and Ridge physiographic provinces. Locally the hydrogeological aquifer is predominantly sedimentary shales of Brailier, Chemung, Harrell, and Mahantango formations. Similar aquifer characteristics are found along New Creek 1 to the southeast, where Marcellus Formation and Needmore Shale are dominant.

The specific capacities of wells drilled in the aforementioned formations are less than 1.0 gpm/ft (generally ranging between 0.28 and 0.86 gpm/ft) with median transmissivity of between 70-170 ft²/day. Devonian and Silurian aquifer wells range between 50-300 feet deep and commonly yield less than 100 gallons of water per minute. The water yields are enough for domestic, farm, small commercial supplies, and moderate-to-good potential for small industrial and public supplies with generally good quality (Kozar, 1995). As noted above in Section 3.2.1, all public water supply within the North Branch-Potomac River watershed is withdrawn from surface water sources.

There are no documented springs within the study area or adjacent to the study area according to the West Virginia Watershed Atlas (WVDEP, 2013a). There are no sole-source aquifers located within West Virginia according to the USEPA (USEPA, 2016b).

3.2.4 Floodplain Management

According to Federal Emergency Management Agency (FEMA) Map Number 54057C0186D, effective March 19, 2013, the area upstream of the Site 1 is mapped as Zone X – *Areas determined to be outside the 0.2% annual chance (500-yr) floodplain*.

However, Site 1 is designed to retain floodwater behind the dam up to and exceeding the 500-year event. No structures are present below the top of dam elevation (**see Figure C-10, Existing Conditions**). One residential structure to the northeast of the dam is located at EL. 928.51, whereas the top of dam is at EL. 925.55.

Lands immediately downstream of Site 1 are also designated as Zone X. The 100-year and 500-year floodplain associated with the mainstem of New Creek are generally designated east of WV Route 220 (Mineral Street) through the city of Keyser.

There are residential properties located immediately downstream of the reservoir dam structure. The area north of the reservoir itself is deciduous forest land with small areas of hay/pasture lands. Downstream floodplain mapping can be found in **Figures C-6, C-7, C-8, and C-9**. See **Section 3.9.7** for a description of structures and infrastructure within the 100- and 500-year downstream floodplains.

3.3 Wetlands and Waters of the U.S.

3.3.1 Wetlands

Three wetland complexes are located within the study area, including palustrine emergent wetland (PEM) and palustrine scrub-shrub wetland (PSS) components based on June 2016 field investigations.

Wetland 1 is an approximately 0.52 acre, man-made PEM/PSS wetland complex formed along the fringe of the Site 1 reservoir. The PEM portion of the wetland is approximately 0.30 acre in size and vegetation is affected by maintenance mowing activities along the southern, eastern, and northern edge of the reservoir. The PSS portion

of the wetland includes sapling and shrub vegetation not affected by maintenance mowing and comprises approximately 0.22 acres predominantly at the western end of the reservoir.

Wetland 2 is an approximately 0.12 acre PEM wetland on the north side of the reservoir immediately adjacent to a PSS portion of Wetland 1. The associated hydrology of this wetland is influenced by runoff from adjacent slopes and possibly groundwater seeps. Wetland vegetation is affected by property-owner maintenance mowing of this area during dry periods throughout the year.

Wetland 3 is located upslope of Wetland 2 along the forest edge. This 0.05 acre PEM wetland is hydrologically influenced by surface runoff and a small groundwater seep.

Exhibit 3.2 - Summary of Study Area Wetlands

Wetland ID #	Cowardin Classification	Area within Study Area (acres)	Flag Numbers	Hydric Test Plots	Upland Test Plots
1	PEM	0.30	W1-1 to W1-23 to W1-22J; W1-34 to W1-54 and W1-107 to W1-125	W1 - Wet1, W1 - Wet3	W1 - Up 1
	PSS	0.22	W1-125 to W1-137; W1-137 to W1-101; W1-101 to W1-107; W1-54 to W1-58; W1-58 to W1-22J; W1-22J to W1-22A; W1-22A to W1-23; and W1-23 to W1-34.	W1 - Wet 2, W1 - Wet 4	W1 - Up 2
2	PEM	0.12	W2-1 to W2-14	W2 - Wet 1	W2 - Up 1
3	PEM	0.05	W3-1 to W3-16	W3 - Wet 1	W3 - Up 1
Total Acreage		0.69	—		

See the Natural Resources Summary in Appendix D for more information.

3.3.2 Streams

Detailed field investigations identified two perennial watercourses within the study area comprising a total of approximately 650 linear feet, both identified as unnamed tributaries to New Creek. Stream 1/1A feeds the Site 1 reservoir, while Stream 2 is associated with the principal spillway outlet. A map depicting the stream locations and the associated sampling reaches within the study area is provided as **Figure C-2. Exhibit 3.3** provides a summary of the watercourse information collected.

Exhibit 3.3 - Summary of Study Area Watercourses

Stream ID #	Flow Regime	Length within Study Area (LF)	Stream Width (ft)	Substrate Type	Tributary To
1	Perennial – Flow E	125	3	Gravel, Cobble, Clay with Sand and Silts	New Creek
2	Perennial – Flow E	524	4	Concrete and Silt	New Creek
Total LF		649			

See the Natural Resources Summary in Appendix D for more information.

Stream 1 is an approximately three-foot wide, well-defined, partially shaded natural channel containing flow primarily in shallow and deep runs with pools. Average depth of flow in the study area is approximately 1.5 inches.

Stream 2 is an approximately four-foot wide, open, artificially channelized (concrete) stream with generally shallow flow. Average depth of flow in the study area is approximately 4 inches.

3.4 Aquatic Biology

The two perennial streams were evaluated for water quality, and benthic macroinvertebrates, using the Rapid Bioassessment Protocol (RBP) methods for physical characterization/water quality and habitat assessment (Barbour et al., 1999). Data were collected from the perennial streams that feed and outlet the Site 1 reservoir to assess the biological condition of wadeable streams with riffle/run habitats. According to the RBP sample data, Stream 1/1A was found to exhibit sub-optimal habitat quality while Stream 2 exhibited poor quality habitat. Also, according to the West Virginia Stream Condition Index (WVSCI) scores taken from the macroinvertebrate sampling data of the perennial streams, Stream 1/1A was classified as unimpaired-very-good and Stream 2 was classified as impaired-moderately. Refer to **Exhibit 3.4** for individual stream ratings, and **Exhibit 3.5** for overall stream results. Predominant benthic macroinvertebrate insect species identified within the perennial streams were mayflies (*Ephemeroptera spp.*), stoneflies (*Plecoptera spp.*), and midges (*Diptera chironomidae*). Common non-insect benthic macroinvertebrate species found were snails (*Gastropoda spp.*) and pea clams (*Bivalia sphaeriidae*).

Exhibit 3.4 - Stream Evaluation Index Results

Stream ID (Reach)	Flow Regime	RBP Habitat Assessment			WVSCI	
		Gradient	Score	Habitat Quality	Total Score	Condition
1	Perennial	High	143	Sub-Optimal	86.18	Unimpaired - Very Good
2	Perennial	Low	20	Poor	41.39	Impaired - Moderately

Notes:

1. New Creek Site 1 streams were RBP assessed and sampled for macroinvertebrates on June 2, 2016.
2. RBP = Rapid Bioassessment Protocol
3. WVSCI = West Virginia Stream Condition Index

Exhibit 3.5 - Stream Evaluation Summary

RBP Habitat Assessments			
Quality		Score Criteria	Total Number Scored
Optimal		200 to 160	0
Sub-Optimal		159-110	1
Marginal		109 to 60	0
Poor		59 to 0	1
WVSCI Total Scores			
Quality		Score Criteria	Total Number Scored
Unimpaired	Very Good	100.00 to 78.01	1
	Good	78.00 to 68.01	0
Gray Zone		68.00 to 60.61	0
Impaired	Slightly Impaired	60.60 to 45.01	0
	Moderately Impaired	45.00 to 22.01	1
	Severely Impaired	22.00 to 0.00	0

3.5 Terrestrial Biology

3.5.1 Plants

Lands immediately surrounding the reservoir are dominated by areas of mowed/maintained lawn and mowed and fallow agricultural fields. Forested lands were located along the west and north edge of the study area. The mixed hardwood forest canopy consists predominately of black locust (*Robinia pseudoacacia*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), white oak (*Quercus alba*), red oak (*Quercus rubra*), tulip poplar (*Liriodendron tulipifera*), black walnut (*Juglans nigra*), and black cherry (*Prunus serotina*).

The shrub understory consisted of Morrow's honeysuckle (*Lonicera morrowii*), blackberries/raspberries (*Rubus spp.*), and rambler rose (*Rosa multiflora*). The fallow fields and mowed lawn areas within the project study area were dominated by annual bluegrass (*Poa annua*), orchard grass (*Dactylis glomerata*), tall false rye grass (*Schedonorus arundinaceus*), smooth brome (*Bromus inermis*), white clover (*Trifolium repens*), Japanese honeysuckle (*Lonicera japonica*), poison ivy (*Toxicodendron radicans*), goldenrods (*Solidago spp.*), and violets (*Viola spp.*).

Invasive Species

The following species are considered the 15 most invasive plant species in West Virginia; Autumn-olive (*Elaeagnus umbellata*), amur/tatarian/morrow's honeysuckles (*Lonicera maackii*, *L. tatarica*, *L. morrowii*), European privet (*Ligustrum vulgare*), garlic mustard (*Alliaria petiolata*), Japanese barberry (*Berberis thunbergii*), Japanese knotweed (*Polygonum cuspidatum* and *Fallopia japonica*), Japanese stiltgrass (*Microstegium vimineum*), kudzu (*Pueraria montana*), mile-a-minute (*Persicaria perfoliata*), purple loosestrife (*Lythrum salicaria*), tree of heaven (*Ailanthus altissima*), spotted knapweed (*Centaurea stoebe*), Viper's bugloss (*Echium vulgare*), cheatgrass (*Bromus tectorum*), and multiflora rose (*Rosa multiflora*) (WVDNR, 2009).

During field reconnaissance, the presence of invasive plant species was documented using the WVDNR invasive plant list (WVDNR, 2009). The following species were observed at multiple wetland and upland sampling sites throughout the study area: multiflora rose (*Rosa multiflora*), Morrow's honeysuckle (*Lonicera morrowii*), and Japanese honeysuckle (*Lonicera japonica*). These species were encountered sporadically throughout the study area.

3.5.2 Fish and Wildlife

West Virginia supports a wide range of wildlife species, with WVDNR reporting 70 species of mammals, 300 bird species, 178 fish species, 35 salamander species, 14 frog and toad species, 13 turtle species, 6 lizard and skink species, and 20 species of snakes commonly found throughout the state.

Common wildlife species expected to inhabit the reservoir include warm water fish species such as striped bass (*Morone saxatilis*), sunfish (*Centrarchidae spp.*), catfish (*Ictaluridae spp.*), perch (*Percidae spp.*), common carp (*Cyprinus carpio*), and minnows (*Cyprinidae spp.*). The reservoir likely supports common water snakes (*Nerodia s. sipedon*) along with eastern snapping turtles (*Chelydra s. serpentina*), American bull frogs (*Rana catesbeiana*), pickerel frogs (*Rana palustris*) and other reptile and amphibian species. Mammals expected to inhabit the reservoir fringes and surrounding lands include white-tailed deer (*Odocoileus virginianus*), black bear (*Ursus americanus*), red fox (*Vulpes vulpes*), muskrat (*Ondatra zibethicus*), striped skunks (*Mephitis mephitis*), raccoons (*Procyon lotor*), and other small mammals like meadow voles (*Microtus pennsylvanicus*), moles (*Talpidae spp.*), and shrews (*Soricidae spp.*). Bird species expected to use the reservoir and its associated wetlands and surrounding landscape include hawks (*Accipiter spp.*), great horned owls (*Bubo virginianus*), great blue herons (*Ardea herodias*),

shorebirds, and various waterfowl species along with song birds, ruffed grouse (*Bonasa umbellus*), wild turkeys (*Meleagris gallopavo*), and migratory bird species (WVDNR, 2001, 2006). The reservoir is likely too small to support nesting activities of raptor species such as bald eagle (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*) or ospreys (*Pandion haliaetus*).

Several species of wildlife were encountered during field reconnaissance. Wildlife observations within the wetlands, the reservoir, and along the streams included butterflies, damselflies, dragonflies, raccoon tracks, deer tracks, frogs, fish, geese, mallards, red-winged blackbirds, swallows, and a muskrat. No large raptor nests were observed within trees surrounding the reservoir. Calls of bull frogs and spring peepers were noted in field logs.

According to WVDNR and the WVDEP, there are no Tier 3 or Trout Stocked streams flowing into New Creek Site 1 (WVDEP, 2016a).

Invasive Species

Hundreds of invasive terrestrial animal and insect species are found throughout the state. Key insect pests include gypsy moth (*Lynmantria dispar*), emerald ash borer (*Agrilus planipennis*), hemlock woody adelgid (*Adelges tsugae*), and brown marmorated stink bug (*Halyomorpha halys*) (WVDNR, 2014).

Invasive aquatic species of concern in West Virginia include virile crayfish (*Orconectes virilis*), rusty crayfish (*O. rusticus*), Asian clams (*Corbicula fluminea*), and zebra mussels (*Dreissens polymorpha*).

None of these terrestrial or aquatic invasive species were observed within the Site 1 study area.

3.6 Endangered and Threatened Species

Coordination with the U.S. Fish and Wildlife Service (USFWS) and West Virginia Department of Natural Resources (WVDNR) was completed to determine if there were any known occurrences of threatened or endangered species within the study area (**Appendix A**).

The USFWS noted that Indiana bat (federally-endangered) and Northern Long-eared bat (federally-threatened) may occur or could be potentially affected by activities in the area of Site 1. WVDNR determined that there are no known records of any rare, threatened, and endangered species or sensitive habitats within the study area.

Forest-dwelling migratory birds are likely to utilize tree cover within the study area, however the reservoir is likely too small to support raptors such as bald or golden eagles or ospreys and no large nests were observed near the study area.

During field investigations, no species or habitats associated with federal or state listed rare, threatened, or endangered species were identified.

3.7 Air Quality

The USEPA sets National Ambient Air Quality Standards (NAAQS) in accordance with the Federal Clean Air Act. Based on a review of the current USEPA-designated attainment status, it was verified that Mineral County is considered to be an attainment area for all NAAQS criteria pollutants (USEPA, 2020).

3.8 Climate

West Virginia has a humid continental climate, generally with hot summers and cool to cold winters. Average annual precipitation in Mineral County is 39.9 inches, with an average seasonal snowfall of 37 inches. In winter, the average daily temperature is 32 degrees F and the average daily minimum is 22 degrees F. In summer, the average daily temperature is 72 degrees F and the average daily maximum temperature is 85 degrees F (NRCS, 2017a).

3.9 Human and Social Characteristics

3.9.1 Demographics

Site 1 is located within the U.S. Census Block Group 3, Census Tract 106 of Mineral County (U.S. Census Bureau, 2018). To characterize demographics of the study area, American Community Survey Five-Year Average data for 2014-2018 were analyzed for Block Group 3, Census Tract 106 (referred to below as the “local area”) and compared with statistics for Mineral County and the state where applicable.

Population

Local area population is estimated at 2,069 persons, accounting for approximately 8 percent of the total Mineral County population of 26,940.

Median Income

Median household income in the local area is \$47,010 per year, which is higher than comparable statistics for both Mineral County (\$46,354) and the state (\$44,921). Per capita income levels are comparatively lower, with the local area exhibiting a per capita income of \$22,577 in relation to Mineral County (\$23,546) and the state (\$25,479).

Poverty

The local area exhibits similar levels of poverty in comparison to both Mineral County and the state. Locally, approximately 16.6 percent of are identified as having income below the poverty level. County poverty levels are approximately 14.5 percent for individuals and 17.8 percent for individuals on a statewide level.

Race and Ethnicity

The local area population is estimated to include approximately 13.4 percent overall minority population. Mineral County includes approximately 5.4 percent minority residents while the state exhibits a minority population of approximately 6.5 percent.

Environmental Justice

In comparison to both Mineral County and the state, the local area exhibits higher percentages of minority residents and similar percentages of low-income populations. There are no identified environmental justice communities present within or surrounding the Site 1 study area that would be impacted by the proposed project.

3.9.2 Land Use/Land Cover and Recreation

The watershed drainage area of Site 1 is approximately 213 acres. Land use/cover types and quantities (**Exhibit 3.6 and Exhibit 3.7**) were obtained from the USGS National Land Cover Dataset 2011, which is a consistent land cover data layer for the United States.

Exhibit 3.6 - Land Use in the New Creek Site 1 Upstream Watershed

Land Cover Type	Percent
Open Water	1.8%
Developed, Open Space (less than 20% impervious surface)	7.0%
Developed, Low Intensity (20 - 49% impervious surface)	0.4%
Deciduous Forest	80.9%
Mixed Forest	0.5%
Pasture Hay	9.4%
Totals:	100.0%

Exhibit 3.7 - Land Use in the New Creek Site 1 Floodplain (500-year Floodplain Downstream to the Confluence with New Creek)

Land Cover Type	Percent
Developed, Open Space	100.0%
Totals:	100.0%

Land use/cover was analyzed for the Site 1 watershed drainage basin (i.e., upstream of the dam) and the area downstream of the dam to include the 500-year without dam floodplain.

General land use/cover in the Site 1 watershed upstream of the dam is dominated by deciduous forest cover with small areas of hay/pasture lands. Downstream of the dam, residential and commercial development are the predominant land uses.

Currently no recreational activities are offered at Site 1.

3.9.3 Visual Resources

Visual resources are the natural resources, landforms, vegetation, and manmade structures in the environment that contribute to the public's appreciative enjoyment of the landscape. The area upstream of Site 1 is generally natural with little development. Downstream, residential development has developed since construction of the dam. The dam and its appurtenances do not look natural, but blend in with the natural environment when viewed at a distance.

3.9.4 Transportation and Infrastructure

Transportation within the study area is generally provided via U.S. Route 220 (Mineral Street), which runs generally southwest-northeast, approximately 0.4 miles downstream of Site 1. Local street access to Site 1 is provided via Carskadon Lane and Baker Street, which extend from Route 220 northwest to Site 1.

U.S. Route 220 is maintained by the West Virginia Department of Transportation (WVDOT) and classified as a principal arterial roadway. According to the WVDOT, 2017 average annual daily traffic (AADT) on the section of U.S. Route 220 downstream of Site 1 was 14,467 vehicles (WVDOT, 2009). The road is used for emergency response by police, and other emergency services, including New Creek Fire and Rescue, and the Keyser Volunteer Fire Department, and as a school bus route. Year 2017 local traffic volumes on Carskadon Lane and Baker Street are 496 and 1,160 AADT, respectively.

US Route 220, a critical facility per 7 CFR 650.25, does not experience flooding in the 100- and 500-year flood events with the dam in place. In the absence of the dam, flooding over the road would be approximately 0.5 feet in the 100-year and 500-year events. In the event of a washout, vehicles would need to detour more than three miles to travel north-south on alternate routes.

In the absence of the dam, flooding (an average 0.4 feet in depth) would occur on local streets, including Main Street and its cross streets, and South Water Street, during the 25-500 year events (see **Appendix C, Figures 6, 7, 8, and 9**). South Water Street runs southwest-northeast along New Creek, approximately 0.6 mile downstream of Site 1. The flooding of 0.5 mile of South Water Street is expected to wash out portions of the flooded road due to its proximity to New Creek. Vehicles would be able to travel alternate routes in the downtown street grid, but the flooding would block access to properties along South Water Street.

Aside from the dam infrastructure and appurtenances, no other public or private infrastructure or utilities are present or cross the area upstream of Site 1 below the top-of-dam elevation. Typical residential and commercial electrical and telephone lines are found along U.S. Route 220 and along local streets.

3.9.5 Noise

Although ambient noise in the project area has not been measured, Site 1 is located at the edge of the Keyser urban area. Ambient noise includes typical urban-level roadway activity on adjacent roadways and general commerce activities along Route 220 and the WV Potomac State College campus within a 0.5-mile radius from the project area. Residential areas are within close proximity of the study area. The City of Keyser does not have regulations or restrictions concerning construction-related noise levels or hours of activity.

3.9.6 Hazardous Materials

Hazardous materials are any liquids, solids, gases, and sludges with properties that make it dangerous or capable of having a harmful effect on human health or the environment. Online hazardous waste mapping sites from the WVDEP and the USEPA were reviewed to determine if any hazardous or solid waste sites are located within the project area. According to the WVDEP mapping tools, no mining waste, open dumps, or toxic releases were identified within the project area or immediately upstream or downstream of Site 1. Two inactive (plugged) natural gas production wells are located approximately 1.1 mile upstream from Site 1. According to the USEPA, no hazardous or solid waste sites nor toxic releases were identified within the project area or immediately upstream or downstream from the dam (USEPA, 2020).

3.9.7 Public Health and Safety

Site 1 is classified as a High Hazard dam under USDA NRCS standards. A dam breach hydraulic analysis was performed for Site 1 using the XPSWMM two-dimensional computer model in order to determine the downstream

inundation limits of the flood wave created by a dam breach. The peak breach outflow was approximately 64,000 cfs. Inundation mapping was extended approximately 1.4 miles downstream to the City of Keyser until the flood wave was largely within the banks of New Creek. According to the XPSWMM model, the peak flow rate of the breach flow or flood wave at Keyser is approximately 36,000 cfs or 56 percent of the peak breach flow at the dam.

Eight dwellings were identified within the downstream inundation zone that are less than 200 feet from the toe of the dam. Many other dwellings, including the City of Keyser, approximately 1.4 miles downstream, would be impacted by a flood wave that overflowed the channel banks. A total of approximately 19 dwellings were judged to experience flooding of the adjacent ground by a depth of more than 3 feet based on the aforementioned dam failure hydraulic analysis. The corresponding population at risk (PAR), assuming an average of 3.0 persons per dwelling, is 57 persons. Many other structures, including 31 commercial buildings, 5 apartment buildings, and 116 additional dwellings would clearly be impacted by a flood wave that overflowed the channel banks. Thirty-five of these dwellings are less than 1,500 feet from the toe of the dam. Assuming 3.0 persons per dwelling and 10.0 persons per commercial or apartment building, an additional 651 persons would be affected by the breach flow.

It should be noted that according to the model results, it would take less than 60 minutes for a flood wave created by a sudden failure of Site 1 to reach its peak flood level at Keyser. There is, therefore, a limited amount of warning time available which significantly decreases the probability of survival for persons at risk that are located in the downstream reaches of the inundation area. The NRCS currently uses DamWatch, a web-based software program, as a monitoring tool to predict, identify, and prepare for potentially destructive environmental events.

Site 1 currently maintains flood protection up to and exceeding the 500-year event. U.S. Route 220, a critical facility per 7 CFR 650.25, is located approximately 0.4 mile downstream of Site 1. With the dam in place, Route 220 does not experience flooding in the 100- and 500-year flood events. In the absence of the dam or other flood prevention measures, flooding over the road would be on the range of 0.4-0.5 feet for the 100-year and 500-year events. A Potomac Valley Hospital medical office building (hospice/lab services facility at 433 South Mineral Street, Keyser WV), a critical facility per 7 CFR 650.25, is located 0.6 mile downstream of Site 1. In the absence of the dam or other flood prevention measures, the 100-year and 500-year flood event would cause the medical building parking lot to flood, potentially restricting access to the facility.

In addition, in excess of 158 structures are located in the existing downstream 500-year floodplain. Structure types include residential and commercial buildings and associated outbuildings. Other private property subject to flooding includes roads, bridges, fences, landscaping, and miscellaneous improvements. Based on HEC-RAS modeling, it was determined that these 158 properties in the 500-year floodplain are receiving flood control benefits from the presence of the dam. If the dam were removed and no other flood prevention measures provided, 129 of these properties would experience flooding in the 500-year event (average depth of 0.5 feet), and 127 of these properties would also experience flooding in the 100-year event and events smaller than the 100-year.

3.10 Cultural Resources

The West Virginia State Historic Preservation Office (SHPO), geographic information systems (GIS) website was consulted to assess potential cultural resources within the vicinity of Site 1 and the area of potential effect. Based on the review of the SHPO database, no known cultural resources were located within the area of potential effect.

Coordination with the West Virginia Division of Culture and History (SHPO) was conducted in accordance with Section 106 of the National Historic Preservation Act, for Site 1. SHPO noted that no recorded archaeological resources are located within the proposed project area. SHPO requested that an additional survey and a Historic Property Inventory Form be completed for properties over 50 years of age to assess potential effects to architectural resources (see **Appendix A**). This survey was completed in December 2019 and January 2020 the SHPO concurred with a determination that the Site 1 dam (MI-0249) was not eligible for listing in the National Register of Historic Places (see **Appendix A**). The Site 1 dam is a common, solitary piece of infrastructure similar to numerous dams constructed during the same period or earlier, has no association to persons of historic significance, and is not a significant example of innovative infrastructure engineering or design.

Tribal Ancestral Lands Consultation was conducted by NRCS in May 2021. Responses received from the Osage and Seneca Nations in July and August of 2021 respectively indicated that the study area is not within their ancestral land areas of interest.

3.11 Description of Site 1

Site 1 is a single-purpose dam (flood control) consisting of a 950-foot long, earthfill embankment with a maximum height of 42.4 feet. The dam has two spillways; a two-stage principal spillway and an open channel vegetated auxiliary spillway. Both spillways are uncontrolled. All inflow is discharged through the principal spillway until the pool level reaches the level of the auxiliary spillway crest which is approximately 5.7 feet below the top of dam. As-built drawings indicate the presence of a low level dewatering drain pipe with a steel plate bulkhead at the location where the drain pipe enters the principal spillway riser structure. The principal spillway conduit consists of a 24-inch diameter reinforced concrete, steel cylinder type pre-stressed pressure pipe. The principal spillway conduit was originally constructed with a concrete cradle with reinforced concrete anti-seep collars. As-built drawings indicate the presence of a 6-inch-diameter Corrugated Metal Pipe (CMP) toe drain located 29-feet downstream of the centerline of the dam embankment. The location of the toe drain outfall is unknown and may have been terminated or disrupted by the residential development which has occurred at the downstream toe of the dam. Historic photographs and comparison of existing conditions to as-built drawings confirms that additional modifications have been made to the dam in support of the residential development at the outfall of the principal spillway. The principal outfall pipe has been extended and the original rock-lined plunge pool has been removed and replaced with a narrow concrete-lined channel to maximize the developable land immediately downstream of the embankment.

The design drainage area of Site 1 totals 213 acres (approximately 0.33 square miles) comprised of mainly forest cover. The reservoir at normal pool covers an area of approximately 3.2 acres. The reservoir has storage allocated for flood control and sediment storage.

3.11.1 Status of Operation and Maintenance

Operation and maintenance of Site 1 is the responsibility of the Potomac Valley Conservation District, in cooperation with the WVCA. This site receives monthly inspections by the WVCA and an annual operation and maintenance inspection by the Sponsors and NRCS. The NRCS State Conservation Engineer certifies this dam biennially to the West Virginia Department of Environmental Protection (WVDEP), Dam Safety Section. Recent records indicate that the operation and maintenance of the structure has been kept current for the site.

Identified areas of deferred maintenance include, but are not limited to, backfilling of animal burrows, removal of trees and tree stumps, and removal of the water pipeline from the footprint of the dam.

3.11.2 Current Conditions

An updated evaluation of Site 1 was completed based on field surveys and exploration and use of engineering analyses to identify deficiencies of the dam and its appurtenances (see Appendix D for detailed information). Field investigations included:

- ▶ a subsurface boring exploration program to characterize embankment material and underlying bedrock geology;
- ▶ a topographic survey of the dam embankment and surrounding land to document the current surface conditions;
- ▶ a bathymetric survey to verify the current storage volume of the reservoir and determine the extent of sediment deposition; and
- ▶ an environmental field survey to document baseline conditions of wetlands, streams, waterbodies, and possible species of interest that may occur in or around the Site 1 dam.

Exhibit 3.8 provides a summary of specific topographic survey data from as-built drawings and a comparison value based on 2016 field survey findings.

Since its construction, residential development has occurred downstream of the Site 1 reservoir. However, based on field survey measurements no structures were found to occur below the top of dam elevation.

3.11.3 Current Performance

Using the field data collected, numerous engineering analyses involving hydrology and hydraulics parameters and geotechnical criteria were completed to identify deficiencies of the current dam in meeting design safety and engineering criteria and performance standards.

Hydrologic and Hydraulic Performance

To evaluate the performance of Site 1 against current NRCS and WVDEP design criteria, updated hydrologic and hydraulic performance was analyzed using the NRCS Water Resources Site Analysis Program (SITES) modeling program to determine the required auxiliary spillway crest and top of dam elevations. The analysis considered both a short-duration (6-hour) and long duration (24-hour) storm (27.2- and 34.6-inches of rainfall respectively, from HMR-51) in evaluating the required top of dam elevation and the 100-year flood event (5.79-inches of rainfall from NOAA Atlas 14) for the auxiliary spillway crest elevation criteria (**Exhibit 3.9**).

These results indicate that the Site 1 embankment passes the short duration (6-hour) Freeboard Hydrograph (FBH) elevation with 1.0 feet of freeboard and the long duration (24-hour) storm with 2.65 feet of freeboard. As such, the auxiliary spillway crest is higher than required for both the 100-year point rainfall criteria and the 100-year runoff volume criteria. Based on the controlling criteria (runoff volume criteria), the auxiliary spillway crest is 3.45 feet higher than required. Therefore, no changes are needed to the top of dam elevation to meet current High Hazard performance criteria.

Exhibit 3.8 - Existing Conditions Data Comparison for New Creek Site 1

Description	As-Built Value (1960)	Observed Value (2016)
General Data		
Year Designed	1956	
Year Constructed	1957	
Purpose	Flood Control	
Original Hazard Classification	High	
Current Hazard Classification	High	
Design Life	50 years (2007)	
Design Drainage Area	226 Acres (0.35 Mi ²)	213 Acres (0.33 Mi ²)
Dam Height	41.7 Feet	42.4 Feet
Embankment Length	945 Feet	950±
Embankment Top Width	14 Feet	12 – 14 Feet
Embankment Upstream Slope	3H:1V	3±H:1V
Embankment Downstream Slope	2H:1V	2±H:1V
Critical Elevations (MSL)		
Top of Dam	926.4 Feet (NGVD29) ¹	925.55 Feet (NAVD88)
Auxiliary Spillway Crest	920.3 Feet (NGVD29) ¹	919.9 Feet (NAVD88)
PSW Weir	916.9 Feet (NGVD29) ¹	916.35 Feet (NAVD88)
Normal Pool	906.3 Feet (NGVD29) ¹	905.66 Feet (NAVD88)
PSW Conduit Outfall Invert	884.7 Feet (NGVD29) ¹	883.16 Feet (NAVD88)
PSW Outlet Channel Invert	883.7 Feet (NGVD29) ¹	883.13 Feet (NAVD88)
Storage Capacities		
Sediment Storage (50-Year Submerged Sediment)	11.0 Acre-Feet ²	4.0± Acre-Feet (Submerged Sediment)
Normal Pool (50-Year Submerged Sediment)	11.0 Acre-Feet ²	16.9± Acre-Feet (Water Volume Remaining)
Auxiliary Spillway Crest (total storage available – sediment & water)	72.4 Acre-Feet ²	92.7± Acre-Feet
Top of Dam	117± Acre-Feet ²	137.1± Acre-Feet
Pool Surface Areas		
Normal Pool	2.1 Acres	3.2± Acres
Auxiliary Spillway Crest	6.4 Acres	6.9± Acres
Other Features		
Principal Spillway Orifice Size	12 Inch Diameter	12 Inch Diameter
Principal Spillway Conduit Diameter	24 Inches	24 Inches
Principal Spillway Conduit Length	161.13 Feet	178.26 Feet
Principal Spillway Weir Crest Length	6-Feet (Total)	6-Feet (Total)
Auxiliary Spillway Width	80 Feet	78 Feet

1 As-built elevation taken from As-built Drawings which are in vertical datum of NGVD29. Conversion from NGVD29 to NAVD88 = -0.6 feet (source: Verticon-National Geodetic Survey, NOAA)

2 As-built storage capacities taken from original design documents

Exhibit 3.9 - Side-By-Side Comparison of Key SITES Model Input and Output

Parameter	Original 1956 Design (NGVD 29)	2016 Gannett Fleming Survey El. (NAVD 88)	Updated 2017 Analyses (NAVD 88)		
			100-Year (1-Day/10-Day) ASW Crest	6-hr High Hazard Top of Dam	24-hr High Hazard Top of Dam
Key Input Data					
Watershed Area	226 Acres	-	213 Acres	213 Acres	213 Acres
Weighted Curve Number	73	-	59	59	59
Time of Concentration, T _c	0.31 Hours	-	0.49 Hours	0.49 Hours	0.49 Hours
100-Year Rainfall (P-100)	-	-	5.79 Inches	-	5.79 Inches
Freeboard Rainfall (P-FB)	27.3 Inches	-	-	27.2 Inches	34.6 Inches
Key Output Data					
ASW Crest Elevation (Point Rainfall Criteria)	920.3 Feet	919.9 Feet	912.01 Feet	-	-
ASW Crest Elevation (Runoff Criteria)	920.3 Feet	919.9 Feet	916.45 Feet	-	-
Top of Dam Elevation	926.4 Feet	925.55 Feet	-	924.55 Feet	922.90 Feet
Freeboard	-	-	-	1.00 Feet	2.65 Feet

The NRCS SITES model using the SCS Curve Number method was used to evaluate the performance of the dam for both the 100- and 500-year events. In each case, the routed storm event was contained below the auxiliary spillway elevation. Consequently, the dam currently provides flood control for storm events in excess of the 500-year event (auxiliary spillway activated by a 2,000+/- year event).

Sediment Storage

Original Design - Site 1 was originally designed to provide a submerged sediment storage capacity of 11.0 acre-feet at normal pool elevation over its 50-year design life.

Current Survey Observations - Based on 2016 bathymetric survey results, approximately 4.0 acre-feet of sediment is estimated to be present within the reservoir below normal pool elevation. Therefore, over the approximate 60-year life of the dam the annual sedimentation rate is 0.07 acre-feet. Based on the 2016 bathymetric survey, it is estimated that approximately 16.9 acre-feet of sediment storage volume at normal pool remains, which exceeds the design volume of 11 acre-feet.

Assuming that similar sedimentation rates occur in the future, the remaining sediment volume (16.9 acre-feet) is expected to be more than adequate for the next 100-years.

3.11.4 Breach Analysis

Site 1 is classified as a High Hazard dam under NRCS and WVDEP standards, defined as a dam located where failure may cause loss of life, serious damage to homes, industrial and commercial buildings, important public utilities, main highways, or railroads.

Revised breach inundation mapping for Site 1 was prepared using the XPSWMM two-dimensional model in order to determine the downstream inundation limits of the flood wave created by a sudden breach of the dam.

The inflow hydrograph, reservoir stage-storage relationship, and other inputs used to describe the dam in the two-dimensional model were obtained from the 6 hour FBH SITES output and as-built drawings.

The two-dimensional dam breach analysis and downstream unsteady flow modeling of the flood wave was performed using a four-foot horizontal resolution LiDAR terrain data. Landuse data was digitized using Geographic Information System (GIS) tools and aerial imagery to characterize the surface runoff features of the downstream terrain.

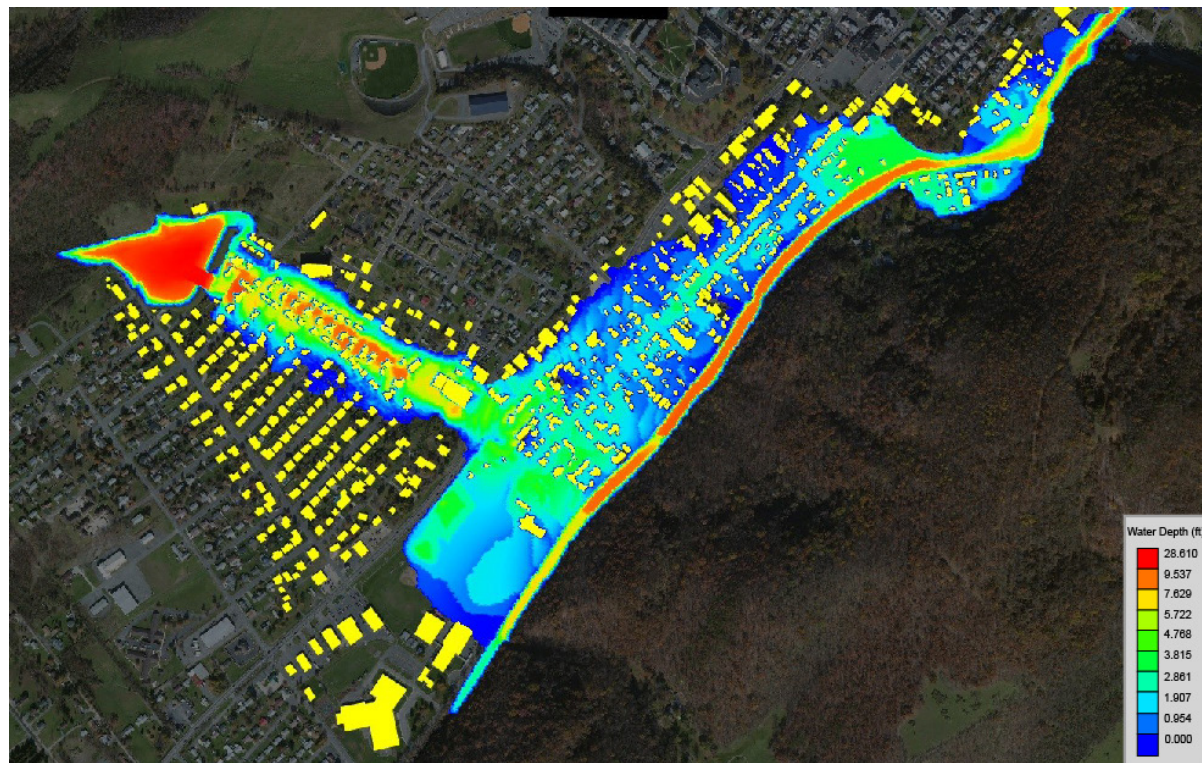
The dam breach parameters, including the time to breach, breach bottom width and side slopes were determined by trial and error until the peak breach discharge criteria specified in TR-60 was satisfied. The minimum and maximum peak breach discharges using TR-60 criteria were computed to be approximately 36,000 cfs and 64,000 cfs, respectively. Assuming a complete breach of the dam occurs within 3 minutes, a peak discharge of approximately 36,000 cfs was computed using the two-dimensional flow model. The height of the breach flood wave at the dam site, from the top of the dam to the valley floor would be approximately 47 feet.

The breach analysis was performed for two scenarios namely, (1) a Sunny Day failure of the dam with the reservoir at normal pool, and (2) a FBH storm plus failure, with the failure occurring when the reservoir is at the peak pool level. The FBH storm was only assumed to occur in the watershed upstream of the dam. Inundation mapping was extended to the city of Keyser, approximately 1.4 miles downstream of the dam, until the flood wave was largely within the banks of New Creek. According to the XPSWMM model, the peak flow rate of the breach flow or flood wave at Keyser is approximately 36,000 cfs or 56 percent of the peak breach flow at the dam. **Exhibits 3.10 and 3.11** present the approximate inundation in the area downstream of New Creek Site 1 during a Sunny Day Breach and FBH plus breach scenario, respectively.

Exhibit 3-10 - *Approximate Maximum Flow Depths Corresponding to a Sunny Day Breach Scenario at New Creek Site 1.*



Exhibit 3-11 - *Approximate Maximum Flow Depths Corresponding to FBH Plus Breach Scenario at New Creek Site 1.*



3.12 Evaluation of Potential Failure Modes

3.12.1 Dam Failure by Overtopping of the Embankment

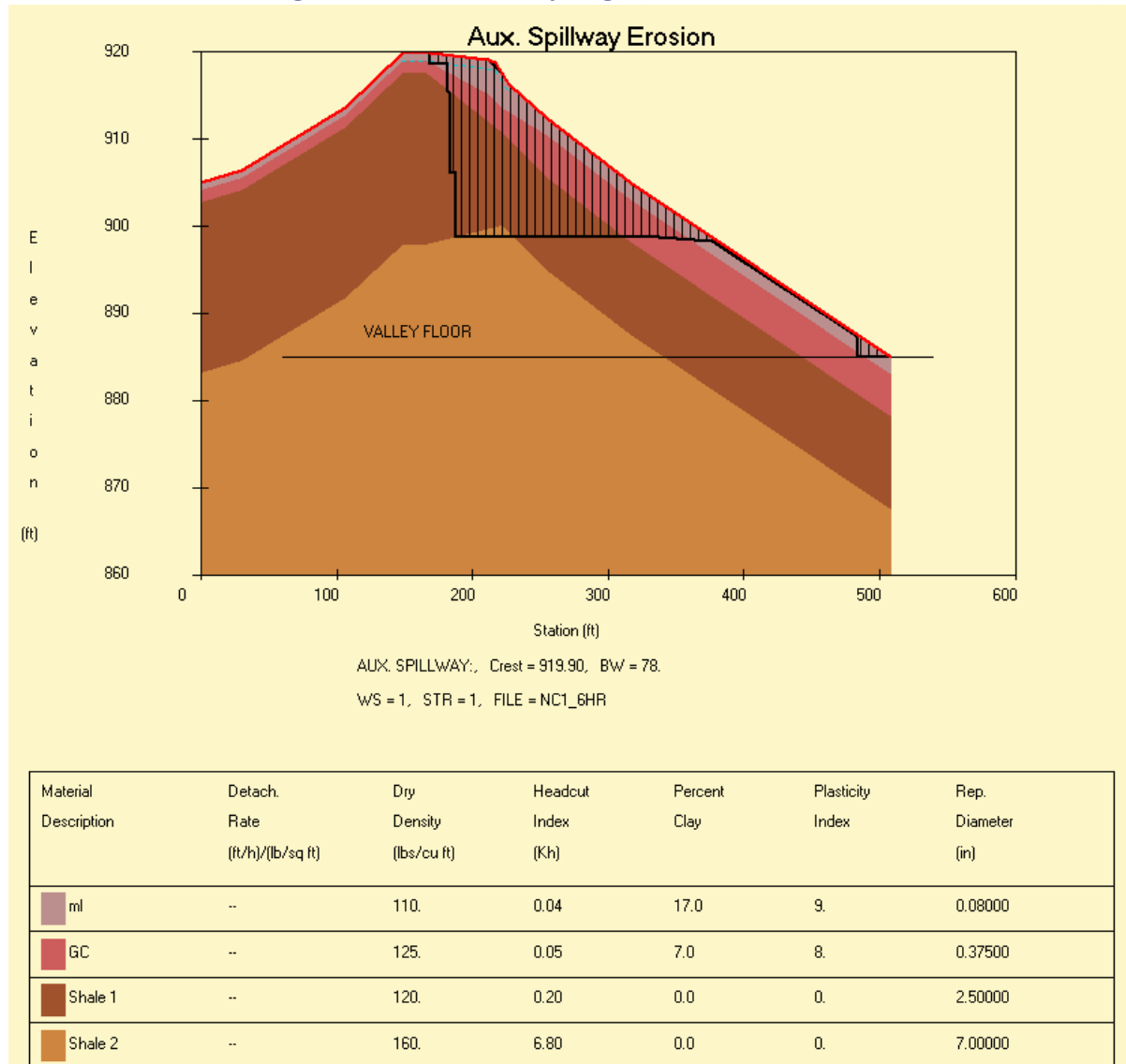
Site 1 exceeds the required elevations for the top of dam and auxiliary spillway crest based on current NRCS and WVDEP design criteria. Based on the SITES analysis, the dam was shown to not overtop during the 6-hour or 24-hour PMP event. Therefore, dam failure by overtopping of the embankment is considered improbable for Site 1.

3.12.2 Dam Failure by Erosion of the Auxiliary Spillway

Using the SITES modeling program, an integrity analysis of the auxiliary spillway was performed. Subsurface information from the as-built drawings and 2016 boring logs were used to develop a representative geologic profile of the most erodible section through the auxiliary spillway. Headcut erodibility index and other soil and rock parameters were estimated based on available subsurface data.

Results of the SITES auxiliary spillway integrity analysis shows significant erosion of the downstream end of the auxiliary spillway (20-foot high headcut) but no breach of the spillway crest during passage of the 6-hour Freeboard Hydrograph (FBH) or 24-hour FBH. In most cases the 24-hour event is the worst case scenario for the integrity of vegetated spillways, however the SITES model analysis for Site 1 shows that the 6-hour FBH scenario is the worst case scenario for the integrity of the spillway. Even though the duration that the auxiliary spillway is activated is much less during the 6-hour event than the 24-hour event, the peak discharge through the auxiliary spillway during the 6-hour event is significantly greater than the 24-hour event. Because of this, the SITES model shows more erosion to the spillway during the 6-hour event.

Exhibit 3.12 - Plot of Auxiliary Spillway Profile and Extent of Erosion from Integrity Analysis for 6-hour High Hazard Freeboard Hydrograph (PMF) Obtained from SITES Model Output



During the 6-hour event, the headcut is computed to have a maximum final headcut depth of approximately 21 feet. The furthest upstream headcut was computed to be 1.2 feet deep and progressed up to the downstream end of the level control section.

A SITES sensitivity analysis was performed where the soil parameters were altered to determine how close the auxiliary spillway is to breaching during passage of both the 6-hour and 24-hour FBH. Using conservative values, all information available indicates that a breach of the auxiliary will not likely occur during passage of the 6-hour or 24-hour FBH.

While the integrity of the existing spillway appears to be adequate, the alignment of the exit channel does not comply with the auxiliary spillway layout requirements of TR-60. The current alignment directs flow towards the downstream toe of the dam embankment which may result in erosion, loss of embankment cross section and

ultimately failure of the embankment. **To comply with the requirements of TR-60, it is recommended that the auxiliary spillway alignment be adjusted to prevent discharge from impinging upon the downstream toe of the dam.**

3.12.3 Sedimentation

Analysis of sedimentation accumulation and historic rates indicate that Site 1 has adequate capacity to store the expected sediment loading without compromising available flood water storage. The original design anticipated an annual sedimentation rate of 0.22 acre-feet per year. Over the approximate 60 year life of the dam, the observed sedimentation rate is approximately 0.07 acre-feet per year. Forest lands cover over 80 percent of the drainage area of Site 1, with minimal agricultural activity or urban activity due to limitations of terrain in the upper reaches of the watershed. Minimal opportunity exists for additional urban development, therefore the observed sedimentation rate over the past 60 years is not anticipated to increase. The remaining sediment storage life of the reservoir is adequate for the next 102 years and the potential for failure of the dam due to inadequate reservoir capacity is negligible.

3.12.4 Drainage and Seepage Concerns

Seepage analysis of the embankment was performed based on information obtained from borings, piezometer falling head testing, observed bedrock pressures and grain-size distribution curves from soil samples. Slope stability results indicated that the dam embankment (both upstream and downstream) met the factor of safety under rapid drawdown conditions. Under steady state seepage conditions, the downstream slope factor of safety was calculated to be 1.2, less than the minimum NRCS required value of 1.5.

The potential for dam failure due to seepage or drainage concerns or slope failure is minimal.

3.12.5 Principal Riser Structure Stability

Seismic analysis was conducted in accordance with USACE guidance which accounts for overall stability under seismic loads and corresponding hydrodynamic and buoyant forces. The riser was found to be stable under both unusual and extreme seismic design loads and exceeded calculated factors of safety for sliding, floatation, overturning, and bearing pressure.

The New Creek watershed is not located within an area of significant seismic risk. Failure of the dam due to principal spillway riser failure is considered to be of low potential based on the strength of the foundation and the stability of the structure.

3.13 Consequences of Dam Failure

Site 1 is classified as a High Hazard dam under NRCS and WVDEP standards, defined as a dam located where failure may cause loss of life, serious damage to home, industrial and commercial buildings, important public utilities, main highways, or railroads.

Based on inundation mapping, a total of approximately 19 dwellings are assumed to experience flooding of the adjacent ground by a depth of more than 3 feet based on the dam failure hydrologic analysis. The corresponding population at risk (PAR), assuming an average of 3.0 persons per dwelling, is 57 persons. Many other dwellings within the City of Keyser, including 31 commercial buildings, 5 apartment buildings, and 116 additional dwellings

would clearly be impacted by a flood wave that overflowed the channel banks. Thirty-five of these dwellings are less than 1,500 feet from the toe of the dam. Assuming 3.0 persons per dwelling and 10.0 persons per commercial or apartment building, an additional 651 persons would be affected by the breach flow.

Transportation along U.S. 220 would be restricted as the roadway essentially parallels New Creek along the valley floor. U.S. 220 would be flooded along the entire stretch of roadway southeast of Site 1, affecting upwards of 14,467 vehicles per day (WVDOT, 2017). Travel along other local streets would also be affected within the City of Keyser. Bridges and public infrastructure within the inundation zone may be impassable and/or damaged, leading to service delay and potential economic consequences.

Long-term economic losses from a catastrophic breach would include changes in real property values and the tax base; loss of business revenue; strain on state and municipal budgets to address unforeseen infrastructure needs; and increased future flood damages due to the absence of the dam and its flood protection benefits.

It should be noted that according to the HEC-RAS model results, it would take less than 60 minutes for a flood wave created by a sudden failure of Site 1 to reach its peak flood level at Keyser. There is, therefore, a limited amount of warning time available which significantly decreases the probability of survival for the PAR that are located in the downstream reaches of the inundation area.

4.0 ALTERNATIVES

4.1 Formulation Process

The objective of the Plan-EA is to address the identified watershed problems and opportunities with consideration of the effects of various alternative solutions on resource concerns. The purpose and need for federal action is to bring Site 1 into compliance with current NRCS and WVDEP dam design safety and engineering criteria and performance standards while continuing to provide flood protection in excess of the 500-year event.

Formulation of alternative rehabilitation concepts followed procedures outlined in the NRCS National Watershed Program Manual (NWPM), Part 505.35B. Other guidance incorporated into the alternatives formulation process included the NRCS National Planning Procedures Handbook and other applicable NRCS watershed planning guidance.

Alternative plans were also developed in consideration of completeness, effectiveness, efficiency and acceptability criteria, in accordance with the *Economic and Environmental Principles and Guidelines for Water and Related Land Resource Implementation Studies* (P&G).

Each alternative evaluated in detail used a 102-year period of analysis, which includes a 2-year design and installation period and 100 years of expected useful life. The service life of 100 years was used in compliance with the NWPM 505.30B.1.(iii) (Costs and benefits were amortized for a 102 year period, 100 years of service life plus 1 year for design and 1 year for installation).

The formulation process began with discussions between the Sponsors and NRCS. 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 objective of bringing Site 1 into compliance with current design criteria and performance standards.

4.2 Alternatives Considered But Eliminated From Detailed Study

Some of the alternatives considered in the planning process were eliminated from detailed consideration because they did not meet the purpose and needs of the project, or they were found not to be reasonable taking into consideration cost, logistics, acceptability, or existing technology.

4.2.1 No Action

Under a No Action alternative, there would be no formal action by either the NRCS or the Sponsors and Site 1 would remain deficient in terms of meeting current design criteria and performance standards. Existing deficiencies would not be addressed, resulting in an unacceptable level of risk to Sponsors and the public. This alternative does not meet the purpose and need and was therefore eliminated from further consideration.

4.2.2 Decommissioning

Decommissioning is a mandatory rehabilitation alternative that must be considered under NRCS policy (NWPM Part 505.35). Decommissioning is defined as the removal of the storage function of the structure and also the reconnection, restoration and stabilization of the stream and floodplain functions. This alternative would consist of

removing a section of the earthen embankment, including removal of the principal spillway riser and outlet conduit. At a minimum, the breach dimensions would comply with West Virginia Title 47, Series 34 Dam Safety Rule, such that the remaining residual structure would not meet the requirements of a “dam”. It would be recommended that the breach cross section include a pilot channel for containing low flows and an overbank area for passing larger flows such that the channel remains stable during the 100-year rainfall event. The pilot channel would connect the existing channel at the downstream toe of the dam to existing grade at the upstream toe of the dam. The need for channelization through the reservoir should be considered during final design. Existing topography and site conditions support the onsite spoiling of excavated material from the breach. The auxiliary spillway and the area inside the reservoir could be used as spoil areas provided that the spoils do not impede the natural flow patterns through the reservoir. Refer to **Figure C-11i and C-11j** for a conceptual breach plan, cross sections and channel profile.

Hydraulic modeling of the downstream inundation area was prepared for conditions with and without the New Creek Site 1 dam using the XPSWMM two-dimensional flow model (see **Appendix D, Economics Investigation and Analysis**). U.S Route 220, a critical facility per 7 CFR 650.25, is located 0.4 miles downstream of the dam. In the absence of the dam, the existing culvert would need to be resized, and other floodproofing measures possibly undertaken to reduce flooding on the roadway.

Using ArcGIS, it was determined that 129 properties located in the downstream without-dam 500-year floodplain would experience flooding in the 500-year event. Structure types include residential, commercial and institutional buildings and associated outbuildings. Other private property subject to flooding includes roads, fences, landscaping, and miscellaneous improvements. Based on the XPSWMM modeling, it was determined that these 129 properties in the 500-year floodplain are receiving flood control benefits from the presence of the dam. If the dam were removed, these properties would experience flooding in the 500-year event, and 127 of the properties would also experience flooding in the 100- through 25-year events.

A Potomac Valley Hospital medical office building (a hospice/lab services facility) at 433 South Mineral Street, Keyser WV, a critical facility per 7 CFR 650.25, is located 0.6 miles downstream of Site 1. In the absence of the dam, the 25- through 500-year flood events would cause flooding at the medical building parking lot, and flooding on U.S. Route 220, potentially restricting access to the medical building.

Public property such as state and county roads and utility infrastructure such as water lines, electric lines, electric poles, meters, and communication investments would also be subject to increased damages during flood events if Site 1 is decommissioned. These public properties are not conducive to flood proofing so additional flood damages would occur.

Replacing flood protection provided by the dam through flood proofing measures would be cost prohibitive. Based on a planning level analysis of structures in a similar watershed in West Virginia, it is estimated that the cost to raise, flood proof, relocate or otherwise protect downstream structures from flooding would be approximately \$130,000 per structure (NRCS, 2012; NRCS, 2017b). Flood proofing the 129 structures in the expanded 500-year floodplain would cost \$16,770,000 (NRCS, 2012). Costs to floodproof U.S. Route 220 and portions of the Potomac Valley Hospital medical office building were not quantified but would increase the total cost.

Replacing only a portion of the flood protection provided by the dam using incremental analysis was rejected as failing the “efficiency” and “acceptability” alternatives evaluation criteria (P&G 1.6.2.(c)). Sponsors indicated that selecting properties that would or would not receive flood protection and introducing flooding at low recurrence intervals for a portion of downtown Keyser residents would be unacceptable to the sponsor and the public. Frequent flooding of the community, even at low flood depths, would exact a social cost beyond what is reflected in the economic analysis. Therefore, the decommissioning alternative was dismissed from further study.

4.2.3 Non-Structural Measures

Site 1 was classified as a High Hazard structure when constructed in 1957. Urban or developed land in the New Creek Watershed has increased from 2 percent to 7.4 percent of total land since the original watershed plan in 1956 (with significant development occurring directly downstream of Site 1), and the structure remains classified as High Hazard.

Non-structural measures would consist of the relocation or flood proofing of structures in the 100-year floodplain (see Decommissioning Alternative). High Hazard structures provide significant downstream flood damage reduction to homes, buildings, transportation corridors, and other infrastructure and improvements. Relocation of the roads, bridges, and utilities protected by Site 1 out of the floodplain would not be practicable or reasonable and would generate substantial adverse economic and environmental impacts within the watershed. When costs for protecting roads and other infrastructure and property purchases for relocation or flood proofing are added, the cost of non-structural measures far exceeds the cost of structural alternatives to rehabilitate. Non-structural measures were determined not to be cost effective and were eliminated from further consideration.

Exhibit 4.1 - Conceptual Grading Plan to Extend the Existing Auxiliary Spillway Exit Channel.



4.2.4 Realignment of Vegetated Auxiliary Spillway

To comply with the requirements of TR-60, the auxiliary spillway should be extended downstream a sufficient distance to prevent auxiliary spillway flows from impinging on the dam. Extending the spillway past the toe of the downstream embankment would require acquisition of at least two properties in order to accommodate the proposed grading activities (**Exhibit 4.1**) and may result in increased flooding on additional properties located immediately downstream of the exit channel. Based on the adverse impacts to multiple residential properties, this option was not pursued as a viable option.

4.2.5 Convey the FBH Discharge to New Creek

To prevent auxiliary spillway flows from impinging upon the downstream toe of the embankment, spillway flows could be collected in a closed conduit system and conveyed to New Creek. **Exhibit 4.2** shows a possible alignment for the conduit system (designated as a yellow line), extending from the existing auxiliary spillway approximately 3,300 feet to New Creek. Based on existing topography, conduit slopes may range from approximately three (3) percent along Carskadon Lane to less than one (1) percent in the lower reaches of the system between Route 220 and New Creek. The entrance of the closed conduit system would be located at the northern end of Loughs Lane. Localized grading would be required to berm across the existing spillway discharge channel, directing flow into the new culvert system. A culvert opening of approximately 30 feet wide by 8' high would be required to provide the inlet conditions needed to capture the spillway discharge from the FBH. Downstream of the culvert entrance the dimensions of the culvert could be reduced. In the flatter areas of the closed conduit system, a 14-foot-wide by 8-foot-high culvert may be needed to convey the FBH.

The closed conduit system would direct flow away from the downstream embankment toe, eliminating the dam safety concern associated with the alignment of the existing auxiliary spillway discharge channel. This option would also eliminate downstream flooding from auxiliary spillway flows. However, construction costs associated with the closed conduit system could exceed \$9 million which would be in addition to other dam rehabilitation

Exhibit 4.2 - Conceptual Alignment of Closed Conduit Conveyance System



costs which include, but are not limited to, the addition of an internal drainage system, flattening the downstream embankment slope, and replacing the riser structure. Total construction costs could exceed \$15 million. The closed conduit system was determined to be not cost effective and was dismissed from further study.

4.2.6 Retain Spillway Design Flood

In order to eliminate discharge through the auxiliary spillway and the subsequent flooding immediately downstream of the dam during the spillway design flood, the storage capacity of the reservoir could be increased to approximately 476 acre-feet in order to contain the entire spillway design flood (existing dam contains 137 acre-feet at the top of dam elevation).

Exhibit 4.3 - Construction of New Dam to Contain the Freeboard Design Hydrograph to Eliminate the Need for an Auxiliary Spillway.



Raising the existing dam to accommodate this storage volume would prove to be problematic as the increased storage height would inundate the residential structure located along the left side of the reservoir and embankment fill slopes would impact adjacent residential development. Alternatively, a new flood control dam could be constructed upstream of New Creek Site 1 such that the combined volume of the two structures would contain the freeboard hydrograph, eliminating auxiliary spillway flow (**Exhibit 4.3**). It is estimated that the second structure would require an embankment with a length of approximately 950 feet and a height of approximately 80 feet. Based on the anticipated construction costs of such a structure, additional costs to maintain two dams instead of one, and the environmental impacts associated with placing a new dam and reservoir in a wooded stream corridor, this option was dismissed as a viable option.

4.2.7 Increase Flood Storage Volume to Reduce Likelihood of Activating the Auxiliary Spillway

Additional downstream flood protection can be gained by maximizing the available floodwater pool without raising the top of dam elevation. This can be accomplished by increasing the usable floodwater pool using the one of the following options, both of which assume the top of dam is held at its current location and a new roller compacted concrete spillway is constructed over the existing embankment to address the dam safety concern associated with auxiliary spillway flows impinging upon the toe of the downstream embankment.

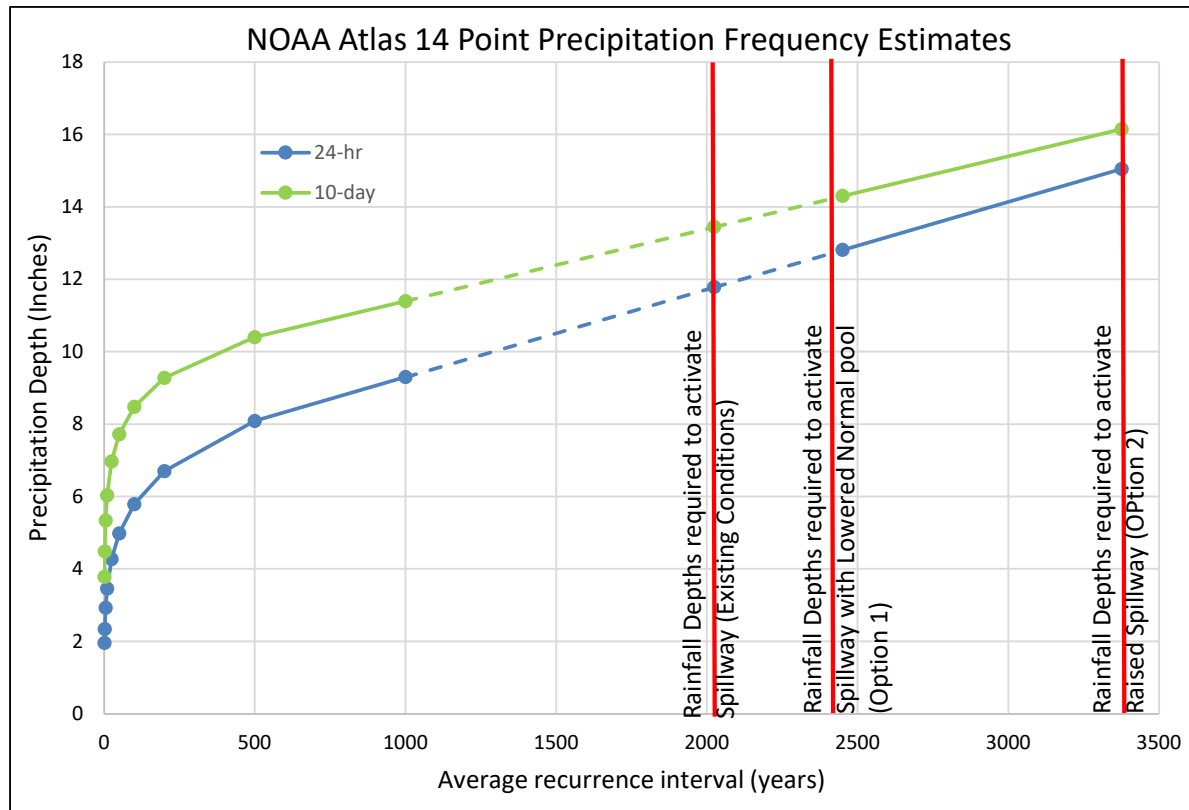
Option 1: Reduce auxiliary spillway width to 50 feet, maintain the existing auxiliary spillway crest elevation, and lower normal pool to El. 902.0 which results in an additional 9.7 acre-feet of floodwater storage.

Option 2: Increase auxiliary spillway width to 300 feet, raise the auxiliary spillway crest to El. 924.0 (a 4.1-foot-rise in elevation), and lower normal pool to El. 902.0. If the auxiliary spillway crest is raised, the spillway width must be increased in order to provide the conveyance capacity needed to pass the freeboard hydrograph without overtopping the dam. These modifications increase the floodwater storage volume between normal pool and the auxiliary spillway crest by approximately 40 acre-feet.

Exhibits 4.4 and 4.5 summarize the peak discharge for each option using the 6-hour freeboard hydrograph and the estimated recurrence interval which is expected to activate the auxiliary spillway. For each of the modeled conditions, the peak discharge from the dam is equal to or less than the existing conditions. Option 1, which increases the floodwater storage volume by 9.7 acre-feet, decreases the recurrence interval which will activate the auxiliary spillway from the 2,000+ year event to a 2,400+ year event. By raising the crest of the auxiliary spillway, the recurrence interval which activates the auxiliary spillway can be further decreased. Option 2, which increases the spillway width to 300 feet and raises the auxiliary spillway crest elevation by 4.1 feet, results in a peak discharge that matches the current conditions and decreases the recurrence interval which will activate the auxiliary spillway to a 3,300+ year event. However, raising the auxiliary spillway crest would result in inundation of unimproved land on the private property located along the left side of the reservoir immediately upstream of the existing auxiliary spillway.

Exhibit 4.4 - Auxiliary Spillway Performance Summary

Modeled Condition	Peak Discharge from Dam (cfs)	Recurrence Interval which Activates Auxiliary Spillway (yr)
Existing Conditions	2610	2,000+
Option 1	2270	2,400+
Option 2	2610	3,300+

Exhibit 4.5 - Extrapolated Rainfall Return Period Expected to Activate Existing and Proposed Auxiliary Spillway.

Increasing the floodwater pool (Options 1 and 2) will reduce the likelihood of activating the auxiliary spillway (refer to **Exhibits 4.4 and 4.5**), providing an additional level of flood protection immediately downstream of the dam. Flood protection benefits along New Creek would likely be negligible during the freeboard hydrograph.

Lowering the normal pool elevation under both Options 1 and 2 can be achieved by setting the orifice in the riser structure at the desired elevation with no significant increase in construction cost. However, lowering the normal pool may have environmental impacts associated with wetland impacts around the rim of the reservoir and exposing sediment which was previously submerged. Raising the auxiliary spillway crest will require a wider spillway which could increase construction costs by 50 percent or more in comparison to the preferred alternative described in Section 4.3.2.

Due to the level of development which has occurred downstream of the dam, it is recommended that the level of flood protection provided by New Creek Site 1 Dam be maintained. Based on the level of flood protection currently provided by New Creek Site 1 Dam, the need to reduce the likelihood of activating the auxiliary spillway does not appear to be warranted. Furthermore, options for increasing the flood pool volume may introduce environmental impacts, land right issues, and additional costs. Consequently, the option of increasing the available flood pool volume was dismissed from further study.

4.3 Alternatives Retained for Detailed Study

4.3.1 Alternative 1: No Federal Action (Sponsors' Rehabilitation) Alternative

The No Federal Action Alternative is a mandatory rehabilitation alternative that must be considered under NRCS policy (NWPM Part 505.35). The No Federal Action (or Future Without Project) represents the Sponsors' most likely course of action in the absence of federal funding. The No Federal Action Alternative provides a basis for comparison among alternatives to determine the magnitude of benefits and adverse effects. For this study, the No Federal Action Alternative was defined as follows:

The Sponsors would not seek the 65 percent federal cost-share available through the Watershed Rehabilitation Program, and no federal funds would be expended. To meet the purpose and needs of the project, the Sponsors would use state and/or local funding to update Site 1 in order to meet current NRCS and WVDEP design, safety, and performance criteria. The total installation cost of this alternative is \$7,161,100, equivalent to the Preferred Alternative.

The likelihood of this course of action depends on the availability of non-federal funds and the Sponsors' ability to secure those funds. Sponsor financial resources may limit timely implementation of the No Federal Action alternative.

4.3.2 Alternative 2: Rehabilitate Site 1 to Meet NRCS/WVDEP Standards (Preferred Alternative)

The primary concerns which need to be addressed by the rehabilitation alternative are drainage and seepage concerns, downstream embankment stability, and the location of the auxiliary spillway. Drainage, seepage and downstream embankment measures are presented below, followed by a summary and identification of the recommended option to address the auxiliary spillway concerns. The construction cost for Alternative 2 would be \$4,231,400 and the total installation cost would be \$7,161,100.

To implement the auxiliary spillway and principal spillway outlet conduit components of the preferred alternative, displacement of two residential properties would be required for construction. Rehabilitation of Site 1 would include:

Construct a Blanket and Toe Drain System near the downstream Toe of Dam: The outlet pipe of the toe drain system at New Creek Site 1 dam as shown on As-built drawings could not be located in the field. Also, piezometer data indicate the existing toe drain system is not functioning as designed to reduce pore pressures near the downstream embankment toe. The TR 60 requires the rehabilitation to be designed with sound defensive measures to reduce, filter and discharge seepage. It is recommended that a new blanket drain and toe drain system be constructed at the downstream embankment toe. The new drain system should include a dual-aggregate filter system, collector pipes and weir boxes to monitor seepage flow rates.

Flatten the downstream embankment slope: Under steady state seepage conditions, the existing downstream slope factor of safety was calculated to be 1.2, less than the minimum NRCS required value of 1.5. Flattening of the downstream embankment slope to a 3.0H:1V ratio or flatter is recommended to provide an adequate factor of safety for steady state and seismic loading conditions. The calculated factors of safety under steady state seepage and seismic loading conditions with a 3.0V:1H slope are 1.7 and 1.5 respectively. These values meet or exceed the required minimum factors of safety of 1.5 (NRCS TR-60) and 1.2 (West Virginia Regulations) respectively.

Flattening the slope would also improve the ability to properly maintain the area and provide a cover over the proposed blanket and toe drain system. The embankment crest should be restored to a uniform width of 14-feet (per the original design) as part of grading activities associated with the flattening of the downstream embankment.

Replace Principal Spillway Riser Structure: It is recommended that the principal spillway riser structure be replaced with a new structure that complies with current NRCS requirements. The new riser structure could be constructed in front of the existing riser which allows the existing riser and outlet pipe to function as a bypass system during construction of the new riser. Moving the riser upstream, near the upstream embankment toe, allows for the addition of a low-level dewatering gate for draining the reservoir.

The new riser will include a mechanism for releasing cooler, hypolimnetic water to the downstream receiving channel, maintaining suitable conditions for aquatic organisms. This can be accomplished by incorporating a cold water release orifice in the riser structure located just below the normal pool elevation which is covered by a shroud that pulls water from the lower levels of the reservoir. WV DNR concurred with the use of a cold water release system as an adaptive solution to coldwater preservation downstream of Site 1.

Relocate the auxiliary spillway: The auxiliary spillway exit channel does not comply with the requirements of the TR-60 because it directs flow towards the downstream toe of the dam embankment. Due to impacts to private property associated with realigning the existing exit channel, it is recommended that the existing auxiliary spillway be abandoned and a new Roller Compacted Concrete (RCC) spillway be constructed over the embankment in line with the discharge channel from the principal spillway. An RCC auxiliary spillway with a 50-foot width would be adequate to pass the freeboard hydrograph (maintaining the existing auxiliary spillway crest and top of dam elevations). **Exhibit 4.6** compares the freeboard hydrograph inundation area immediately downstream of the dam for the existing conditions (red shaded area) and with the relocated auxiliary spillway in place (cyan line). The inundation areas are nearly identical with the exception of the area immediately downstream of the existing auxiliary spillway. The relocated spillway will newly protect seven properties from experiencing inundation from spillway flows. Refer to **Figure C-11** for a plan view showing the 50-foot-wide RCC auxiliary spillway option.

The proposed auxiliary spillway configuration has several advantages, including but not limited to, the following:

The location of the RCC auxiliary spillway would protect the downstream toe of the dam embankment from erosive flow.

The RCC auxiliary spillway could be configured to accommodate and/or incorporate other improvements such as flattening the downstream embankment slope, providing a filtered drain system beneath the spillway and replacing the downstream end of the principal spillway conduit which would be set in a concrete cradle and provided with a filter diaphragm.

The RCC stilling basin could be configured to include a plunge pool for energy dissipation from the principal spillway conduit.

The current auxiliary spillway configuration impacts homes located in the path of the exit channel within an area that would not be flooded if the spillway was not there. The proposed RCC auxiliary spillway

Exhibit 4.6 - Comparison of the Freeboard Hydrograph Inundation Area (Existing Versus Relocated Auxiliary Spillway)



will direct flow into the area which would currently be flooded from activation of the existing auxiliary spillway. Consequently, no additional properties would be impacted by flooding beyond those properties which are expected to be flooded under the current conditions and the depth of flooding would not be expected to increase. There are more than 40 homes that would be impacted by flooding without the dam in-place and are affected by PMF flows from the auxiliary spillway.

Evaluation of the water surface elevations for the proposed condition were not found to be higher than water surface elevations for the no-dam condition, therefore the proposed condition is not considered inducing flooding per NWPM 504.3.C.1.iii.

The RCC stepped auxiliary spillway with stilling basin would dissipate most of the flow energy at the toe of the dam before it is released downstream, thus providing a safer discharge of flood flows as compared to the existing auxiliary spillway configuration. The existing spillway configuration has the flood flows accelerating downhill picking up speed until the flow impacts the toe of the dam and the dwellings along the left side of the spillway. The flow then takes a tortuous path until it turns 90 degrees and finds its way downstream.

Reconstruct downstream end of the principal spillway outlet conduit: The principal spillway conduit has been extended and the original rock-lined plunge pool has been removed to support the residential development which

has occurred at the downstream toe of the dam. The conduit extension contains open joints and is misaligned, and the removal of the plunge pool reduces the ability of the outfall to dissipate energy. Those portions of the principal spillway outlet conduit which are not supported on a concrete cradle would be removed and replaced with a new extension set in a concrete cradle. Energy dissipation features would be installed at the conduit outfall and may be incorporated into the proposed RCC auxiliary spillway stilling basin (**Figure C-11**). A filter diaphragm would be installed in the area of the outlet conduit reconstruction to satisfy the TR-60 requirement that rehabilitations of all dams include a filter diaphragm around all conduit penetrations.

The grading activities for the auxiliary spillway stilling basin and flattening of the downstream embankment slope will require acquisition of at least two properties at the downstream toe of the dam. Flattening of the downstream embankment slope may encroach on private property requiring additional property acquisition or easements from the impacted homeowners. These downstream property impacts could be minimized by shifting the embankment centerline into the reservoir, subsequently reducing the footprint of the proposed 3H:1V embankment slope which encroaches onto private property; however, this would impact the sediment storage and floodwater retarding volume. Refinements to the embankment alignment can be further investigated during preliminary and final design. Consideration should be given to purchasing all property at the downstream toe of the dam.

4.4 Comparison of Alternatives Retained for Detailed Study

Exhibit 4.7 provides a comparison of the alternatives retained for detailed study considering costs, benefits, and environmental effects.

Exhibit 4.7 - Summary and Comparison of Alternatives

Item of Concern/Effect	Alternative 1: No Federal Action (Sponsor's Rehabilitation) (Blanket and Toe Drain System; Flatten Downstream Embankment; Replace Riser Structure; Relocation/Construction of RCC Auxiliary Spillway; Reconstruct Principal Spillway Outlet Conduit)	Alternative 2: Rehabilitate Site 1 to Meet NRCS/WVDEP Standards (Blanket and Toe Drain System; Flatten Downstream Embankment; Replace Riser Structure; Relocation/Construction of RCC Auxiliary Spillway; Reconstruct Principal Spillway Outlet Conduit)
Installation Costs		
Total Project Investment	\$7,161,100	\$7,161,100
Total Construction	\$4,231,400	\$4,231,400
Total Beneficial Annualized (AAEs) ¹	–	\$208,800
Total Adverse Annualized (AAEs) ¹	–	\$208,800
National Economic Development		
Net Beneficial	–	\$0
Benefit/Cost Ratio	–	1.0 to 1.0
O,M & R Total ²	–	\$9,800

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Exhibit 4.7 - Summary and Comparison of Alternatives (continued)

Item of Concern/Effect	Alternative 1: No Federal Action (Sponsor's Rehabilitation) (Blanket and Toe Drain System; Flatten Downstream Embankment; Replace Riser Structure; Relocation/Construction of RCC Auxiliary Spillway; Reconstruct Principal Spillway Outlet Conduit)	Alternative 2: Rehabilitate Site 1 to Meet NRCS/WVDEP Standards (Blanket and Toe Drain System; Flatten Downstream Embankment; Replace Riser Structure; Relocation/Construction of RCC Auxiliary Spillway; Reconstruct Principal Spillway Outlet Conduit)
Environmental Quality		
Soils (Erosion and Sedimentation; Prime and Unique Farmland)	Reservoir has adequate sediment storage capacity for the 102-year analysis period. BMPs will be implemented to reduce erosion and sedimentation effects during construction. No conversion of prime, statewide, or locally important farmlands not already committed to dam infrastructure use.	Reservoir has adequate sediment storage capacity for the 102-year analysis period. BMPs will be implemented to reduce erosion and sedimentation effects during construction. No conversion of prime, statewide, or locally important farmlands not already committed to dam infrastructure use.
Water Quality (Surface and Ground)	Proposed improvements will have no permanent impact on water quality. Erosion and sedimentation controls will be implemented before and during construction to reduce potential for impact to New Creek "Zone of Critical Concern" related to City of Keyser public water source.	Proposed improvements will have no permanent impact on water quality. Erosion and sedimentation controls will be implemented before and during construction to reduce potential for impact to New Creek "Zone of Critical Concern" related to City of Keyser public water source.
Floodplains	Present level of flood protection (in excess of 500-year; 0.2 percent flood) maintained. Project would not increase floodplain occupancy or change floodplain boundaries. Proposed rehabilitation would reduce potential for flooding of seven structures adjacent to downstream embankment from activation of the existing auxiliary spillway under PMF conditions.	Present level of flood protection (in excess of 500-year; 0.2 percent flood) maintained. Project would not increase floodplain occupancy or change floodplain boundaries. Proposed rehabilitation would reduce potential for flooding of seven structures adjacent to downstream embankment from activation of the existing auxiliary spillway under PMF conditions.
Wetlands and Waters of the U.S.	Minor permanent impact on tributary to New Creek due to extension (18 linear feet) of principal spillway conduit and reconstruction of stilling basin (20 linear feet). Section 404, Clean Water Act permit will be required. Temporary impacts to Stream 2 from stream restoration activities to blend improved principal spillway outlet into downstream channel.	Minor permanent impact on tributary to New Creek due to extension (18 linear feet) of principal spillway conduit and reconstruction of stilling basin (20 linear feet). Section 404, Clean Water Act permit will be required. Temporary impacts to Stream 2 from stream restoration activities to blend improved principal spillway outlet into downstream channel.
Air quality	Minimal, temporary impact due to construction activity. Construction best management practices (BMPs) implemented to minimize emission impacts.	Minimal, temporary impact due to construction activity. Construction best management practices (BMPs) implemented to minimize emission impacts.
Threatened & endangered species	Based on field observations and consultation with USFWS and WVDNR, no effect on species of concern are anticipated.	Based on field observations and consultation with USFWS and WVDNR, no effect on species of concern are anticipated.

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Exhibit 4.7 - Summary and Comparison of Alternatives (continued)

Item of Concern/Effect	Alternative 1: No Federal Action (Sponsor's Rehabilitation) (Blanket and Toe Drain System; Flatten Downstream Embankment; Replace Riser Structure; Relocation/Construction of RCC Auxiliary Spillway; Reconstruct Principal Spillway Outlet Conduit)	Alternative 2: Rehabilitate Site 1 to Meet NRCS/WVDEP Standards (Blanket and Toe Drain System; Flatten Downstream Embankment; Replace Riser Structure; Relocation/Construction of RCC Auxiliary Spillway; Reconstruct Principal Spillway Outlet Conduit)
Invasive Species	Several invasive plant species identified within study area. Construction BMPs will be implemented to reduce transport or further introduction of invasives. The contractor would be required to implement best management practices, including cleaning of equipment and vehicles prior to entering the dam area and also once construction is complete to avoid spreading any potential invasive aquatic species.	Several invasive plant species identified within study area. Construction BMPs will be implemented to reduce transport or further introduction of invasives. The contractor would be required to implement best management practices, including cleaning of equipment and vehicles prior to entering the dam area and also once construction is complete to avoid spreading any potential invasive aquatic species.
Fish & wildlife (including migratory species)	Potential minor temporary impacts (e.g. habitat disturbance, dispersal) resulting from construction effects, including activity, noise, and temporary stream disturbance. Species expected to disperse during construction. Adequate alternate areas for feeding, breeding and nesting are available near the study area. Species would be expected to return to area following construction. Project erosion and sedimentation controls will protect downstream water sources during construction.	Potential minor temporary impacts (e.g. habitat disturbance, dispersal) resulting from construction effects, including activity, noise, and temporary stream disturbance. Species expected to disperse during construction. Adequate alternate areas for feeding, breeding and nesting are available near the study area. Species would be expected to return to area following construction. Project erosion and sedimentation controls will protect downstream water sources during construction.
Riparian areas	Minor temporary and permanent impacts to tributary to New Creek upstream and downstream of Site 1. No significant changes to riparian areas or aquatic habitats. Project erosion and sedimentation controls will protect downstream water sources during construction.	Minor temporary and permanent impacts to tributary to New Creek upstream and downstream of Site 1. No significant changes to riparian areas or aquatic habitats. Project erosion and sedimentation controls will protect downstream water sources during construction.
Forest resources	No impact on forested areas. Disturbed areas revegetated with native vegetation.	No impact on forested areas. Disturbed areas revegetated with native vegetation.
Historic Properties	Site 1 is not eligible for listing in the NRHP. No other eligible standing resources within the APE. No recorded archaeological resources in the APE.	Site 1 is not eligible for listing in the NRHP. No other eligible standing resources within the APE. No recorded archaeological resources in the APE.
Environmental Justice	No EJ populations or communities identified within local area. The project would not generate disproportionate high and adverse effects impacting EJ populations.	No EJ populations or communities identified within local area. The project would not generate disproportionate high and adverse effects impacting EJ populations.

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Exhibit 4.7 - Summary and Comparison of Alternatives (continued)

Item of Concern/Effect	Alternative 1: No Federal Action (Sponsor's Rehabilitation) (Blanket and Toe Drain System; Flatten Downstream Embankment; Replace Riser Structure; Relocation/Construction of RCC Auxiliary Spillway; Reconstruct Principal Spillway Outlet Conduit)	Alternative 2: Rehabilitate Site 1 to Meet NRCS/WVDEP Standards (Blanket and Toe Drain System; Flatten Downstream Embankment; Replace Riser Structure; Relocation/Construction of RCC Auxiliary Spillway; Reconstruct Principal Spillway Outlet Conduit)
Land use	No impact on existing conditions or influence on future land use. Two residential displacements required for construction. Seven other displacements recommended to be considered for construction access. Displacements would not adversely affect population dynamics, community cohesion or services, or generate adverse economic effects on local area.	No impact on existing conditions or influence on future land use. Two residential displacements required for construction. Seven other displacements recommended to be considered for construction access. Displacements would not adversely affect population dynamics, community cohesion or services, or generate adverse economic effects on local area.
Aesthetics	Flattening of the downstream embankment and placement of the auxiliary spillway will introduce perceptible but not significant visual changes within the study area, as the effect will be mainly related to the color and texture of the RCC auxiliary spillway channel. Viewshed impacts limited to existing adjacent residential properties. Disturbed areas will be revegetated to provide natural cover similar to existing conditions.	Flattening of the downstream embankment and placement of the auxiliary spillway will introduce perceptible but not significant visual changes within the study area, as the effect will be mainly related to the color and texture of the RCC auxiliary spillway channel. Viewshed impacts limited to existing adjacent residential properties. Disturbed areas will be revegetated to provide natural cover similar to existing conditions.
Visual impacts	Temporary visual impacts would occur during construction activities. Implementation of the auxiliary spillway channel and embankment flattening would introduce permanent but not substantial changes in the visual appearance of the dam.	Temporary visual impacts would occur during construction activities. Implementation of the auxiliary spillway channel and embankment flattening would introduce permanent but not substantial changes in the visual appearance of the dam.

¹ Per 1.7.2 (a) (ii) of the P&G, U.S. Water Resources Council, March, 1983, allowing for abbreviated procedures, flood damage reduction 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 \$139,400, 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 2.75% discount rate and a 102 year period of analysis (1 year to design, 1 year to install, and a 100-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 so they are not included in the analysis.

4.5 National Economic Development Alternative

Alternatives for Federal water and related land resources implementation studies must be formulated in accordance with the P&G standards and procedures as well as the Principles and Requirements for Federal Investments in Water Resources and Interagency Guidelines, where applicable. To address appropriate use of federal investments and the broad consideration of environment, economic, and social goals, an alternative that reasonably maximizes net national economic development benefits is to be formulated and considered for water resource projects. This alternative is to be identified as the National Economic Development (NED) plan.

For the rehabilitation program, when human life is potentially at risk, the NED Alternative is defined as the federally assisted alternative with the greatest net economic benefits. Alternative 2 is identified as the NED plan.

5.0 ENVIRONMENTAL CONSEQUENCES

This section addresses the environmental impacts or effects that would result from implementation of the alternatives. The alternatives include the No Federal Action and the Preferred Alternative. See **Section 4.0** for additional alternatives that were eliminated from further consideration.

The following types of resource impacts were considered for the resource areas analysis:

- ▶ **Direct effect:** A direct effect is caused by and occurs concurrently at or near the location of the action.
- ▶ **Indirect effect:** An indirect effect is caused by a proposed action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action.
- ▶ **Cumulative effect:** Cumulative effects result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions.

Permanent effects of the proposed action would be associated with the grading of the downstream embankment, addition of a new blanket drain and toe drain system, construction of a new principal spillway riser, extending the principal spillway conduit and outfall, and creating a plunge pool at the spillway outfall. Temporary effects of the project include the impacts associated with construction activities, workspace and access. Temporary impacts would occur to stream and fish and wildlife species as a result of construction activity.

Conceptual requirements for construction were assumed to include associated workspace and use of existing roads to provide access between the reservoir, auxiliary spillway and workspace areas.

5.1 Soils and Geology

5.1.1 Soils

No Federal Action and Preferred Alternative

There would be no substantive permanent impact to soils within the study area under the No Federal Action Alternative or the Preferred Alternative.

Temporary effects of soil compaction on erosion and sedimentation would be minimized through implementation of best management practices and approved ESC plans. Impacted soil areas would be supplemented with sand and gravel, prior to adding soil for regrading and to improve drainage characteristics. The first foot of topsoil would be reserved for backfill after installation and would be placed in disturbed areas and be reseeded with herbaceous vegetation.

The surface area impact would be approximately 3.0 acres and primarily located on the downstream embankment face and at the downstream toe of the dam embankment. There would be no loss or conversion of Prime Farmland, Farmland of Statewide Importance, or Farmland of Local Importance from the No Federal Action Alternative or the Preferred Alternative as the area immediately downstream of the dam is committed to public infrastructure

use and is not currently in agricultural production. Also, the area where rehabilitation construction would occur are not areas that would be returned to farmland due to risk of impacting the dam structure and integrity.

5.1.2 Geology

No Federal Action and Preferred Alternative

There would be no adverse impact to geology within the study area with the No Federal Action Alternative or the Preferred Alternative. There would be limited removal of competent rock/bedrock during the rehabilitation process. Approximately 225 cubic yards of weathered/competent rock would be excavated for installation of auxiliary spillway to provide competent bedrock for foundation support.

5.2 Water Resources

5.2.1 Surface Water and Water Quality

No Federal Action and Preferred Alternative

There would be permanent physical effects on surface water resources as a result of the implementation of the No Federal Action Alternative or the Preferred Alternative. Approximately 18 feet of the downstream portion of Stream 2 would be put into a closed channel (pipe culvert) to enable flattening of the downstream embankment and stilling basin construction.

During rehabilitation, water would still flow from the upstream streams into the reservoir, from the principal spillway conduit and would continue to flow downstream through the tributary to New Creek. Minimal interruption of flow would occur while work is performed on the spillway conduit extension, stilling basin, and installation of the blanket drain/toe drain, requiring pumping or other diversion measures to pass normal stream. Interruption would occur for one construction season and then flow would resume to original conditions once the rehabilitation is complete.

Under the Preferred Alternative, a cold water release shroud would be incorporated into the principal spillway riser. This design will contribute to maintaining suitable conditions for aquatic organisms by allowing the release of cooler, hypolimnetic water to Stream 2. WV DNR concurred with the proposed design as an adaptive solution to coldwater preservation downstream of Site 1 (**Appendix A - Scoping Summary Report, August 2021 email from Brandon Keplinger, WVDNR Fisheries Biologist, found in Scoping Report Appendix 4**).

Temporary impacts to water quality (e.g. siltation, sedimentation) immediately adjacent to the project site may occur while construction is underway. Erosion and sediment controls would be installed to control downstream sedimentation and to limit potential effects of surface water sedimentation in the Zone of Critical Concern for the City of Keyser public water supply along the tributary to New Creek (WVDHHR, 2003). Construction activities would be conducted in compliance with West Virginia water quality standards. As the City of Keyser water intake is located approximately 0.6 miles downstream from Site 1, no effects to water quality are anticipated that would affect public water supplies.

5.2.2 Streams

No Federal Action and Preferred Alternative

There would be permanent impact to Stream 2 from implementation of the Preferred Alternative. Rehabilitation of the principal spillway conduit pipe carrying the stream would involve removal of 18 feet from the downstream

end of the principal spillway conduit and construction of 36 feet of new piping, resulting in an additional 18 feet of Stream 2 being contained within the conduit pipe.

An additional 20 feet of stream would be impacted to construct a new plunge pool at the end of the principal spillway conduit pipe. Upwards of 75 feet of stream restoration may also be required to blend the new outchannel into the tributary. A USACE 404 permit and WVDEP 401 water quality certification would be required for the proposed stream impact.

5.2.3 Groundwater

No Federal Action and Preferred Alternative

There would be no adverse impacts to groundwater of the study area as a result of the No Federal Action Alternative or the Preferred Alternative. It is anticipated that there will be no drawdown of water within the reservoir during the dam rehabilitation. Soil erosion and sedimentation controls will be implemented prior to and during construction activities to limit the potential for quality impacts to the groundwater aquifer.

5.2.4 Floodplain Management

No Federal Action and Preferred Alternative

There would be no adverse impacts to floodplain management as a result of the No Federal Action Alternative or the Preferred Alternative. Rehabilitation of Site 1 to address NRCS and WVDEP design and performance criteria would not change the current 100-year or 500-year floodplain boundaries downstream of the dam. There are no structures upstream of the dam that are below top of dam elevation.

5.3 Wetlands and Waters of the U.S.

Under both the No Federal Action Alternative and the Preferred Alternative, there would be permanent and temporary impacts to Waters of the U.S. including one stream.

5.3.1 Wetlands

No Federal Action and Preferred Alternative

The No Federal Action Alternative and the Preferred Alternative would have no direct permanent effects on wetlands.

Exhibit 5.1 - Impacts

Streams	Type of Impact	Description	Length (LF)	Area (ft ²)
Stream 1 (Tributary to New Creek)	Extension of principal spillway outlet culvert (18 lf) and stilling basin construction (20 lf)	Perennial tributary	38.0	152
Total Permanent Impacts			88.0	352
Stream 2 (Tributary to New Creek)	Temporary – stream restoration downstream of improved outlet to blend channel	Perennial tributary	75.0	300
Total Temporary Impacts			75.0	300

5.3.2 Watercourses

No Federal Action and Preferred Alternative

Construction activities of the No Federal Action and the Preferred Alternative would directly and temporarily/permanently impact Stream 2 (tributary to New Creek) downstream of the dam embankment (**Exhibit 5.1**). Permanent impacts to Stream 2 would consist of the 18-foot extension of the principal spillway conduit and construction of the 20-foot long stilling basin. Upwards of 75 feet of stream restoration may also be required to blend the new outchannel into the tributary.

5.4 Aquatic Biology

No Federal Action and Preferred Alternative

There would be temporary impacts to aquatic life as a result of the No Federal Action Alternative and the Preferred Alternative. Rehabilitation activities within Stream 2 would affect fish, reptiles, amphibians, and wildlife in the immediate area for one season; aquatic habitat would be temporarily interrupted during the season of construction. Some individuals using the reservoir may relocate to surrounding natural resource habitats during construction activities, but would be expected to return after project completion. Equipment would be cleaned prior to entering the dam area and also once construction is complete to avoid spreading any potential invasive aquatic species.

5.5 Terrestrial Biology

5.5.1 Plants

No Federal Action and Preferred Alternative

There would be no substantial adverse impacts to plants and vegetation as a result of the No Federal Action Alternative or the Preferred Alternative. Grading of the downstream embankment would only require removal of herbaceous vegetation. Disturbed areas outside of the RCC auxiliary spillway improvements footprint would be backfilled with reserved topsoil and reseeded. Several ornamental trees which have grown into the downstream embankment would also be removed. Herbaceous areas and trees impacted by implementation of the project do not provide valuable habitat for wildlife or aesthetic values.

In order to contain the spread of invasive species already present within the study area (multiflora rose, Morrow's honeysuckle, and Japanese honeysuckle) or other species that may be brought into the study area, equipment would be cleaned prior to entering the construction site and prior to exit. If needed, only clean fill would be brought onto the site.

5.5.2 Wildlife

No Federal Action and Preferred Alternative

There would be minor temporary impacts to fish and wildlife as a result of the No Federal Action Alternative or the Preferred Alternative. Project erosion and sedimentation controls will help protect downstream aquatic habitat during construction. Construction during the spring may affect the migration and breeding habitat of waterfowl and birds that would otherwise use the reservoir or stream. Similarly, fish and aquatic species that use the reservoir or the tributary to New Creek for habitat will be affected during the construction season. However, fish and wildlife would likely disperse to natural cover in the surrounding area until rehabilitation is complete.

5.6 Endangered and Threatened Species

No Federal Action and Preferred Alternative

There would be no adverse impacts to endangered and threatened species as a result of the No Federal Action Alternative or the Preferred Alternative. A “no effect” determination was received from the USFWS and the WVDNR stated there are no known records of any rare, threatened and endangered species, or sensitive habitats within the study area. The habitat surrounding the dam and reservoir would not change from pre-rehabilitation to post-rehabilitation.

While species specific surveys were not completed, there were no species or habitats associated with federal or state listed rare, threatened, or endangered species observed within the study area during the wetland delineation and stream assessment. However, should a rare, threatened, or endangered species be identified during rehabilitation, the appropriate agency will be notified.

5.7 Air Quality

No Federal Action and Preferred Alternative

The proposed project, under the No Federal Action Alternative or the Preferred Alternative, would not involve the permanent generation or emission of any pollutants which would permanently affect air quality or attainment with the NAAQS.

Construction activities would temporarily emit several air pollutants. Particulate matter emissions are associated with the dust created from demolition, land clearing, ground excavation, cut-and-fill operations, and road construction. Other pollutants are generated from heavy-duty diesel engines used by the construction equipment. Construction emissions are greatest during the earthwork phases because of the dust associated with this activity.

To minimize temporary, construction-stage air quality effects, the contractor would be required to implement standard BMPs, such as using dust suppressants and establishing vegetative cover on bare ground as soon as possible after grading, providing a stabilized construction entrance and requiring proper use of emission-control devices on construction equipment.

5.8 Human and Social Characteristics

5.8.1 Demographics and Environmental Justice

No Federal Action and Preferred Alternative

Installation of the proposed project would require the displacement of at least two residential properties. No business displacements are proposed or anticipated. Loss of two residential properties (and potentially others at the toe of the downstream embankment) would not adversely affect population dynamics of the local area.

The minority population of the local area could be considered meaningfully greater as the local area has approximately 17.4 percent of the total Black or African American population of Mineral County. However, no disproportionate high and adverse effects would occur. Also, the local area exhibits similar levels of poverty in comparison with both Mineral County and the state. However, effects of the dam rehabilitation are restricted to areas immediately adjacent to the existing structure and no disproportionate adverse effects would be generated from implementation of the project upon EJ populations. Therefore, the Federal Action or Preferred Alternative

would not have disproportionately high and adverse effects on minority or low-income populations as per Executive Order 12898.

5.8.2 Land Use/Land Cover and Recreation

No Federal Action and Preferred Alternative

The proposed project would not generate any permanent changes in existing land use or land cover, beyond the anticipated residential displacements. The dam rehabilitation would not induce or increase the potential for future development within the watershed. No recreational opportunities are offered at Site 1. Therefore, there would not be direct, indirect, or cumulative effects to recreational activities or land use as a result of the No Federal Action or Preferred Alternative.

5.8.3 Visual Resources

No Federal Action and Preferred Alternative

The proposed dam improvements would generally involve excavation and placement of underground components. Temporary impacts to visual resources would occur as a result of the construction on the embankment and auxiliary spillway, and the associated construction equipment present on site. Work is anticipated to last one 12-month period. After installation, disturbed ground areas would be revegetated. The major permanent visual change would be the installation of the RCC auxiliary spillway over the face of the downstream embankment. The RCC spillway would generally be visible only to existing downstream residential structures. The visual effect would be limited to a change in the surface color and pattern of the embankment. The proposed improvements would not alter the height or location of the existing dam structure and therefore not further restrict the viewshed from adjacent lands.

5.8.4 Transportation and Infrastructure

No Federal Action and Preferred Alternative

No permanent impacts on transportation or infrastructure would occur under either the No Federal Action Alternative or the Preferred Alternative. There would be a temporary increase of construction equipment and construction workers traveling to and from the project site. Construction of the dam is anticipated to last one construction season, weather permitting. Traffic on U.S. Route 220, Carskadon Lane and Baker Street would increase during construction, but would return to normal volumes upon completion of the project. Resident access would be maintained throughout construction.

5.8.5 Noise

No Federal Action and Preferred Alternative

Construction-related noise generated by operation of heavy equipment and the concrete plant would occur as a result of the No Federal Action and Preferred Alternative. The City of Keyser has no regulations or restrictions concerning construction-related noise levels or hours of activity. RCC construction may take place during nighttime hours. Heavy construction equipment can generate noise levels of 73 to 96 dBA at a distance of 50 feet (USEPA, 1971). The nearest residence is located less than 50 feet from the edge of the downstream dam embankment. Consequently, non-RCC construction should be limited to occur only during the hours of 6 am and 10 pm to reduce impacts to adjacent homeowners.

Noise generated by construction would be temporary and would cease upon completion of the project. Noise effects of construction would be minimized by requiring contractors to ensure construction equipment mufflers are properly maintained and are in good working order.

5.8.6 Hazardous Materials

No Federal Action and Preferred Alternative

No hazardous materials or waste sites were identified within the study area. Additionally, the No Federal Action or Preferred Alternative would not have direct or indirect impacts on the closed natural gas wells upstream of Site 1.

Contractors would be responsible for the management of hazardous materials and petroleum usage on site. When fuel tanks are stored on-site, it is recommended that such tanks be stored within a diked area to provide spill control. Contractors would be required to comply with federal, state, and local laws and regulations pertaining to pollution and contamination of the environment in order to prevent pollution of surface water, groundwater, soil, and air with any hazardous materials.

5.8.7 Public Health and Safety

No Federal Action and Preferred Alternative

The No Federal Action and Preferred Alternative would directly reduce the hazard potential for the loss of life and property to the breach inundation zone. A total of approximately 19 dwellings are present in the breach inundation zone, with a corresponding population at risk (PAR) of 57 persons. U.S. Route 220, a critical facility per 7 CFR 650.25, is approximately 0.4 miles downstream of Site 1, within the breach inundation zone. A Potomac Valley Hospital medical office building (443 South Mineral St) , a critical facility per 7 CFR 650.25, is approximately 0.6 miles downstream of the dam, within the breach inundation zone.

Addressing the drainage and seepage concerns and auxiliary spillway location concerns would meet requirements of the NRCS and WVDEP dam safety regulations and reduce the risk of dam failure.

The National Watershed Program Manual (NWPM) section 504.3.C.1.iii states, “For areas downstream of the dam, landrights should be acquired for the entire area where water elevations are higher for the dam in-place condition than for elevations occurring without the dam in place. See NWPM section 504.3.C.3.i.” Induced flooding is defined and clarified in NWPM section 504.3.C.3.

To implement the No Federal Action or Preferred Alternative, the flowage area of the auxiliary spillway was evaluated regarding the potential for induced flooding per the NWPM section 504.3.C.3.ii. This evaluation is documented in “**H&H Evaluation of Downstream Impacts from the New Creek Site 1 Auxiliary Spillway**” located in **Appendix E. Appendix C, Figure 12** (New Creek Site 1 – PMF Flows) provides a side-by side comparison of the PMF flows for the existing, proposed, and no-dam condition.

Alternatives to eliminate or reduce auxiliary spillway flowage during the Probable Maximum Flood (PMF) were infeasible due to the community or environmental impacts that would result.

Immediately downstream of the dam, under existing conditions, induced flooding would occur to seven homes located in the exit path of the auxiliary spillway. Under proposed conditions, induced flooding in this area would be eliminated.

Further downstream of the dam, there are more than 40 homes that would be impacted by flooding without the dam in-place and are affected by PMF flows from the auxiliary spillway.

Evaluation of the water surface elevations for the proposed condition were not found to be higher than water surface elevations for the no-dam condition, therefore the proposed condition is not considered inducing flooding per NWPM 504.3.C.1.iii.

The preferred alternative would maintain flood control protection exceeding the 500-year flood event at the auxiliary spillway crest, remove the induced flooding condition, and remove the potential for embankment toe erosion during auxiliary spillway activation.

5.9 Cultural Resources

No Federal Action and Preferred Alternative

Coordination with the West Virginia SHPO verified that there are no historical architectural resources within the study area (**Appendix A - Scoping Summary Report, January 2020 letter from Susan Pierce, Deputy SHPO, found in Scoping Report Appendix 4**). Proposed construction would occur in previously disturbed areas. Therefore, the SHPO concurred that there would be no historic properties affected as a result of the No Federal Action Alternative or the Preferred Alternative. Tribal Ancestral Lands Consultation conducted by NRCS in May 2021 determined that the study area is not within ancestral land areas of interest for tribes with a historic or cultural interest in West Virginia.

If a cultural resource were discovered after Section 106 review is complete, but prior to construction, NRCS would seek avoidance or minimization strategies in consultation with the West Virginia SHPO, interested American Indian Tribes, and other consulting parties to resolve adverse effects in accordance with 36 CFR Part 800.6. If a potential historic property is discovered or unanticipated effects to historic properties are found after implementation, installation, or construction has begun then NRCS would halt work and proceed with the post-review discoveries in accordance with 36 CFR 800.13.

If human remains are discovered, NRCS would follow all applicable federal, Tribal, and state burial laws and ordinances, including the Native American Graves Protection and Repatriation Act, and implementing regulations, when on Tribal or federal lands, and related human rights and health statutes, where appropriate. NRCS would also refer to the ACHP's Policy Statement regarding Treatment of Burial Sites, Human Remains and Funerary Objects and the ACHP's Section 106 Archaeology Guidance. NRCS would also follow USDA and NRCS policy on treatment of human remains and consultation.

5.10 Cumulative Effects

NRCS has constructed nine, primarily single-purpose, watershed dams within the New Creek-White's Run Subwatershed. This system of generally small upstream impoundments provides a network of flood protection for the City of Keyser. The Site 14 dam, which recently underwent rehabilitation, also provides incidental recreation and serves as a water supply source for Keyser.

Construction of Site 1 would have minor, long-term, direct effects on the environment through the excavation for the dam embankment and filling of the reservoir. Rehabilitation of the dam under either alternative would occur within the area previously disturbed for construction and, therefore would have no cumulative impact on the environment other than minor, temporary, construction-related impacts.

Since construction, the dam has indirectly affected the natural environment by temporary inundation of the floodplain upstream of the dam during rain events and by trapping sediment that would otherwise move downstream during rain events. The dam has also altered the hydrology of New Creek by reducing downstream flows during storm events, and consequently protecting property and people in otherwise flood-prone areas.

Within the New Creek-White's Run project area, the amount of agricultural land (crop and pasture) has decreased substantially and has been largely converted to forest cover **Exhibit 5.2**. Urbanized land has also increased. Within the Site 1 drainage area, residential development has occurred within the drainage area since construction of the dam in 1957.

Exhibit 5.2 - New Creek - White's Run Subwatershed Land Use Trends

Land Use	1957	Current
Cropland	12%	<1%
Pasture	18%	8%
Forest	68%	83%
Urban/miscellaneous	2%	9%

Rehabilitation of Site 1 under either alternative would not change the hydrology of New Creek except for protecting the downstream area from catastrophic flooding that could occur if the dam were to fail. No reasonable, foreseeable future actions were identified within the project area that would significantly contribute to cumulative resource effects. Implementation of either the No Federal Action Alternative or the Preferred Alternative would not contribute to significant cumulative effects on project area natural or socioeconomic resources and Site 1 would continue to provide flood protection and public water source benefits to the community.

Additionally, other future rehabilitation efforts to dams within the New Creek-White's Run subwatershed are likely to occur within the foreseeable future as those dams reach the end of their service life; however, rehabilitation of those dams would not be expected to generate significant cumulative resource effects at a watershed scale.

5.11 Risk and Uncertainty

Estimating project costs and benefits involves a certain degree of risk and uncertainty. Assumptions made during the planning process are based on the best available technology and information at the time of planning.

5.11.1 Geologic

Areas of uncertainty regarding the proposed rehabilitation elements include the location of competent bedrock. The location of competent bedrock may impact the amount of excavation and the volume of RCC needed to construct the auxiliary spillway channel.

5.11.2 Future Land Use

Limitations of future land use and environmental conditions introduce a degree of uncertainty, especially related to future water quality. Much of the land surrounding the reservoir is privately held and therefore control of future land use in the immediate area of Site 1 is uncertain. However, while not anticipated due to terrain and other natural constraints, additional urbanization in the next 100 years could cause increased sedimentation and runoff pollution concerns within the watershed. Additionally, changes in land use and impervious coverage in the watershed and downstream areas may affect the extent of local floodplain areas and the severity of flood events.

5.11.3 Economic

The areas of risk and uncertainty associated with the economic analysis consist of uncertainty associated with abbreviated procedures, simplifying assumptions used to estimate benefits, and uncertainty related to future changes in cost estimates as engineering design progresses. The assumptions made represent the best methodology available within the scope of the analysis. To minimize uncertainty, aerial photography review and field verification of economic conditions were conducted for Site 1.

This Plan-EA is based on a 102 year period of analysis, including a 100-year evaluated life, and two year implementation period. The life expectancy of the principal spillway and associated components is expected to meet the minimum requirements of the rehabilitation period, but it has not been confirmed that these components would last for a longer period. As the service life is extended, there is an increased risk that assumptions and conditions will be different than predicted.

Finally, there is inherent uncertainty in estimating the social and environmental costs associated with each alternative because values and judgments vary among interested parties.

Extended delays between planning and implementation increase the degree of risk and uncertainty. Estimated project costs are based on computed work quantities multiplied by the appropriate unit cost for that type of work. Unit costs are based on historical data from similar projects, indexed to current price levels. Costs can be influenced by several economic factors that cannot be predicted with certainty during the planning process. Fuel shortages, unforeseen labor and materials shortages, natural disasters, and international incidents can adversely affect costs and construction schedules.

6.0 CONSULTATION, COORDINATION, AND PUBLIC PARTICIPATION

Questions, comments, and concerns regarding the proposed action were requested from resource and regulatory agencies and stakeholders during the scoping period for the project. Outreach to the public included the following activities (additional details can be found in **Appendix A**).

Project Scoping Meeting: A project scoping meeting was held on February 16, 2017 at the Davis Conference Center, Potomac State College in Keyser, WV. Representatives of federal and state resource and regulatory agencies, local sponsoring organizations, local stakeholders, and the general public were invited to attend. The purposes of the meeting were to: 1) explain the known deficiencies of Site 1 and to describe the likely alternatives that would be evaluated during the planning process, and 2) solicit input regarding environmental issues and impacts that may result from the installation of rehabilitation measures and suggestions on how to avoid, minimize, or mitigate those impacts.

Project Scoping Letters and Agency Coordination: Project information and requests for comments were sent to 61 regulatory and resource agencies, Sponsors, local stakeholders, and public officials to help identify relevant environmental concerns and to provide information that would be helpful in evaluating potential environmental impacts.

Results of the scoping process identified the concerns to be considered in the development of project alternatives and evaluation through the Plan-EA process (**Exhibit 6.1**).

Suggestions received from agency consultations, and during the scoping meeting, were evaluated and, where appropriate, incorporated into the rehabilitation plan. Additional consultations with resource agencies will be conducted as alternatives are evaluated and during the agency and public review process. These consultations are to ensure that the project effects upon resources of concern are adequately avoided, minimized, or mitigated.

The Draft Plan-EA will be made available for public review and comment prior to a final decision. Additionally, a public meeting will be held during the review period to solicit additional agency and stakeholder comments and to provide clarification, as needed, on the proposed action and environmental effects.

Record of Communication & Tribal Consultation: Tribal Ancestral Lands Consultation (TALC) was initiated by West Virginia NRCS on May 24, 2021. This consultation sought to include twenty federally recognized tribes with potential areas of interest within the state, of which West Virginia NRCS received three responses, as of October 14, 2021. The Osage Nation and the Seneca Nation of Indians' ancestral lands areas of interest do not include Mineral County, where this project is being conducted. West Virginia NRCS is continuing efforts to contact and include additional tribes in consultation for this project.

- ▶ May 24, 2021 – Official, wet-ink TALC letters sent to twenty federally recognized tribes seeking to initiate TALC.
- ▶ June 25, 2021 – Official, email letters sent to twenty federally recognized tribes seeking to initiate TALC.
- ▶ June 28 & 29, 2021 – Open Tribal Listening Sessions held to mark the initiation of TALC.
- ▶ July 22, 2021 – Tribal Listening Session with the Osage Nation held to mark the initiation of TALC.

Three tribes responded to initial TALC meeting requests: Osage Nation, Seneca Nation of Indians, Shawnee Tribe.

- ▶ On July 22, 2021 The Osage Nation provided WV NRCS with a list of counties included in their ancestral land areas of interest. Mineral County is not included on this list.

Exhibit 6.1 - Comment Summary

Commenter	Comment
USACE - Pittsburgh District	A Department of the Army permit is needed for work in streams or wetlands. Every effort should be made to avoid and minimize impacts to the aquatic resources.
USFWS - West Virginia Field Office	The USFWS issued a "no effect" determination for the proposed Site 1 project. The project will not affect federally listed endangered or threatened species .
West Virginia Division of Culture and History, SHPO	There are no recorded archaeological resources located within the project area. Further information is needed about the design concepts for further comment. We request a Historic Property Inventory (HPI) of the New Creek Site 1 Watershed Dam as it is over 50 years old and may be eligible for inclusion in the National Register of Historic Places.
WVDNR - Wildlife Resources	Considering the dam impounds approximately 200 acres of drainage area, the WVDNR strongly considers the deconstruction of the dam and the reconstruction of a natural stream channel. If dam modifications or repair is necessary, it would be ideal to have a principal spillway that was bottom-release operated to allow the discharge of cold hypolimnetic water during times of summer stratification, aiding the maintenance of coldwater flow to New Creek.

- ▶ On August 27, 2021 an email was sent to the Seneca Nation of Indians requesting their areas of interest for TALC and specifically for consultation on the New Creek 1 Project. On August 30, 2021 a response was received including their ancestral land areas of interest. Mineral County is not included on this list.
- ▶ The Shawnee Tribe have been sent communication on 8/27/21 and 10/12/21 requesting a list of their ancestral land areas of interest. To date no response has been received. Continued attempts at communication are occurring.

7.0 PREFERRED ALTERNATIVE

7.1 Rationale for Preferred Alternative Selection

Alternative plans were formulated in consideration of the purposes of the project and concerns expressed during the public scoping process. Formulation of the alternative plans considered four criteria: completeness, effectiveness, efficiency, and acceptability. Alternatives 1 and 2 are the same project, with the only difference being the use of federal funds for a portion of project costs, and both alternatives meet all four of these criteria. Both alternatives maintain the present level of flood control and comply with current performance and safety standards. The Preferred Alternative, Alternative 2, was identified by the Sponsors as the recommended plan because it is the federally assisted alternative that best fulfills the purpose and need for the project.

7.2 Measures to be Installed

Based on review of the project purpose and need, the overall impacts on human and natural environmental resources, and consideration of the NED Alternative, the Preferred Alternative (Alternative 2) is to rehabilitate Site 1 to meet current NRCS and WVDEP dam design criteria and performance standards. This rehabilitation would sustain the present level of flood protection and reduce the threat to public health and safety. Alternative 2 includes the following modifications to the dam and study area:

- ▶ Construct a blanket and toe drain system near the downstream embankment toe; flatten the downstream embankment slope; replace principal spillway riser structure; relocate the auxiliary spillway; reconstruct downstream end of the principal spillway outlet conduit; and perform maintenance activities.

Construct a Blanket and Toe Drain System near the downstream Toe of Dam: It is recommended that a new blanket drain and toe drain system be constructed at the downstream embankment toe to provide sound defensive measures for reducing, filtering and discharging seepage. The new drain system should include a dual-aggregate filter system, collector pipes and weir boxes to monitor seepage flow rates.

Flatten the downstream embankment slope: Flattening of the downstream embankment slope to a 3.0H:1V ratio or flatter is recommended to provide an adequate factor of safety for steady state and seismic loading conditions and to improve conditions for proper maintenance. The embankment crest should be restored to a uniform width of 14-feet (per the original design) as part of grading activities.

Replace Principal Spillway Riser Structure: It is recommended that the principal spillway riser structure be replaced with a new structure that complies with current NRCS requirements. The new riser structure could be constructed in front of the existing riser which allows the existing riser and outlet pipe to function as a bypass system during construction of the new riser and allows for the addition of a low-level dewatering gate for draining the reservoir. The new riser structure will contain a cold water release system for maintaining/improving downstream aquatic resources.

Relocate the auxiliary spillway: The auxiliary spillway exit channel does not comply with the requirements of the TR-60 because it directs flow towards the downstream toe of the dam embankment. To minimize potential impacts to private property associated with realigning the existing exit channel, it is recommended that the

existing auxiliary spillway be abandoned and a new Roller Compacted Concrete (RCC) spillway be constructed over the embankment in line with the discharge channel from the principal spillway. An RCC auxiliary spillway with a 50-foot width would be adequate to pass the freeboard hydrograph (maintaining the existing auxiliary spillway crest elevation). With activation of the auxiliary spillway occurring during a 2,000+/- year event, the need to reduce the potential for activation by raising the auxiliary spillway crest elevation and/or lowering the normal pool elevation is not warranted.

Reconstruct downstream end of the principal spillway outlet conduit: The principal spillway conduit has been extended and the original rock-lined plunge pool has been removed. The conduit extension contains open joints and is misaligned, and the removal of the plunge pool reduces the ability of the outfall to dissipate energy. Recommend removing and replacing the conduit extension with a new extension set in a concrete cradle and inclusion of a new filter diaphragm. Energy dissipation features are recommended at the conduit outfall and may be incorporated into the proposed RCC auxiliary spillway stilling basin.

7.3 Environmental Compliance and Permitting

Prior to construction, the Sponsors would be responsible for obtaining and complying with permits required by Federal, State, and/or local regulatory agencies. Permit approvals necessary to construct the proposed project would include a USACE Section 404 Permit/WVDEP 401 Permit for the physical alteration of waters and wetlands.

Prior to construction, the contractor would be required to obtain a WVDEP, Division of Water and Waste Management Construction Stormwater General Permit and develop and implement a Stormwater Pollution Prevention Plan which includes applicable erosion and sediment control measures. The cost of the permit was estimated to be \$31,200, which includes \$30,000 of labor cost and \$1,200 for the permit application fee.

The Preferred Alternative would not impact the regulated floodplain. The Sponsor may choose to coordinate with the FEMA Flood Insurance Administrator on whether updated floodplain mapping is needed based on the project technical H&H data. Changes to floodplain mapping would be documented through a Conditional Letter of Map Revision (CLOMR) (see NFIP regulation 44 CFR 65.3, 65.8 and 65.12).

7.4 Mitigation

Prior to commencement of any federally-funded rehabilitation activity, the Sponsors would be responsible for obtaining and complying with permits required by Federal, State and/or local regulatory agencies. The cost of required mitigation was estimated to be \$42,400, which includes \$12,000 of labor cost and \$30,400 to purchase mitigation credits for impacts to 38 linear feet of stream (\$800 per foot). Due to the relatively minor impacts associated with the Preferred Alternative, the conceptual approach for mitigation would involve a contribution to the WVDEP In Lieu Fee Stream and Wetland Mitigation Program, which allows permittees to pay a fee towards the program based on the proposed impacts and the resource quality of the streams and wetlands to be affected. A preliminary In-Lieu Fee has been included within the construction cost estimate to account for anticipated mitigation.

7.5 Costs

Costs are shown in **Economics Table 1**; **Economics Table 2** shows the costs by category. Total annual costs are shown in **Economics Table 4** along with the estimated costs for operation and maintenance. **Economics Table 5** displays the average annual flood damage reduction benefits by flood damage categories, and **Economics Table 6** displays a comparison of annual costs and benefits. A 2020 price base was used and amortized at 2.75 percent for the 102 year period of analysis.

The planning costs for the proposed rehabilitation measures are estimated costs only. Detailed structural designs and construction cost estimates would be prepared prior to contracting for the work to be performed. The final cost would be the low price received by competitive bidding plus or minus the amounts of contract modifications.

7.6 Installation and Financing

The project is planned for installation in one construction season; however depending on weather conditions construction could extend to a second season. During construction, equipment would not be allowed to operate when conditions are such that soil erosion and water, air, and noise pollution cannot be satisfactorily controlled.

If cultural resources are discovered during installation, work would cease and procedures discussed in General Manual 190-601.29, *National Cultural Resources Procedures Handbook*, would be implemented.

The NRCS would provide technical and financial assistance to the Sponsors with the design and implementation of the Site 1 rehabilitation project. NRCS would be responsible for the following:

1. Execute a project agreement with the Sponsors before either party initiates work involving funds of the other party. Such agreements would set forth, in detail, the financial and working arrangements and other conditions that are applicable to the specific works of improvement.
2. Execute a Memorandum of Understanding with the Sponsors to provide a framework for which cost-share funds are accredited.
3. Execute an updated Operation and Maintenance (O&M) Agreement with the Sponsors for the dam.
4. Provide financial assistance equal to 65% of total eligible project costs, not to exceed 100% of actual construction costs.
5. Provide engineering support and technical assistance during design and following construction of the project.
6. Certify completion of all installed measures.

The Sponsors would be responsible for the following:

1. Secure all needed environmental permits and land rights for installation of the rehabilitation measures.

2. Prepare an updated Emergency Action Plan (EAP) for the dam prior to the initiation of construction.
3. Execute an updated Operation and Maintenance Agreement with NRCS for the dam.
4. Execute a Memorandum of Understanding with NRCS to provide a framework within which cost-share funds are accredited.
5. Execute a project agreement with NRCS before either party initiates work involving funds of the other party. Such agreements would set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.
6. Provide nonfederal funds for cost-sharing of the project at a rate equal to, or greater than, 35% of the total eligible project costs.
7. Participate in and comply with applicable Federal floodplain management and flood insurance programs.
8. Enforce all associated project easements and right-of-ways.

The Sponsors maintain easements for lands below the top of dam for operation and maintenance of Site 1 (**Appendix C**). The proposed improvements would not generate a change in hydrologic conditions, e.g. top of dam or normal pool elevation.

7.7 Emergency Action Plan

Prior to construction, the WVCA shall prepare an updated EAP for the dam as required by state and local regulations. The EAP shall meet the minimum content specified in the NRCS Title 180, National Operation and Maintenance Manual, Part 500, Subpart F, Section 500.52, and meet applicable State agency dam safety requirements. The NRCS would require that an EAP is prepared prior to the execution of fund-obligating documents for construction of the structure. EAPs shall be reviewed and updated by the Sponsors as required by the WVDEP.

7.8 Contracting

The project would be installed by means of a contract developed and agreed to by WVCA and NRCS prior to commencement or authorization of work activities. Contracting arrangements would be agreed to between WVCA and the NRCS before either party commences work activities. A project or other implementation agreement between WVCA and NRCS would detail the work activities and financial responsibilities for involved parties, including participating Sponsors.

7.9 Operation, Maintenance, and Replacement

Measures installed as part of this plan, and previously installed measures, would be operated and maintained by the Sponsors with technical assistance from federal, state, and local agencies in accordance with their delegated authority. A new Operation and Maintenance (O&M) agreement would be developed for Site 1 utilizing the NRCS National Operation and Maintenance Manual. The O&M agreement would be executed prior to signing the project agreement for the construction of the project. The term of the new O&M agreement would be for 50 years, after which the agreement would be renewed, or a new agreement would be developed for the remaining

service life of the project. The agreement would specify responsibilities of the Sponsors and include detailed provisions for retention, use, and disposal of property acquired or improved with PL-106-472 cost sharing. Provisions would be made for free access of district, State, and Federal representatives to inspect all structural measures and their appurtenances at any time.

Economics Table 1 - Estimated Installation Cost¹

Works of Improvement	Unit	Number (Non-Federal Land	Estimated Cost ^{1, 2}		
			Public Law 83-566 Funds	Other Funds	Total
Rehabilitation of New Creek 1	No.	1	\$4,620,600	\$2,540,500	\$7,161,100
Total Project			\$4,620,600	\$2,540,500	\$7,161,100

Prepared: May 2020

¹ Price base: 2020.

² Federal Funds include NRCS Engineering Services and Project Administration (\$1,650,200 of \$4,620,600 Public Law Funds), which are not included when calculating eligible federal cost-share. Permit and land acquisition costs (\$941,000 of the \$2,540,500 Other Funds) are also not included. Therefore, federal cost share is based on Total Eligible Project Cost of \$4,569,900.

Economics Table 2 - Estimated Cost Distribution, Water Resource Project Measures¹

Works of Improvement	Installation Costs (Federal Funds) ₂				Installation Costs (Other Funds)						Total Installation Cost
	Construction ³	Engineering Services	Project Administration	Total Public Law 566	Construction	Engineering Services	Real Property Rights ⁴	Required Permits	Project Admin.	Total Other Funds	
Rehabilitation of New Creek 1	\$2,970,400	\$1,354,000	\$296,200	\$4,620,600	\$1,261,000	\$42,300	\$909,800	\$31,200	\$296,200	\$2,540,500	\$7,161,100
Total	\$2,970,400	\$1,354,000	\$296,200	\$4,620,600	\$1,261,000	\$42,300	\$909,800	\$31,200	\$296,200	\$2,540,500	\$7,161,100

Prepared: May 2020

¹ Price base: 2020.

² Federal cost share for total eligible dam rehabilitation costs is 65%. Federal engineering services and project administration costs, as well as real property acquisition and permit costs, are not included when calculating eligible federal cost share. Therefore, federal cost share for construction is based on total eligible project cost of \$4,569,900.

³ Total construction cost of \$4,231,400 includes \$42,400 for environmental mitigation.

⁴ Includes \$151,600 for relocation assistance advisory services.

Structural Table 3 - Structural Data – New Creek, WV

Item	Unit	Site 1
Class of Structure		High
Seismic Zone		Zone 1
Uncontrolled Drainage Area	mi ²	0.33
Controlled Drainage Area	mi ²	N/A
Total Drainage Area	mi ²	0.33
Runoff Curve No. (1-day) (AMC II)		59
Time of Concentration (T _c)	hrs	0.49
Elevation Top of Dam	ft	925.5
Elevation Crest Auxiliary Spillway	ft	919.9
Elevation Crest High Stage Inlet	ft	916.3
Elevation Crest Low Stage Inlet	ft	905.7
Auxiliary Spillway Type		Vegetated
Auxiliary Spillway Bottom Width	ft	78
Auxiliary Spillway Exit Slope	percent	Varies from 2 to 10 percent
Maximum Height of Dam	ft	42.4
Volume of Fill	yd ³	51,548 (From As-Built Drawings)
Total Capacity¹	acre ft	92.7
Sediment Submerged	acre ft	16.9
Sediment aerated	acre ft	0
Beneficial Use (Identify Use)	acre ft	N/A
Floodwater Retarding	acre ft	75.8
Between High and Low Stage	acre ft	48.7
Surface Area		
Sediment Pool	acres	3.2
Beneficial Pool Use (Identify Use)	acres	N/A
Floodwater Retarding Pool ¹	acres	6.9
Principal Spillway Design		
Rainfall Volume (1-day)	in	5.79
Rainfall Volume (10-day)	in.	8.48
Runoff Volume (10-day)	in	6.5
Capacity of Low Stage (max.)	ft ³ /s	7
Capacity of High Stage (max.)	ft ³ /s	71
Dimensions of Conduit	in	24
Type of Conduit		RCP
Frequency Operation-Auxiliary Spillway	percent chance	0.05

continued on following page

Structural Table 3 - Structural Data – New Creek, WV (continued)

Item	Unit	Site 1
Auxiliary Spillway Hydrograph		
Rainfall Volume	in	9.9 (6 hours); 13.3 (24 hours)
Runoff Volume	in	N/A
Storm Duration	hrs	6 hours and 24 hours
Velocity of Flow (V_e)	ft/s	No flow through Auxiliary Spillway
Maximum Reservoir Water Surface Elevation	ft	919.72 (6 hours); 919.24 feet (24 hours)
Freeboard Hydrograph		
Rainfall Volume	in	27.2 (6 hours); 34.6 (24 hours)
Runoff Volume	in	N/A
Storm Duration	hrs	6 hours and 24 hours
Maximum Reservoir Water Surface Elevation	ft	924.55 (6 hours); 922.90 (24 hours)
Capacity Equivalents		
Sediment Volume	in	1.0
Floodwater Retarding Volume	in	4.3
Beneficial Use (Identify Use)	in	N/A

Prepared: May 2020

Economics Table 4 - Estimated Average Annual National Economic Development (NED) Costs¹

Works of Improvement	Project Outlays		Total
	Amortization of Installation Cost ²	Operation, Maintenance and Replacement Cost ²	
New Creek 1	\$199,000	\$9,800	\$208,800
TOTAL	\$199,000	\$9,800	\$208,800

Prepared: May 2020

¹ Price base: 2020.

² Amortized for 102 years at 2.75 percent.

Economics Table 5 - Estimated Average Annual Flood Damage Reduction Benefits¹

Item	Estimated Average Annual Damage Reduction Benefit		Damage Reduction Benefit ³
	Without Project	With Project ²	
Floodwater ²			
Residential	\$23,400	\$0	\$23,400
Commercial	\$13,400	\$0	\$13,400
Institutional	\$1,100	\$0	\$1,100
Infrastructure	\$60,700	\$0	\$60,700
Insurance Administration Costs	\$40,800	\$0	\$40,800
TOTAL	\$139,400	\$0	\$139,400

Prepared: May 2020

¹ Price Base: 2020.² Damages and benefits will accrue from floods of greater magnitude than the 500-year event, but these were not evaluated.³ Because the No Federal Action Alternative (Future Without the Project) is a Sponsors' Rehabilitation that would maintain flood damage reduction benefits throughout the life of the project, the flood reduction benefits shown here are the same for both alternatives. No net change in benefits occurs when comparing the two candidate plans to each other.

Economics Table 6 - Comparison of NED Benefits and Costs¹

Works of Improvement	Total Average Annual Non-Agricultural Related Benefits ²	Average Annual Costs ³	Benefit-Cost Ratio
Rehabilitation of New Creek 1	\$208,800	\$208,800	1.0 to 1.0
TOTAL	\$208,800	\$208,800	1.0 to 1.0

Prepared: May 2020

¹ Price base: 2020.

² Damage reduction benefits (\$139,400) 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 NED alternative is displayed with zero-based accounting context that credits local costs avoided (Total Adverse Annualized for the Future Without 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 \$139,400, net benefits are zero because the total project cost is equal to the claimed benefits and the resulting benefit/cost ratio is 1:1.

³ From Economics Table 4.

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Christi Hicks, District Conservationist
USDA - NRCS
67 North Tornado Way, Suite 3
Keyser, WV 26726

Katheryn Emery-Fultineer, Program Director
West Virginia Department of Environmental
Protection, 401 Certification
601 57th Street
Charleston, WV 25304

John Hott, State Delegate
West Virginia House of Delegates – District 54
Room 210E, Building 1
State Capitol Complex
Charleston, WV 25305

Drew A. Brubaker, County Coordinator
Mineral County
150 Armstrong Street
Keyser, WV 26726

Gary G. Howell, State Delegate
West Virginia House of Delegates – District 56
Room 242M, Building 1
State Capitol Complex
Charleston, WV 25305

Shelly Moore Capito
U.S. Senate
500 Virginia St East, Suite 950
Charleston, WV 25301

Nadene Jewell, District Manager
Potomac Valley Conservation District
500 East Main Street
Romney, WV 26757

Andy Deichert, State Conservation Engineer
USDA - NRCS
1550 Earl L. Core Road
Morgantown, WV 26505

Jennifer Junkins, City Councilwoman
City of Keyser
111 N. Davis Street
Keyser, WV 26726

Barbara Douglas, Acting Project Leader
USFWS – West Virginia Field Office
90 Vance Drive
Elkins, WV 26241

Teddy Nester
City of Keyser
111 N. Davis Street
Keyser, WV 26726

Jim Hannas, City Councilman
City of Keyser
111 N. Davis Street
Keyser, WV 26726

Roger Leatherman, Commissioner
Mineral County
150 Armstrong Street
Keyser, WV 26726

Richard Lechlitter, Commissioner
Mineral County
150 Armstrong Street
Keyser, WV 26726

Billy Meek, City Councilman
City of Keyser
111 N. Davis Street
Keyser, WV 26726

Terry Lively, Executive Director
Region 8 Planning and Development Council
131 Providence Lane
Petersburg, WV 26847

Joe Manchin
U.S. Senate
900 Pennsylvania Ave, Suite 628
Charleston, WV 25302

Jeff McClure, State Geologist
USDA - NRCS
1550 Earl L. Core Road
Morgantown, WV 26505

Congressmen David McKinley
700 Beechurst Ave, Suite 29
Morgantown, WV 26505

Jennifer Pauer, Program Coordinator
West Virginia Department of Environmental
Protection, Watershed Improvement
22288 Northwestern Pike
Romney, WV 26757

Brian Penix, State Hazard Mitigation Officer
West Virginia Department of Homeland Security &
Emergency Management
1900 Kanawha Boulevard East, Building 1,
Room EB-80
Charleston, WV 25305-0360

Susan Pierce, Director
West Virginia Division of Culture and History,
SHPO
1900 Kanawha Boulevard East
Charleston, WV 23505

G.E. McCabe, Director
West Virginia Department of Homeland & Security
Emergency Management
2403 Fairlawn Avenue
Dunbar, WV 25064

Tim Ridley, Dam Safety Engineer
USDA - NRCS
1550 Earl L. Core Road
Morgantown, WV 26505

Barbara Rudnick, NEPA Team Leader
US EPA Region 3
1650 Arch Street
Philadelphia, PA 19103-2029

Mike Ryan, City Councilman
City of Keyser
111 N. Davis Street
Keyser, WV 26726

Delbert Shriver, PE, Senior Engineer/Program Manager
West Virginia Department of Environmental
Protection, Dam Safety
2031 Pleasant Valley Road
Fairmount, WV 23505

Randy Smith, State Senator
West Virginia State Senate – District 14
Room 214W, Building 1
State Capitol Complex
Charleston, WV 23505

Dave Sypolt, State Senator
West Virginia State Senate – District 14
Room 214W, Building 1
State Capitol Complex
Charleston, WV 23505

Damon Tillman, Mayor
City of Keyser
111 N. Davis Street
Keyser, WV 26726

Aaron Tonkery, Engineer
West Virginia Department of Environmental
Protection, Dam Safety
2031 Pleasant Valley Road
Fairmount, WV 26554

Charles S. Trump, State Senator
West Virginia State Senate – District 15
Room 210W, Building 1
State Capitol Complex
Charleston, WV 23505

U.S. Army Corps of Engineers, Regulatory Branch
1000 Liberty Avenue
Pittsburgh, PA 15222-4186

West Virginia Division of Natural Resources,
District 2
1 Depot Street
Romney, WV 26757

Jerry Whisner, Commissioner
Mineral County
150 Armstrong Street
Keyser, WV 26726

Pam Yost, Agricultural Economist
USDA - NRCS
1550 Earl L. Core Road
Morgantown, WV 26505

Keyser Housing Authority
Phoebe Miller, Exec. Dir.
470 Virginia Street
Keyser, WV 26726

D&L Coal Company
664 Pine Point Road
Swanton, MD 21561

TTT, LLC
664 Pine Tree Point Road
Swanton, MD 21561

Patomac Heights LLC
500 Carskadon Lane
Keyser, WV 26726

Baltimore Gardens LP
410 Severn Avenue
Annapolis, MD 21403

Rudy & Patricia Sites
700 Loughs Lane
Keyser, WV 26726

Rasit Akbas (Kendra Warnick)
665 Terrace Drive
Keyser, WV 26726

James & Lillian Smith
15021 Carlsbad Road
Woodbridge, VA 22193

Sharon Washington
600 Carskadon Lane
Keyser, WV 26726

Donna Thomas
620 Carskadon Lane
Keyser, WV 26726

Anthony Hickey
630 Carskadon Lane
Keyser, WV 26726

Nicholas Rotruck
1380 Parrish Street
Keyser, WV 26726

Wayne & Betty Watson
635 Carskadon Lane
Keyser, WV 26726

Nellie Henken
1385 Parrish Street
Keyser, WV 26726

James & Virginia Iliff
655 Terrace Drive
Keyser, WV 26726

Barbara Kesner
1380 Beacon Street
Keyser, WV 26726

David Parrish
12700 Knobley Road
Route 1, Box 121A
Keyser, WV 26726

Sharon Greco
1390 Beacon Street
Keyser, WV 26726

J&L Development LLC
377 Carskadon Lane
Keyser, WV 26726

George & Cheryl McNeill
230 Baker Street
Keyser, WV 26726

Marcus Weaver
1280 Beacon St
Keyser, WV 26726

Robert Lannon
1390 Parrish Street
Keyser, WV 26726

Chestnut Hill LLC
c/o Terrance & Paula Stephens
315 Chestnut Hill
Keyser, WV 26726

Kathleen & Frank Brock
1330 Beacon Street
Keyser, WV 26726

Doug & Emma Courtney
1300 Beacon Street
Keyser, WV 26726

Frederick Jr. Green and Misty Warnick
675 Terrace Drive
Keyser, WV 26726

Charles & Debra Bosley
1360 Beacon Street
Keyser, WV 26726

Karen Smith
1400 Funderburg Street
Keyser, WV 26726

James & Bonnie Hannas
1370 Beacon Street
Keyser, WV 26726

Alan & Charlene Shirley
235 Baker Street
Keyser, WV 26726

Robert L Delsignore
9375 Northwestern Turnpike
New Creek, WV 26743

June Halbritter
405 Baker Street
Keyser, WV 26726

June Halbritter
Justice Street, Lot 1B
Keyser, WV 26726

William & Roxy, LE John & Ruth O'Connor
325 Baker Street
Keyser, WV 26726

Luke & Aaronia Litten
690 S Mineral Street
Keyser, WV 26726

Gary L House
PO Box 1137
Keyser, WV 26726

Resident
1400 Beacon Street
Keyser, WV 26726

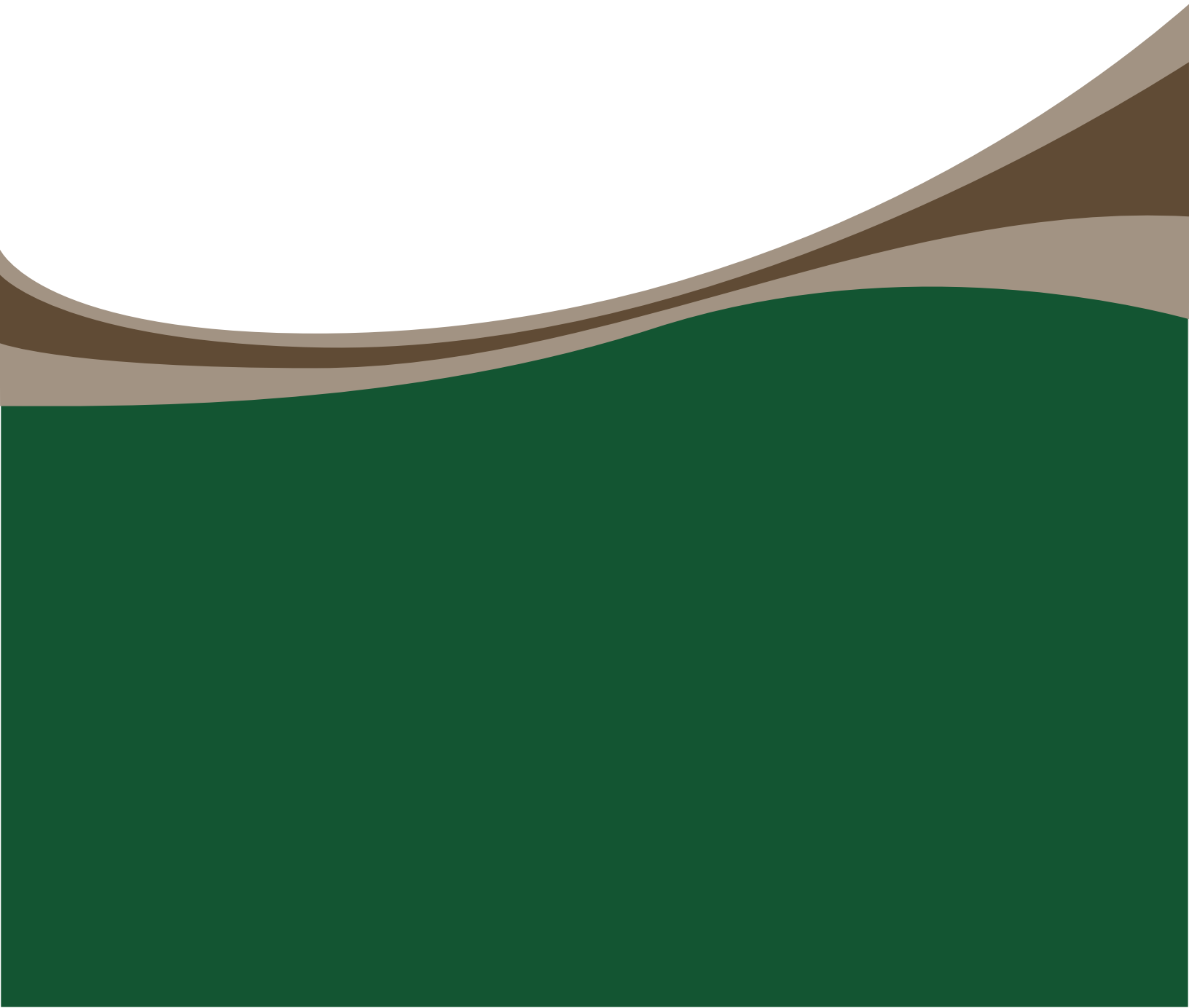
Resident
590 Carskadon Lane
Keyser, WV 26726

Resident
600 Loughs Terrace
Keyser, WV 26726

Resident
630 Loughs Terrace
Keyser, WV 26726

Appendix A

Comments and Responses





West Virginia
Conservation Agency

Scoping Summary Report

New Creek Site 1 Watershed Dam
Mineral County, West Virginia



May 2020



Gannett Fleming

Excellence Delivered **As Promised**

ISO 9001:2008
CERTIFIED

Scoping Summary Report

New Creek Site 1 Watershed Dam Mineral County, West Virginia

May 2020

West Virginia Conservation Agency Dam Rehabilitations
Purchase Order AGR1600000009

Prepared for:

West Virginia Conservation Agency
1900 Kanawha Boulevard, East
Charleston, WV 25305



West Virginia
Conservation Agency

Prepared by:

Gannett Fleming, Inc.
207 Senate Avenue
Camp Hill, PA 17011
Project No. 061371.404



Gannett Fleming

*Excellence Delivered **As Promised***

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- Appendix 3 - Scoping Meeting Presentation and Display Materials
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Introduction

The purpose of this report is to document the scoping process for the proposed New Creek Site 1 (Site 1) Watershed Dam Rehabilitation project. Pursuant to the National Environmental Policy Act (NEPA), the West Virginia Conservation Agency (WVCA) in cooperation with the Natural Resources Conservation Service (NRCS), West Virginia State Office are preparing a Supplemental Watershed Plan-Environmental Assessment (Plan-EA) to evaluate alternatives for rehabilitation of the dam.

Scoping is a systematic process used to obtain the input of watershed stakeholders regarding the most relevant resource issues that need to be considered. Objectives of the scoping process include: identifying concerns; clearly defining environmental issues; identifying relevant laws, regulations and orders applicable to the project; and identifying requirements to be addressed for regulatory compliance. Ultimately, the purpose of scoping is to identify environmental concerns and consider how those concerns will influence alternatives to be considered and agency decision making.

Project Purpose and Need

The purpose of this project, in accordance with the Federal Watershed Protection and Flood Prevention Act (PL 83-566), is to provide rehabilitation of the New Creek Site 1 dam to meet current USDA-NRCS and West Virginia State Dam Safety regulations and current engineering standards, to extend the life of the dam, and to continue to provide benefits for the authorized purpose of flood prevention.

Project Location

New Creek Site 1 dam is located approximately one mile southwest of the center of Keyser, WV. The dam was constructed in 1957 with a 2.1-acre open water reservoir at normal pool. The drainage area totals 213 acres (approximately 0.33 square miles).

Activities

The following dates outline the milestones for the scoping process for the Site 1 dam rehabilitation project. Copies of the early coordination letters, scoping meeting presentation information, and responses received are attached.

- ▶ April 4, 2016 and April 28, 2016: Early coordination letters sent to WVDNR, Natural Heritage program and USFWS, respectively, regarding information concerning state and federal threatened and endangered species to inform field studies.
- ▶ January 25, 2017: Early coordination letters were mailed to 61 regulatory and resource agencies, sponsor organizations, government officials, local stakeholders, and residents. The letters provided a summary of the proposed project, location maps, and asked for comments regarding relevant environmental concerns. Recipients were also invited to participate in a public scoping meeting.
- ▶ January 27, 2017: A Public Notice of Intent and Invitation to a Public Scoping Meeting was published in the News-Tribune newspaper.
- ▶ February 16, 2017: A Public Scoping Meeting was held from 4:30 pm to 7:00 pm at the Davis Conference Center Potomac State College, 101 Fort Avenue in Keyser, WV 26726. Project information and display boards were available for viewing and members of the project team were available to discuss the project and respond to questions and concerns of the attendees. Comment sheets were also provided for attendees to provide written formal comments.

Early Coordination Letter Mailing List

United States Congress,
1st District of West Virginia
David McKinley, U.S. Congressman
2239 Rayburn HOB
Washington, D.C. 20515

Allen V. Evans, State Delegate
Room 216E, Building 1
State Capital Complex
1900 Kanawha Boulevard, East
Charleston, WV 25305

Gary G. Howell, State Delegate
Room 213E, Building 1
State Capital Complex
1900 Kanawha Boulevard, East
Charleston, WV 25305

Charles S. Trump, State Senator
Room 210W, Building 1
State Capital Complex
1900 Kanawha Boulevard, East
Charleston, WV 25305

Craig Blair, State Senator
Room 217W, Building 1
State Capital Complex
1900 Kanawha Boulevard, East
Charleston, WV 25305

Dave Sypolt, State Senator
Room 214W, Building 1
State Capital Complex
1900 Kanawha Boulevard, East
Charleston, WV 25305

Mineral County Commission
Mr. Roger Leatherman, County Commissioner
150 Armstrong Street
Keyser, WV 26726

Mineral County Commission
Mr. Richard Lechlitter, County Commissioner
150 Armstrong Street
Keyser, WV 26726

Mineral County Commission
Mr. Jerry Whisner, County Commissioner
150 Armstrong Street
Keyser, WV 26726

Randy Smith, State Senator
Room 214W, Building 1
State Capital Complex
1900 Kanawha Boulevard, East
Charleston, WV 25305

Mineral County Commission
Mr. Michael Bland, County Coordinator
150 Armstrong Street
Keyser, WV 26726

Mineral County Planning Commission
Mr. Scott Clay, Planning Director
150 Armstrong Street
Keyser, WV 26726

City of Keyser
Randy Amtower, Mayor
111 North Davis Street
Keyser, WV 26726

Region 8 Planning & Development Council
Terry Lively, Executive Director
8 Grant County Industrial Park
131 Providence Lane
Petersburg, WV 26847

United States Senate
Shelley Moore Capito, U.S. Senator
172 Russell
Senate Office Building
Washington, D.C. 20510

City of Keyser
Deborah Pamepinto, City Manager
111 North Davis Street
Keyser, WV 26726

United States Senate
Joe Manchin, U.S. Senator
306 Hart
Senate Office Building
Washington, D.C. 20510

USDA-NRCS, West Virginia State Office
Andy Deichert, State Conservationist Engineer
1550 Earl L. Core Road
Morgantown, WV 26505

Potomac Valley Conservation District
Nadene Jewell, District Manager
500 East Main Street
Romney, WV 26757

USACE, Pittsburgh District
Regulatory Branch
Scott A. Hans, Chief
1000 Liberty Avenue
Pittsburgh, PA 15222-4186

U.S. EPA Region III
Barbara Rudnick, NEPA Team Leader
1650 Arch Street – 3EA30
Philadelphia, PA 19103-2029

U.S. Fish & Wildlife Service
West Virginia Field Office
John Schmidt, Project Leader
694 Beverly Pike
Elkins, WV 26421

WV Division of Culture and History,
State Historic Preservation Office
Susan Pierce, Director
1900 Kanawha Boulevard East
Charleston, WV 25305

WV DEP, Dam Safety Services
Aaron Tonkery, Engineer
2031 Pleasant Valley Road
Fairmount, WV 26554

WVDEP, 401 Certification Program
Wilma Reip, Program Manager
601 57th Street, S.E.
Charleston, WV 25304

WVDEP, WIB
Chad Thompson, Stormwater Technician
22288 Northwestern Pike
Romney, WV 26757

WVDEP, WIB
Jennifer Pauer, Watershed Program Coordinator
601 57th Street S.E.
Charleston, WV 25304

WVDHSEM, Brian Penix
Building 1, Room EB-80
1900 Kanawha Boulevard, East
Charleston, WV 25305-0360

WVDHSEM, Jimmy Gianato, Director
Building 1, Room EB-80
1900 Kanawha Boulevard, East
Charleston, WV 25305-0360

WVDNR, District 2
Brandon Keplinger, Fish Management
1 Depot Street
Romney, WV 26757

USDA-NRCS, West Virginia State Office
Christi Hicks, District Conservationist
67 North Tornado Way, Suite 3
Keyser, WV 26726

City of Keyser Water Plant
Butch Keister, Supervisor
580 South Water Street
Keyser, WV 26726

USDA-NRCS, West Virginia State Office
Louis Aspey, State Conservationist
1550 Earl L. Core Road
Morgantown, WV 26505

Rudy & Patricia Sites
700 Loughs Lane
Keyser, WV 26726

D&L Coal Company
Route 6, PO Box 6192
Keyser, WV 26726

Kendra Warnick
665 Terrace Drive
Keyser, WV 26726

James & Louise Smith
216 Virginia Street
Keyser, WV 26726

Keyser Housing Authority
Phoebe Miller, Exec. Dir.
470 Virginia Street
Keyser, WV 26726

Sharon Washington
600 Carskadon Lane
Keyser, WV 26726

Donald & Donna Thomas
620 Carskadon Lane
Keyser, WV 26726

H. Don & Valerie Thomas
630 Carskadon Lane
Keyser, WV 26726

Wayne & Betty Watson
635 Carskadon Lane
Keyser, WV 26726

James & Virginia Iliff
655 Terrace Drive
Keyser, WV 26726

David Parrish
Route 1, Box 121A
Keyser, WV 26726

Funderburg Family LC
c/o J & L Development LLC
HC 84, Box 4
Keyser, WV 26726

Mina Messick
1280 Beacon St
Keyser, WV 26726

Chestnut Hill LLC
c/o Terrance & Paula Stephens
315 Chestnut Hill
Keyser, WV 26726

Rasit Akbas
665 Terrace Drive
Keyser, WV 26726

Doug & Emma Courtney
1300 Beacon Street
Keyser, WV 26726

Stephen Milligan
6 Abiagayle Loop
Morrilton, AR 72110

Ronald & Juanita Barnette
280 Harts Run Road
Somersville, WV 26651

Charles & Debra Bosley
1360 Beacon Street
Keyser, WV 26726

Steven & Ann Marie Strother
1370 Beacon Street
Keyser, WV 26726

Steven & Lara Cutter
1380 Parrish Street
Keyser, WV 26726

Conrad & Nellie Henken
1385 Parrish Street
Keyser, WV 26726

Fred & Barbara Kesner
1380 Beacon Street
Keyser, WV 26726

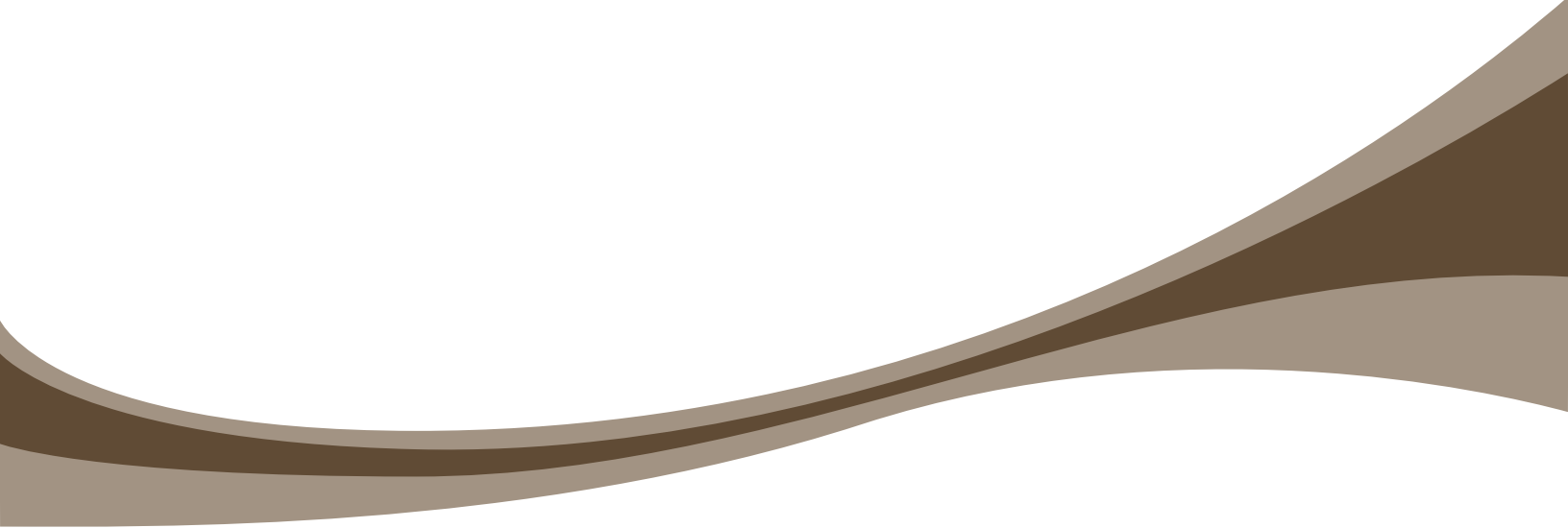
Benjamin & Jerrica Fout
1390 Beacon Street
Keyser, WV 26726

Conald Rodgers
230 Baker Street
Keyser, WV 26726

Robert Lannon
1390 Parrish Street
Keyser, WV 26726

Kathleen Brock
1330 Beacon Street
Keyser, WV 26726

West Virginia Division of Culture and History,
State Historic Preservation Office
Susan Pierce, Director
1900 Kanawha Boulevard East
Charleston, WV 25305



Appendix 1

Sample Scoping Notice

January 25, 2017

Agency

Address

Address

RE: *Notice of Intent to Prepare a Supplemental Watershed Plan & Environmental Assessment and Request for Input to the Project Scoping process*
West Virginia Conservation Agency
New Creek Site 1 Watershed Dam
Mineral County, West Virginia

Dear XXXXXX;

The West Virginia Conservation Agency (WVCA) is preparing a Supplemental Watershed Plan & Environmental Assessment (Plan-EA) to consider improvements and potential environmental impacts concerning the New Creek Site 1 Watershed Dam near Keyser, WV.

Upgrades to the dam and impoundment are being pursued by WVCA through a federal cost-share program with the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) to address current dam design safety and engineering criteria and performance standards. As the project involves federal funding and approvals, the Plan-EA is being developed in accordance with Section 102(2)(c) of the National Environmental Policy Act (NEPA), corresponding Council on Environmental Quality regulations (40 CFR Part 1500), and specifications of the NRCS.

The City of Keyser and the Potomac Valley Conservation District are project sponsors.

The existing dam is located approximately 1 mile from the center of Keyser in Mineral County and was constructed in 1957 (see Attachment 1, Project Location Map and Attachment 2, Project Site Aerial Map). New Creek Site 1 is one of nine dams within the New Creek Watershed flood control system. Rehabilitation alternatives to be considered may involve modifications of the dam structure components to address safety and engineering standards. No-action and decommissioning alternatives will also be evaluated.

The participation of the public is a vital component of the project, providing those who are interested in or potentially affected by the proposed project an opportunity to share their comments, ideas, and concerns during the initial scoping stage of the environmental evaluation process.

As a resident in the vicinity of the project, we are writing to request your input to the scoping process to assist WVCA by (1) identifying relevant environmental issues or concerns to be considered, and (2) providing information or data which would be helpful in evaluating potential environmental impacts, both beneficial and adverse, of the proposed action.

You are also invited and encouraged to learn more about this project and submit comments at a public scoping meeting for the New Creek Site 1 Dam Project to be held on Thursday, February 16, 2017 at the Davis Conference Center at Potomac State College in Keyser, WV (see Attachment 3, Scoping Meeting) for details and directions.

Please provide your comments and any associated information to:

Via mail to:

New Creek Site 1 Dam Rehabilitation Project
c/o Gannett Fleming, Inc. — Eric Neast, Project Manager
PO Box 67100
Harrisburg, PA 17106-7100

Via email to:

Subject: New Creek Site 1 Dam Rehabilitation Project
gsaurborn@wvca.us — Gene Saurborn, Project Technical Director, WVCA
eneast@gfnet.com — Eric Neast, Project Manager, Gannett Fleming, Inc.

Please respond to this request by **March 31, 2017**, so that we can adequately consider and incorporate your response into the Plan-EA evaluation process, as appropriate. After receipt of agency and public scoping comments and information, the WVCA will begin reviewing the comments and developing conceptual alternatives for analysis in the Plan-EA. Preliminary resource concerns identified during this initial project scoping process will also be addressed in the Plan-EA.

If you have any questions or require additional information, please feel free to contact me by phone at (304) 558-2204 or via email at bfarkas@wvca.us.

The project team values your input and encourages you to provide comments and attend the public scoping meeting on February 16, 2017.

Sincerely,

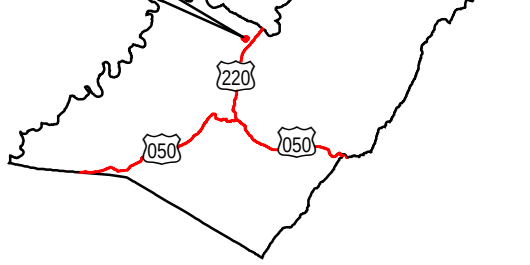


Mr. Brian Farkas, Executive Director
West Virginia Conservation Agency

cc: Mr. Gene Saurborn – WVCA, Project Technical Director
Mr. Eric Neast, PE – Gannett Fleming, Inc. Project Manager

**Site Location in
Mineral County, WV**

New Creek
Site 1



Legend

- Project Area
- Reservoir Boundary

Figure 1
New Creek Site 1
Project Location Map
WEST VIRGINIA
CONSERVATION AGENCY
Mineral County, WV

Scale

0 500 1,000 2,000
Feet

1 inch = 1,000 feet

 **Gannett Fleming**

Map Prepared: 8/12/2016





Legend

- Project Area
- Reservoir Boundary

Figure 2
New Creek Site 1
Project Site Aerial Map
WEST VIRGINIA
CONSERVATION AGENCY
 Mineral County, WV

Scale

0 100 200 400
 Feet

1 inch = 200 feet

 **Gannett Fleming**

Map Prepared: 1/11/2017



Attachment 3 – Scoping Meeting



New Creek Site 1 Dam Rehabilitation Project Scoping Meeting

**When: Thursday, February 16, 2017
4:30 PM. to 7:00 PM**

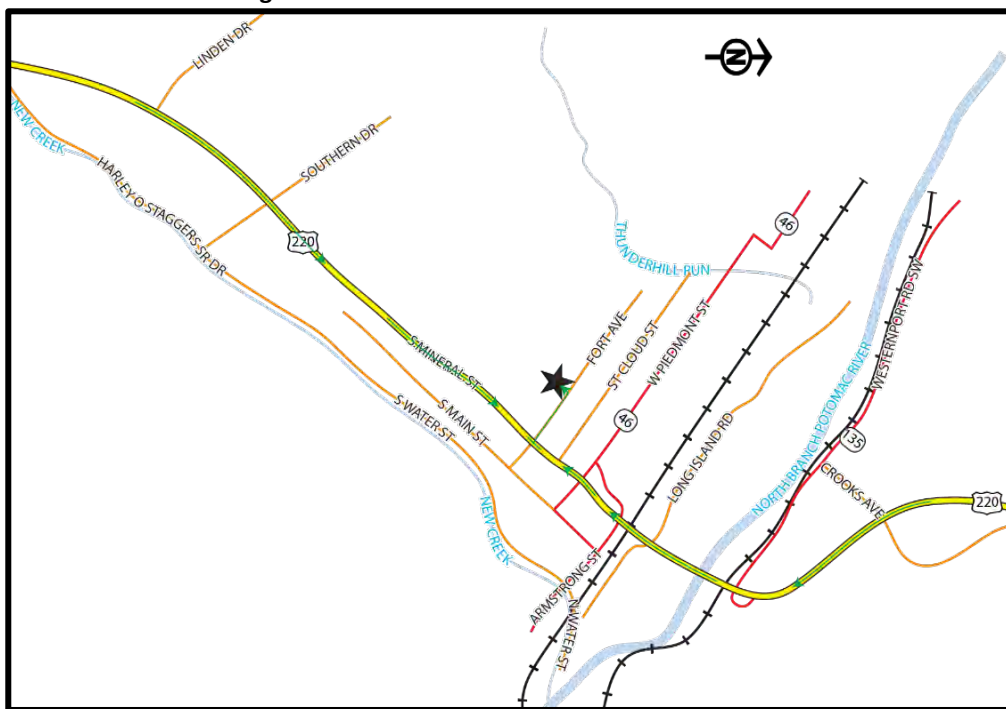
**Where: Davis Conference Center
Potomac State College
101 Fort Avenue
Keyser, WV 26726**

The West Virginia Conservation Agency (WVCA) is preparing a Supplemental Watershed Plan & Environmental Assessment (Plan-EA) to consider improvements and potential environmental impacts concerning the New Creek Site 1 Watershed Dam near Keyser, WV. Upgrades to the dam and impoundment are being pursued by WVCA through a federal cost-share program with the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) to address current dam design safety and engineering criteria and performance standards.

The National Environmental Policy Act (NEPA) and the regulations of the federal Council on Environmental Quality at 40 CFR Parts 1500-1508 require an evaluation of potential environmental impacts associated with federally funded projects. The impact evaluation must provide the opportunity for input from the public, and public input must be considered in development of the final action.

You are invited to attend a public scoping meeting to discuss potential rehabilitation alternatives and environmental concerns associated with the New Creek Site 1 dam.

Directions to Potomac State College



From the South: Travel Route 220 North to Keyser. Once you are in Keyser, continue on Route 220 and pass through four traffic signals. Continue one additional block to Fort Avenue. Take a left onto Fort Avenue, go up the hill, and the main campus entrance will be on your left just past the Catamount statue. Turn left, the parking lot will be on your left and the Davis Conference Center will be on the right.

From the North: Take Route 220 South to Keyser. Once you are in Keyser, cross over the bridge to the stoplight. Go straight through the stoplight, and continue two blocks to Fort Avenue. Take a right onto Fort Avenue, go up the hill, and the main campus entrance will be on your left just past the Catamount statue. Turn left, the parking lot will be on your left and the Davis Conference Center will be on the right.

January 25, 2017

Robert Lannon
1390 Parrish Street
Keyser, WV 26726

RE: *Notice of Intent to Prepare a Supplemental Watershed Plan & Environmental Assessment and Request for Input to the Project Scoping process*
West Virginia Conservation Agency
New Creek Site 1 Watershed Dam
Mineral County, West Virginia

Dear Mr. Lannon:

The West Virginia Conservation Agency (WVCA) is preparing a Supplemental Watershed Plan & Environmental Assessment (Plan-EA) to consider improvements and potential environmental impacts concerning the New Creek Site 1 Watershed Dam near Keyser, WV.

Upgrades to the dam and impoundment are being pursued by WVCA through a federal cost-share program with the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) to address current dam design safety and engineering criteria and performance standards. As the project involves federal funding and approvals, the Plan-EA is being developed in accordance with Section 102(2)(c) of the National Environmental Policy Act (NEPA), corresponding Council on Environmental Quality regulations (40 CFR Part 1500), and specifications of the NRCS.

The City of Keyser and the Potomac Valley Conservation District are project sponsors.

The existing dam is located approximately 1 mile from the center of Keyser in Mineral County and was constructed in 1957 (see Attachment 1, Project Location Map and Attachment 2, Project Site Aerial Map). New Creek Site 1 is one of nine dams within the New Creek Watershed flood control system. Rehabilitation alternatives to be considered may involve modifications of the dam structure components to address safety and engineering standards. No-action and decommissioning alternatives will also be evaluated.

The participation of the public is a vital component of the project, providing those who are interested in or potentially affected by the proposed project an opportunity to share their comments, ideas, and concerns during the initial scoping stage of the environmental evaluation process.

As a landowner in the vicinity of the project, we are writing to request your input to the scoping process to assist WVCA by (1) identifying relevant environmental issues or concerns to be considered, and (2) providing information or data which would be helpful in evaluating potential environmental impacts, both beneficial and adverse, of the proposed action.

You are also invited and encouraged to learn more about this project and submit comments at a public scoping meeting for the New Creek Site 1 Dam Project to be held on Thursday, February 16, 2017 at the Davis Conference Center at Potomac State College in Keyser, WV (see Attachment 3, Scoping Meeting) for details and directions.

Please provide your comments and any associated information to:

Via mail to:

New Creek Site 1 Dam Rehabilitation Project
c/o Gannett Fleming, Inc. — Eric Neast, Project Manager
PO Box 67100
Harrisburg, PA 17106-7100

Via email to:

Subject: New Creek Site 1 Dam Rehabilitation Project
gsaurborn@wvca.us — Gene Saurborn, Project Technical Director, WVCA
eneast@gfnet.com — Eric Neast, Project Manager, Gannett Fleming, Inc.

Please respond to this request by **March 31, 2017**, so that we can adequately consider and incorporate your response into the Plan-EA evaluation process, as appropriate. After receipt of agency and public scoping comments and information, the WVCA will begin reviewing the comments and developing conceptual alternatives for analysis in the Plan-EA. Preliminary resource concerns identified during this initial project scoping process will also be addressed in the Plan-EA.

If you have any questions or require additional information, please feel free to contact me by phone at (304) 558-2204 or via email at bfarkas@wvca.us.

The project team values your input and encourages you to provide comments and attend the public scoping meeting on February 16, 2017.

Sincerely,

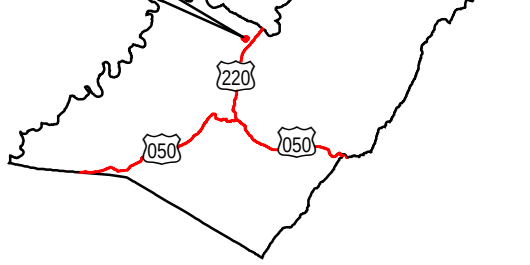


Mr. Brian Farkas, Executive Director
West Virginia Conservation Agency

cc: Mr. Gene Saurborn – WVCA, Project Technical Director
Mr. Eric Neast, PE – Gannett Fleming, Inc. Project Manager

**Site Location in
Mineral County, WV**

New Creek
Site 1



Legend

- Project Area
- Reservoir Boundary

Figure 1
New Creek Site 1
Project Location Map
WEST VIRGINIA
CONSERVATION AGENCY
Mineral County, WV

Scale

0 500 1,000 2,000
Feet

1 inch = 1,000 feet

 **Gannett Fleming**

Map Prepared: 8/12/2016





Legend

- Project Area
- Reservoir Boundary

Figure 2
New Creek Site 1
Project Site Aerial Map
WEST VIRGINIA
CONSERVATION AGENCY
 Mineral County, WV

Scale

0 100 200 400
 Feet

1 inch = 200 feet

 **Gannett Fleming**

Map Prepared: 1/11/2017



Attachment 3 – Scoping Meeting



New Creek Site 1 Dam Rehabilitation Project Scoping Meeting

When: Thursday, February 16, 2017
4:30 PM. to 7:00 PM

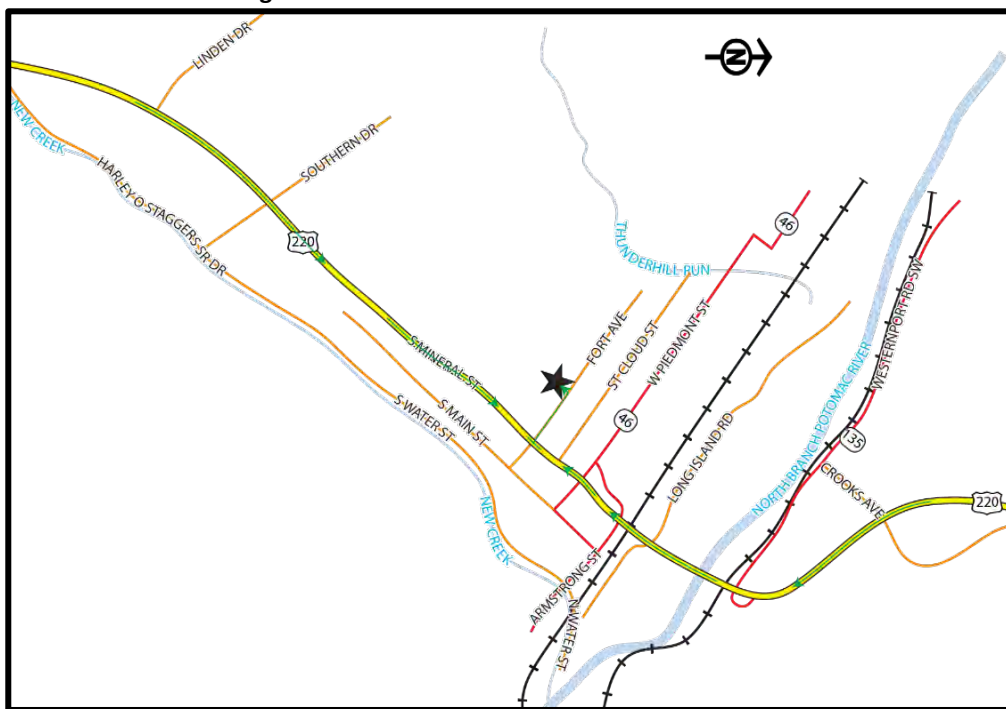
Where: Davis Conference Center
Potomac State College
101 Fort Avenue
Keyser, WV 26726

The West Virginia Conservation Agency (WVCA) is preparing a Supplemental Watershed Plan & Environmental Assessment (Plan-EA) to consider improvements and potential environmental impacts concerning the New Creek Site 1 Watershed Dam near Keyser, WV. Upgrades to the dam and impoundment are being pursued by WVCA through a federal cost-share program with the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) to address current dam design safety and engineering criteria and performance standards.

The National Environmental Policy Act (NEPA) and the regulations of the federal Council on Environmental Quality at 40 CFR Parts 1500-1508 require an evaluation of potential environmental impacts associated with federally funded projects. The impact evaluation must provide the opportunity for input from the public, and public input must be considered in development of the final action.

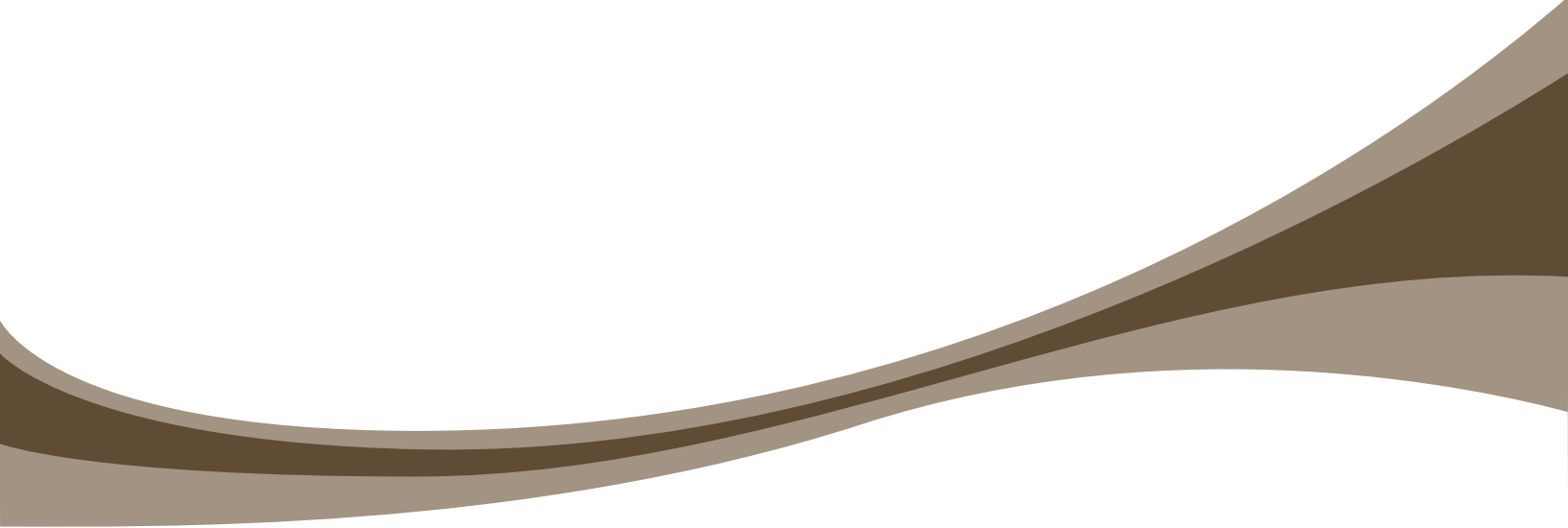
You are invited to attend a public scoping meeting to discuss potential rehabilitation alternatives and environmental concerns associated with the New Creek Site 1 dam.

Directions to Potomac State College



From the South: Travel Route 220 North to Keyser. Once you are in Keyser, continue on Route 220 and pass through four traffic signals. Continue one additional block to Fort Avenue. Take a left onto Fort Avenue, go up the hill, and the main campus entrance will be on your left just past the Catamount statue. Turn left, the parking lot will be on your left and the Davis Conference Center will be on the right.

From the North: Take Route 220 South to Keyser. Once you are in Keyser, cross over the bridge to the stoplight. Go straight through the stoplight, and continue two blocks to Fort Avenue. Take a right onto Fort Avenue, go up the hill, and the main campus entrance will be on your left just past the Catamount statue. Turn left, the parking lot will be on your left and the Davis Conference Center will be on the right.



Appendix 2

Affidavit for Advertisement of Scoping Meeting



Public Scoping Meeting

The West Virginia Conservation Agency (WVCA) is proposing rehabilitation of the New Creek Site 1 dam in the New Creek Watershed of Mineral County, WV. Upgrades to the dam are being pursued by WVCA through a federal cost-share program with the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). The dam is located approximately 1 mile from the center of Keyser, WV, between Baker Street and Carskadon Lane. The City of Keyser and the Potomac Valley Conservation District are project sponsors. The purpose of the project is to rehabilitate the New Creek Site 1 dam to address current dam design safety and engineering criteria and performance standards.

The WVCA is preparing a Supplemental Watershed Plan & Environmental Assessment to consider improvements and potential environmental impacts in accordance with the National Environmental Policy Act and the regulations of the federal Council on Environmental Quality at 40 CFR Parts 1500-1508. The impact evaluation must provide the opportunity for input from the public, and public input must be considered in development of the final action.

You are invited to attend a public scoping meeting to discuss potential rehabilitation alternatives and environmental concerns associated with the New Creek Site 1 dam.

When: Thursday, February 16, 2017
4:30 PM to 7:00 PM

Where: Davis Conference Center
Potomac State College
101 Fort Avenue
Keyser, WV 26726

Interested parties may voice their comments, ideas, and concerns about the project during this meeting. Comments may also be submitted via the following methods prior to the end of the scoping period on March 31, 2017:

Mail: New Creek Site 1 Dam Rehabilitation Project,
c/o Gannett Fleming, Inc. - Eric Neast
PO Box 67100, Harrisburg, PA 17106-7100

Email: Subject: New Creek Site 1 Dam Rehabilitation Project

Gene Saurborn: gsaurborn@wvca.us
Project Technical Director, WVCA
or

Eric Neast: eneast@gfnet.com
Project Manager, Gannett Fleming, Inc.

I, as an officer of the News-Tribune, a daily newspaper published at Keyser, Mineral County, West Virginia, hereby certify that the _____

Gannett Fleming, Inc.

in the case of _____

Public Scoping Meeting

February 16, 2017

a copy whereof is hereto annexed has been published for 1 consecutive

time

in said NEWS TRIBUNE, the first publication being on the

27th

day of,

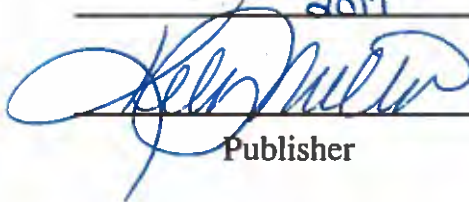
January

2017

Given under my hand at Keyser this 27th

day of January

2017



Publisher

Publisher's Fee

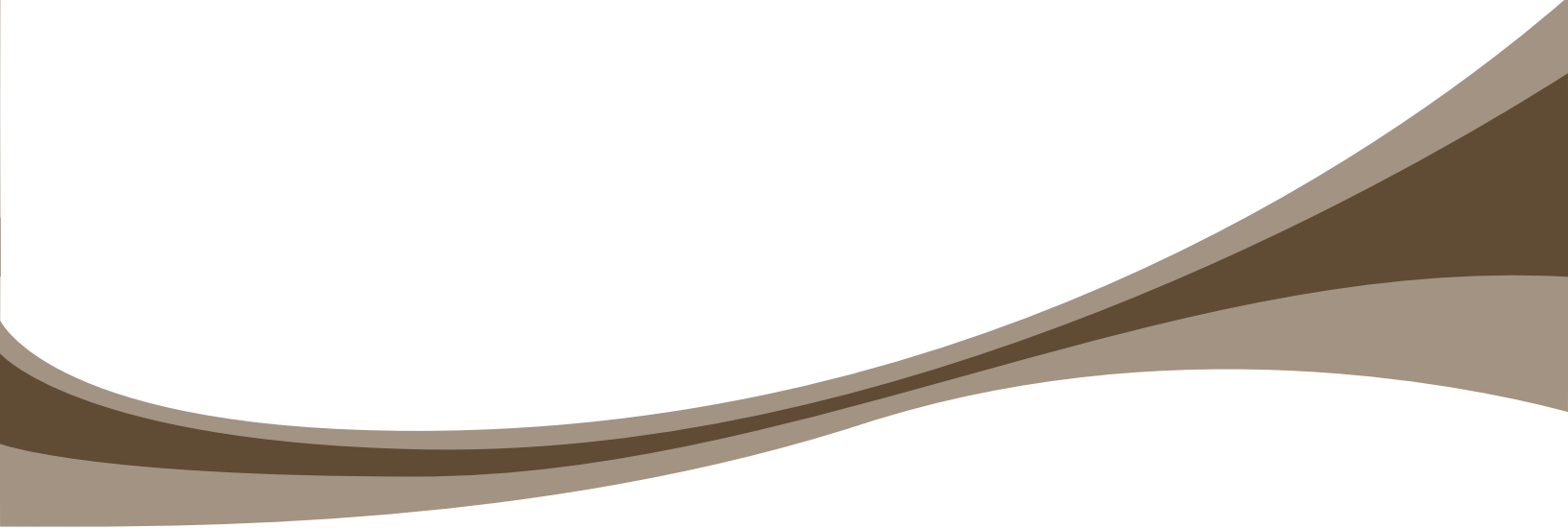
\$ 210.11



Sandra K. Canfield

My Commission Expires

4-19-21



Appendix 3

Scoping Meeting Presentation and Display Materials



New Creek Site 1 Dam Rehabilitation Public Scoping Meeting Sign-in Sheet

February 16, 2017

Name	Agency	Address	Phone	Email
Kent Spencer	WVCD	Keyser		
Brian Dayton	WVCD	Ridgely		
Steve Brubaker	County	Keyser	304-788-5921	
Rudy Sites		Keyser	304-788-3828	
Tim Schumacher	DTL Coal Co.	Keyser	301-359-3003	mining@dlgcoal.com
Donald Thomas	Landowner	Keyser		
Christi Hicks	NRC S	500 E. Main St.		
Mr. Thomas Sr	Landowner			
ERIC NEAST	GANNETT FLEMING	207 SENATE AVE. CAMP HILL, PA	717-763-7212	ENEAST@GFNET.COM
PAUL SCHWEIGER	GANNETT FLEMING	207 SENATE AVE. CAMP HILL, PA	717-763-7212	PSCHWEIGER@GFNET.COM

NEW CREEK SITE 1 DAM REHABILITATION



West Virginia
Conservation Agency



IN COORDINATION WITH: USDA, Natural Resources Conservation Service
City of Keyser, WV
Potomac Valley Conservation District

Scoping Meeting

February 16, 2017

New Creek Site 1 Dam Rehabilitation

WELCOME TO THE SCOPING MEETING !

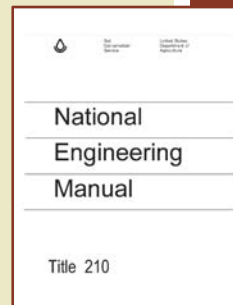
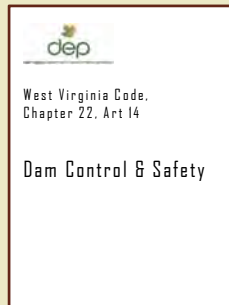
- Please view this presentation at your convenience
- Sign the attendance sheet
- Study the display boards presented
- Ask questions of the project team
- Identify your detailed concerns and comments regarding the project:
 - Through discussion with a project team member
 - Completion of a comment sheet
 - Submittal of comments via mail or email

WELCOME

WVCA is studying rehabilitation of the New Creek Site 1 Dam

Federal Watershed Protection and Flood Prevention Act
Public Law 83-566 Section 14 (a) (1)

“Rehabilitation” means completion of all work necessary to extend service life of dams and meet safety and performance standards.



WHAT IS
THE
PROJECT?

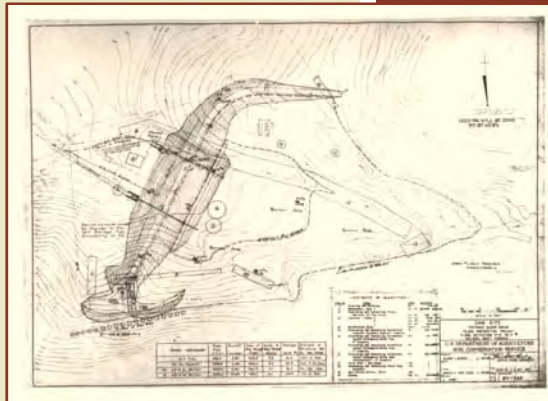
Scoping is a systematic process used to obtain the input of watershed stakeholders regarding the most relevant resource issues that need to be considered

- Identify public and agency concerns
- Clearly define environmental issues
- Identify alternatives to be examined
- Identify relevant laws, regulations and orders applicable to the proposed project
- Identify requirements that must be addressed for regulatory compliance

WHAT IS
SCOPING?

- Historically significant flood damage from storms
- Steep ridge and valley topography and soils with poor infiltration
- Watershed experiences two to three flood events per year
- Changes in local economy and land use resulted in greater floodplain development for urban uses, especially in the Keyser area

NEW CREEK WATERSHED FLOOD HISTORY



- New Creek Site 1 is part of the original watershed flood protection plan for the New Creek-White's Run Watershed
- One of nine dams constructed in the watershed
- Originally designed as a High Hazard dam providing flood control and water supply benefits.
- High Hazard dams are classified as being located where failure may cause:
 - loss of life
 - serious damage to homes, commercial or industrial buildings, main highways or railroads, or important public utilities.

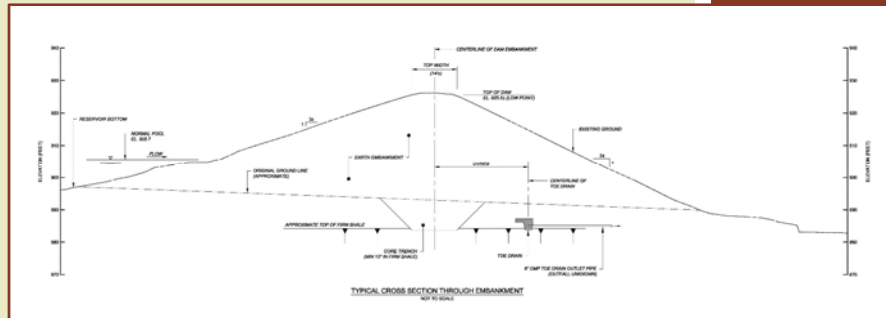
DAM HISTORY



CONDITIONS & CONCERNS

- Development at toe of downstream embankment
- Alterations to principal spillway and outfall basin and limited capacity of discharge channel
- Auxiliary spillway directs flow towards downstream development

EXISTING
DAM



NEW CREEK SITE 1 DAM AND RESERVOIR



NEW CREEK SITE 1 DAM AND RESERVOIR
1957 SURROUNDING LAND USE FOLLOWING CONSTRUCTION



NEW CREEK SITE 1 DAM AND RESERVOIR
CURRENT SURROUNDING LAND USE



This rehabilitation project is being developed as a:

Supplemental Watershed Plan & Environmental Assessment

in compliance with:

- NRCS Title 390, National Watershed Program Manual
- National Environmental Policy Act (NEPA) and regulations at CFR 1500-1508
- Section 106 of the National Historic Preservation Act
- Section 7 of the Endangered Species Act
- Other applicable federal and West Virginia state regulations

PROCESS

The NRCS Watershed Program guidelines and the NEPA process is intended to:

- Help public officials make decisions based on an understanding of environmental impacts
- Consider impacts to the natural and man-made environment, along with cost
- Take actions that protect, restore and enhance the environment
- Provide the opportunity for and consider the input of resource agencies and the public in the decision making process

PROCESS

CONCEPTUAL ALTERNATIVES TO BE CONSIDERED

- No Action
- Dam Decommissioning
- Dam Rehabilitation



SCOPING

RESOURCE CONCERNS

Natural Environment

- Ecologically critical areas
- Fish & wildlife resources and habitat
- Floodplain management
- Forest resources
- Invasive species
- Riparian areas
- Soils and geology
- Threatened & endangered species
- Wetlands and water resources
- Wild & scenic rivers

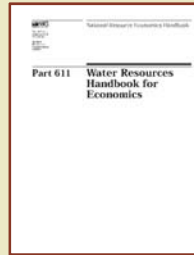


SCOPING

RESOURCE CONCERNS

Man-Made/Influenced Environment

- Air quality
- Cultural & historic properties
- Environmental justice
- Hazardous wastes and materials
- Land use & planning
- National economic development
- Recreation & parklands
- Prime farmlands
- Public health & safety
- Regional water resources plans
- Scenic areas
- Water quality



SCOPING



- **Draft Watershed Plan/EA** available for public review and comment
Fall 2017



- **Public Meeting** to solicit comments on the Draft Watershed Plan/EA
Winter 2017

- **Final Watershed Plan/EA** and Decision
Spring 2018



SCHEDULE

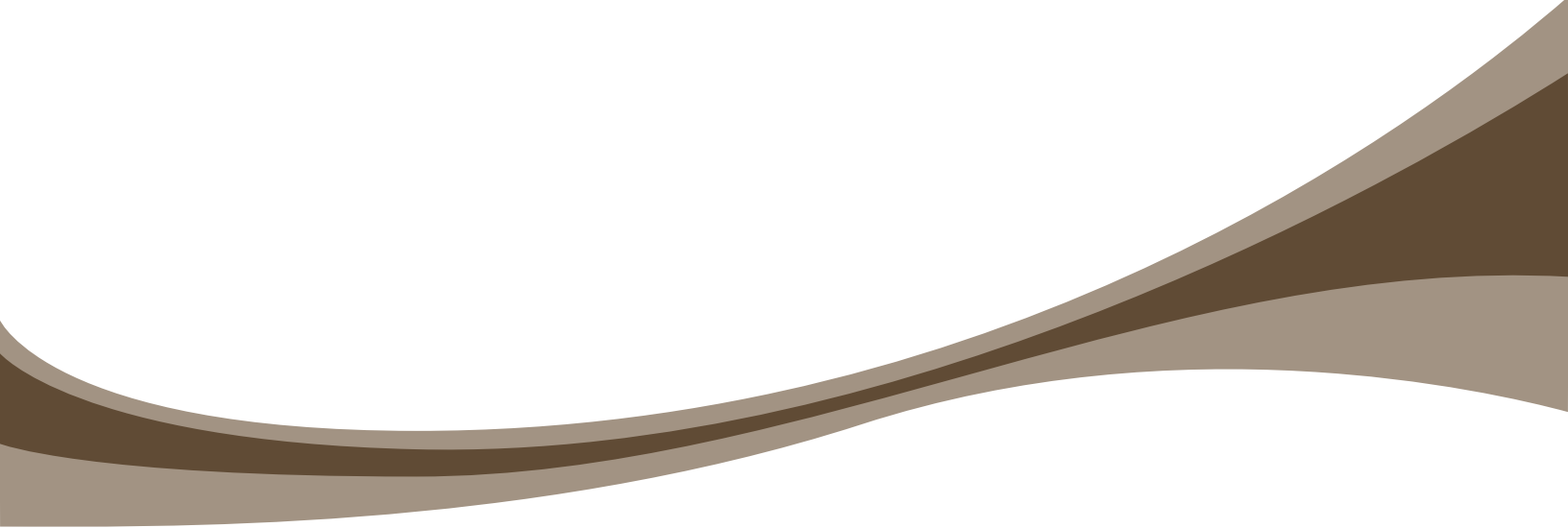
New Creek Site 1 Dam Rehabilitation

THANK YOU !

- Please sign the attendance sheet
- We appreciate your interest – thank you for taking the time to share your thoughts and ideas concerning the project



West Virginia
Conservation Agency



Appendix 4

Scoping Comments



DEPARTMENT OF THE ARMY
PITTSBURGH DISTRICT, CORPS OF ENGINEERS
WILLIAM S. MOORHEAD FEDERAL BUILDING
1000 LIBERTY AVENUE
PITTSBURGH, PA 15222-4186

REPLY TO
ATTENTION OF

February 10, 2017

Operations Division
Regulatory Branch
2017-202

New Creek Site 1 Dam Rehabilitation Project
c/o Gannett Fleming, Inc. – Eric Neast, Project Manger
P.O. Box 67100
Harrisburg, Pennsylvania 17106-7100

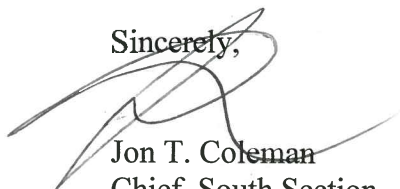
Dear Mr. Neast:

I refer to a letter with attachments, received in this office January 30, 2017, sent in on your behalf by the West Virginia Conservation Agency (WVCA), regarding the Notice of Intent to Prepare a Supplemental Plan and Environmental Assessment and Request for Input to the Project Scoping Process. The WVCA is preparing a Supplemental Plan and Environmental Assessment (Plan-EA) to consider improvements and potential environmental impacts concerning the New Creek Site 1 Watershed Dam near Keyser, Mineral County, West Virginia.

The US Army Corps of Engineers regulates any earth moving activities within streams or wetlands. This includes any placement of fill material, temporary or permanent. Due to the fact that your letter and location map do not clearly identify each aquatic resource, we recommend that you hire a qualified wetland consultant to evaluate the entire project area in order to determine if any jurisdictional streams or wetlands are present. Enclosed is a list of wetland consultants. If impacts to streams or wetlands are in fact proposed, you should again contact this office to discuss permitting requirements.

This project has been assigned Department of the Army Permit Number **2017-202**. Please refer to this number in all future correspondence. If you have any questions, please contact Linda.L.Everley@usace.army.mil.

Sincerely,



Jon T. Coleman
Chief, South Section
Regulatory Branch

Copy Furnished:

Mr. Brian Farkas/Gene Saurborn
WVCA
1900 Kanawha Blvd., East
Charleston, WV 25305



DIVISION OF NATURAL RESOURCES

**Wildlife Resources Section
1 Depot Street
Romney, West Virginia 26757
Telephone (304) 822-3551
Fax (304) 822-7331**

**Jim Justice
Governor**

**Robert A. Fala
Director**

January 31, 2017

Gene Saurborn, Project Technical Director, WVCA
Eric Neast, Project Manager, Gannett Fleming, Inc.

Messrs. Saurborn and Neast,

Greetings! I am the current District 2 Fisheries Biologist for the West Virginia Division of Natural Resources, having taken over for Jim Hedrick earlier this year.

I recently received a request for input for the Supplemental Watershed Plan & Environmental Assessment for the consideration of improvements and environmental impacts incurred at the New Creek Site 1 Watershed Dam.

Although it is a relatively small project area, the surface water this structure impounds and releases into New Creek is certainly of interest to fisheries and aquatic habitat management in this region. Although I am unsure at this time whether any sensitive fish species occur in this stream, many small, spring-fed tributaries to New Creek possess reproducing populations of native Brook Trout. The New Creek mainstem that receives flow from this tributary has the capacity to over-summer hatchery stocked trout due to low stream temperature refuge in some zones. Thus, stream temperature condition and coldwater fish management are important resource themes throughout this watershed.

Increasing water temperatures of coldwater streams, fish passage barriers, and impacts associated with harmful algal blooms rank rather high among current aquatic resource concerns.

Impoundments that allow the heating of cold source water and subsequent transfer of warmed water downstream to coldwater resources are damaging. Although there appears to be little flow of water through this dam during the summer months, thermally impacted water may be discharged during times of higher flow. This will likely occur during times when runoff of land-surface-warmed rainwater is reaching coldwater streams, possibly compounding impacts on downstream temperatures and the acute stress incurred by coldwater stream fishes.

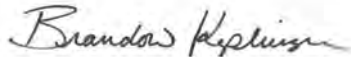
If this unnamed tributary to New Creek is a perennial stream, thus potentially holding obligate native stream fishes common to this area, this watershed dam could be an absolute passage impediment to these species or other aquatic organisms.

Shallow, eutrophic lakes are ideal habitats for the formation of harmful algae or cyanobacteria. These species can be produced in the water column or on the benthos. Issues such as suppressed dissolved oxygen, estrogenic compounds, and/or the generation of toxins that are noxious to a variety of aquatic and terrestrial organisms.

It appears that there are a variety of actions in consideration at this site. Considering that this dam impounds only ~200 acres of drainage area, the aforementioned impacts to local aquatic resources, and the comparatively low cost of decommissioning, I would strongly consider the deconstruction of the dam and the reconstruction of a natural stream channel. If dam modifications or repair is necessary, it would be ideal to have a principal spillway that was bottom-release operated. This would allow the discharge of cold hypolimnetic water during times of summer stratification, aiding the maintenance of coldwater flow to New Creek. Furthermore, the West Virginia Division of Natural Resources encourages the opportunity to manage small impoundments where state or federal agencies owns such surface water impoundments for the benefit of public fishing opportunities. If this opportunity exists for this impoundment, please notify parties to contact our District 2 Office in Romney, WV.

Thank you for the opportunity to comment on this project and the fate of Dam 1. If you have any comments or questions regarding the project or my comments, please feel free to contact me.

Brandon Keplinger



District 2 Fisheries Biologist
1 Depot Street
Romney, WV 26757
WV Division of Natural Resources
(304) 822-3551



Top of shroud (open with trash rack)

Normal Pool Elevation

Small diameter holes in riser (behind shroud)

Cold
Water
Release
Shroud

Bottom of shroud (open)

From: Keplinger, Brandon J <brandon.j.keplinger@wv.gov>

Sent: Monday, August 2, 2021 11:29 AM

To: Neast, Eric C. <eneast@GFNET.com>

Subject: Re: New Creek Site 1 Dam

[EXTERNAL EMAIL]: This email originated from outside the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello Eric,

Thank you for your contact.

Given the proposed continued use of the reservoir, I do believe that this seems like the most reasonable adaptive solution to the issue of coldwater preservation downstream of this site. This would be assuming that the outflow would collect hypolimnetic, cold water from the reservoir water strata.

I appreciate the information and the interest to maintain suitable conditions for native aquatic organisms.

Brandon Keplinger

West Virginia Division of Natural Resources

District II Fisheries Biologist

1 Depot Street, Romney, WV 26757

Office: (304) 822-3551

Fax: (304) 822-7331

brandon.j.keplinger@wv.gov

On Mon, Jul 26, 2021 at 2:19 PM Neast, Eric C. <eneast@gfnet.com> wrote:

From: Neast, Eric C.

Sent: Monday, July 26, 2021 2:20 PM

To: brandon.j.keplinger@wv.gov

Cc: gregory.s.mathews@wv.gov

Subject: New Creek Site 1 Dam

Hi Brandon and Greg,

We are in receipt of a letter (attached for your convenience) sent from your office dated January 31, 2017 related to a planning study which the West Virginia Conservation Agency (WVCA) is preparing for the New Creek Site 1 Dam located in Keyser, West Virginia. Within this letter your office questioned 1) if the dam could be decommissioned, and 2) if modifications to the dam could incorporate a bottom-release principal spillway to encourage the release of cooler water to address possible thermal impacts to the receiving watercourse (i.e., unnamed tributary to New Creek).

As I discussed with Greg this afternoon, this dam was originally designed to provide flood control for agricultural lands. However, over the years a significant amount of residential development has moved into the downstream area which takes advantage of the flood retarding capabilities of the dam. Decommissioning the dam at this point would likely result in increased flooding to numerous downstream structures. Consequently, decommissioning the New Creek Site 1 Dam may not be entertained as a viable or preferred option at this point in time.

To your second point, we have successfully incorporated cold water release systems into other NRCS floodwater retarding dams. Most recently, we have renovated several dams in Fairfax County, Virginia, incorporating a cold water release shroud to the side of the principal spillway riser. The work involves coring one or two small diameter holes through the riser structure just below the normal pool line. The holes are sized to pass approximately one-half of the estimated base flow rate to avoid inadvertently lowering the reservoir during periods of dry weather. A metal shroud is then placed over the holes extending downward to lower elevations within the reservoir. U-channels are

used to form the sides of the shroud and a steel plate forms the exposed face of the shroud. Neoprene gaskets are used between the u-channels and steel plate and between the u-channels and the riser to create a relatively watertight connection once everything is bolted together. This configuration pulls cooler water up from the lower elevations in the reservoir for release through the smaller diameter holes placed just below the normal pool line. This system is very simplistic with a low chance of failure or clogging and does not rely on manual operation of gates or other devices, which is desirable for structures which are not visited on a daily basis.

To help you visualize the cold water release shroud, I have included the image below which is an artist's rendering showing the placement of a cold water release shroud on the long side of an existing NRCS principal spillway riser structure. The attached pdf shows a picture of the same riser structure during construction immediately after the cold water release shroud was installed (note the reservoir was dewatered at the time the construction photo was taken).

As part of the proposed improvements to New Creek Site 1 Dam in Keyser, West Virginia, we anticipate the existing principal spillway riser structure will be replaced with a new structure that meets current NRCS standards. Consequently, a cold water release system, similar to that which I have described within this email, could easily be incorporated into the design. As a follow-up to your letter dated January 31, 2017, we would appreciate a response indicating if such a system would adequately address your concerns related to releasing cooler water from New Creek Site 1 Dam. Your response (which could be a simple email responding to this email) will be incorporated into the final planning study document.

Please do not hesitate to contact me if you have questions or need additional information. I would be happy to discuss this project with you in greater detail at a time convenient to you. I can be reached by phone at 717-576-6744 (cell) or by email at eneast@gfnet.com.

Thank you.

Eric Neast





DIVISION OF NATURAL RESOURCES

Wildlife Resources Section

Operations Center

P.O. Box 67

Elkins, West Virginia 26241-3235

Telephone (304) 637-0245

Fax (304) 637-0250

Earl Ray Tomblin
Governor

Robert A. Fala
Director

April 29, 2016

Mr. David H. Graff
Gannett Fleming, Inc.
PO Box 67100
Harrisburg, PA 17106-7100

Dear Mr. Graff:

We have reviewed our files for information on rare, threatened and endangered (RTE) species and sensitive habitats for the area of the proposed New Creek Site 1 Watershed Dam Assessment project near Keyser, Mineral County, WV.

We have no known records of any RTE species of sensitive habitats within the project area. The Wildlife Resources Section knows of no surveys that have been conducted in the area for rare species or rare species habitat. Consequently, this response is based on information currently available and should not be considered a comprehensive survey of the area under review.

The information provided above is the product of a database search and retrieval. This information does not satisfy other consultation or permitting requirements for disturbances to the natural resources of the state, and further consultation may be required. Additionally, any concurrence requirements for federally listed species must come from the US Fish and Wildlife Service.

Thank you for your inquiry, and should you have any questions please feel free to contact me at the above number, or barbara.d.sargent@wv.gov. Enclosed please find an invoice.

Sincerely,

A handwritten signature in blue ink, appearing to read "Barbara Sargent".

Barbara Sargent
Environmental Resources Specialist
Natural Heritage Program
Wildlife Diversity Unit

enclosure

S:\Monthly\BSargent\Invoices\GF2.doc

INVOICE

West Virginia Division of Natural Resources

Wildlife Resources Section, P.O. Box 67, Elkins, WV 26241

Attention: Ms. Kathy Scott Shreve

In Account With: Gannett Fleming, Inc.
PO Box 67100
Harrisburg, PA 17106-7100

Date: April 29, 2016

Attention: Mr. David H. Graff

For the retrieval and compilation of information on rare, threatened and endangered species and sensitive habitats for the proposed New Creek Site 1 Watershed Dam Assessment project near Keyser, Mineral County, WV.

AMOUNT DUE: \$75.00

Make check payable to WV Division of Natural Resources, and mail to the attention of Kathy Scott Shreve at the address above.

Please reference the invoice number on your check.



United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241



Contact Name: David Graff

Email Address or Fax Number: 717 763 8150

FWS File # 2016-i-0513 All future correspondence should clearly reference this file #.

Project: WVCA New Creek Site 1 Watershed Dam Mineral County

Date of Letter Request: 04/28/2016

This is in response to your letter requesting threatened and endangered species information in regard to the proposed project listed above. These comments are provided pursuant to the Endangered Species Act (ESA, 87 Stat. 884, as amended; 16 U. S. C. 1531 *et seq.*).

We have made a "no effect" determination that the project will not affect federally listed endangered or threatened species. Therefore no biological assessment or further section 7 consultation under the ESA is required with the Fish and Wildlife Service. Should project plans change or amendments be proposed that we have not considered in your proposed action, or if additional information on listed and proposed species becomes available, or if new species become listed or critical habitat is designated, this determination may be reconsidered.

Definitive determinations of the presences of waters of the United States, including wetlands, in the project area and the need for permits, if any, are made by the U.S. Army Corps of Engineers. They may be contacted at: Pittsburgh District, Regulatory Branch, William S. Moorhead Federal Building, 1000 Liberty Avenue, Pittsburgh, Pennsylvania 15222-4188, telephone (412) 395-7152.


05/04/2016
Reviewer's signature and date


5/6/2016
Field Supervisor's signature and date

New Creek Site 1

IPaC Trust Resources Report

Generated March 24, 2016 12:39 PM MDT, IPaC v3.0.0

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.

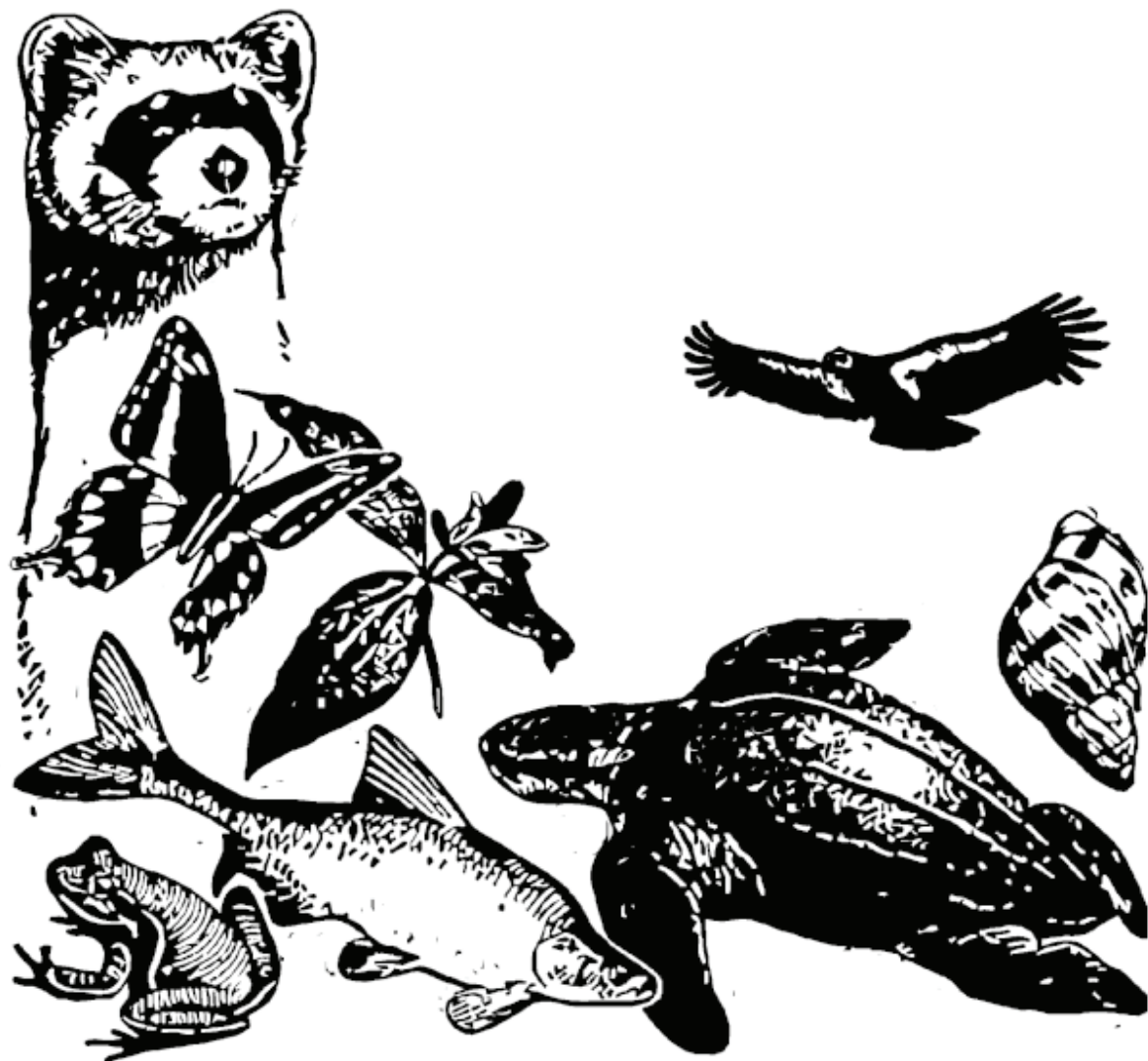


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IPaC Trust Resources Report	<u>1</u>
Project Description	<u>1</u>
Endangered Species	<u>2</u>
Migratory Birds	<u>3</u>
Refuges & Hatcheries	<u>5</u>
Wetlands	<u>6</u>

U.S. Fish & Wildlife Service

IPaC Trust Resources Report



NAME

New Creek Site 1

LOCATION

Mineral County, West Virginia

IPAC LINK

<https://ecos.fws.gov/ipac/project/LK3BH-RY6XR-BFRPP-QHI4E-HI6HT4>



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

West Virginia Ecological Services Field Office

694 Beverly Pike

Elkins, WV 26241-9475

(304) 636-6586

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the [Endangered Species Program](#) of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

[Section 7](#) of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Mammals

Indiana Bat *Myotis sodalis* Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=A000

Northern Long-eared Bat *Myotis septentrionalis* Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=A0JE

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the [Migratory Bird Treaty Act](#) and the [Bald and Golden Eagle Protection Act](#).

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.^[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
<http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Conservation measures for birds
<http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Year-round bird occurrence data
<http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/akn-histogram-tools.php>

The following species of migratory birds could potentially be affected by activities in this location:

Bald Eagle *Haliaeetus leucocephalus*

Year-round

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B008

Bird of conservation concern

Black-billed Cuckoo *Coccyzus erythrophthalmus*

Season: Breeding

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0H1

Bird of conservation concern

Black-capped Chickadee *Poecile atricapillus*

Year-round

Bird of conservation concern

Blue-winged Warbler *Vermivora pinus*

Season: Breeding

Bird of conservation concern

Canada Warbler *Wilsonia canadensis*

Season: Breeding

Bird of conservation concern

Cerulean Warbler <i>Dendroica cerulea</i> Season: Breeding https://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B09I	Bird of conservation concern
Fox Sparrow <i>Passerella iliaca</i> Season: Wintering	Bird of conservation concern
Golden-winged Warbler <i>Vermivora chrysoptera</i> Season: Breeding https://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0G4	Bird of conservation concern
Kentucky Warbler <i>Oporornis formosus</i> Season: Breeding	Bird of conservation concern
Louisiana Waterthrush <i>Parkesia motacilla</i> Season: Breeding	Bird of conservation concern
Olive-sided Flycatcher <i>Contopus cooperi</i> Season: Breeding https://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0AN	Bird of conservation concern
Pied-billed Grebe <i>Podilymbus podiceps</i> Season: Breeding	Bird of conservation concern
Prairie Warbler <i>Dendroica discolor</i> Season: Breeding	Bird of conservation concern
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> Season: Breeding	Bird of conservation concern
Rusty Blackbird <i>Euphagus carolinus</i> Season: Wintering	Bird of conservation concern
Short-eared Owl <i>Asio flammeus</i> Season: Wintering https://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0HD	Bird of conservation concern
Willow Flycatcher <i>Empidonax traillii</i> Season: Breeding https://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0F6	Bird of conservation concern
Wood Thrush <i>Hylocichla mustelina</i> Season: Breeding	Bird of conservation concern
Worm Eating Warbler <i>Helminthos vermivorum</i> Season: Breeding	Bird of conservation concern
Yellow-bellied Sapsucker <i>sphyrapicus varius</i> Season: Breeding https://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0FR	Bird of conservation concern
Northern Saw-whet Owl <i>Aegolius acadicus</i> Year-round	Bird of conservation concern

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

Freshwater Pond

[PUBHh](#)

2.9 acres

A full description for each wetland code can be found at the National Wetlands Inventory website: <http://107.20.228.18/decoders/wetlands.aspx>

December 16, 2019

West Virginia Division of Culture and History, State Historic Preservation Office
Susan Pierce, Director
1900 Kanawha Boulevard East
Charleston, WV 25305

RE: FR 17-312-MI
West Virginia Conservation Agency
New Creek Site 1 Watershed Dam
Mineral County, West Virginia

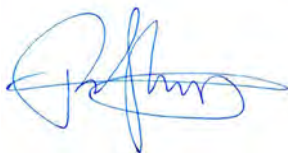
Dear Ms. Pierce,

As requested in your February 22, 2017 letter, attached is a completed Historical Property Inventory form for New Creek Site 1 Watershed Dam and a recommendation concerning eligibility for listing in the National Register of Historic Places. The evaluation has been completed by Cultural Resource Analysts, Inc. (CRA), whose cultural resource professionals meet the *Secretary of the Interior Historic Preservation Professional Qualification Standards*.

WVCA appreciates your consideration of the attached information.

If you have any questions or require additional information, please feel free to contact me by phone at (304) 558-2204 or via email at bfarkas@wvca.us.

Sincerely,



Mr. Brian Farkas, Executive Director
West Virginia Conservation Agency

cc: Mr. Gene Saurborn – WVCA, Project Technical Director
Mr. Eric Neast, PE – Gannett Fleming, Inc. Project Manager



330
FEB 28 2017
13471

The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300

Randall Reid-Smith, Commissioner

Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562

EEO/AA Employer

February 22, 2017

Mr. Brian Farkas
Executive Director
West Virginia Conservation Agency
1900 Kanawha Boulevard, East
Charleston, West Virginia 25305

RE: New Creek Site 1 Watershed Dam Project
FR#: 17-312-MI

Dear Mr. Farkas:

We have reviewed the above mentioned project to determine its effects to cultural resources. As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

According to the submitted information, the West Virginia Conservation Agency proposes upgrades to the New Creek Site 1 Watershed Dam located near Keyser, West Virginia. Through a federal cost-share program with the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) the proposed project will address current dam design safety and engineering criteria and performance standards. Rehabilitation alternatives to be considered may involve modifications to the dam structure components. A no-action plan and decommissioning of the dam will also be evaluated.

Archaeological Resources:

A search of our records indicates that there are no recorded archaeological resources within the proposed project area. Furthermore, available information demonstrates that the majority of the proposed project area has been previously disturbed through dam construction. Therefore, in our opinion the proposed project will have no effect on intact archaeological historic properties. No further consultation is necessary regarding archaeological resources. However, if intact cultural materials are encountered during the proposed work on the dam, please cease all activity in the area of discovery and contact this office immediately. Additionally, if the proposed project is modified to require new ground disturbances we request to be notified so we may provide further comments.

Architectural Resources:

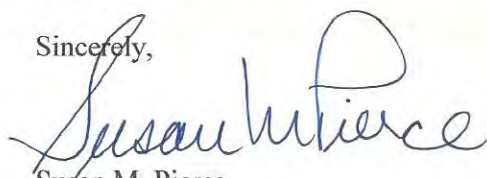
We cannot complete our review with the information submitted. Based on the provided documentation, New Creek Site 1 Watershed Dam was constructed in 1957, and since it is over 50 years of age, it may be eligible for inclusion in the National Register of Historic Places. At this time, we request a Historic Property Inventory (HPI) form be completed and submitted to our office with color photographs. The HPI form is available, along with instructions to fill it out, at www.wvculture.org/shpo/forms.html. Contact Historian, Michael Burdette (Michael.A.Burdette@wv.gov), to obtain an HPI Site number for the newly-documented resource. Please be sure to indicate the original date of construction as well as details about any changes, additions, and/or alterations the dam has experienced. Your photographs need to be keyed to a USGS topographic or aerial map and should accurately depict from various angles any architectural resources, building or structural details, and outbuildings.

February 22, 2017
Mr. B. Farkas
FR# 17-312-MI
Page 2

Panoramic shots of surrounding landscapes and viewsheds are also necessary for us to complete our review. Also, all resources need a determination of eligibility for the National Register by a qualified professional meeting the *Secretary of the Interior's Historic Preservation Professional Qualification Standards*. We will provide additional comments upon receipt of the requested information.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Katie M. Turner, Archaeologist, or Benjamin M. Riggle, Structural Historian, at (304) 558-0240.*

Sincerely,

A handwritten signature in blue ink that reads "Susan M. Pierce". The signature is fluid and cursive, with a large loop at the end of the last name.

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/KMT/BMR



Internal Rating: _____

WEST VIRGINIA HISTORIC PROPERTY INVENTORY FORM

Street Address North of Parrish Street	Common/Historic Name/Both ☐ ☒ ☐ New Creek Site 1 Watershed Dam	Field Survey # S-001	Site # (SHPO Only) MI-0249	
Town or Community Keyser	County Mineral	Negative No.	NR Listed Date	
Architect/Builder U.S. Department of Agriculture Soil Conservation Service	Date of Construction c.1957	Style Earth embankment dam for flood control		
Exterior Siding/Materials n/a	Roofing Material n/a	Foundation n/a		
Property Use or Function Residence ☐ Commercial ☐ Other ☒ UTM# NAD83/Zone 17 North 4366932 East 672711	Photo 1 			
Survey Organization & Date Cultural Resource Analysts, Inc. 12/3/19				Quadrangle Name Keyser
Part of What Survey/FR#				

Sketch Map of Property
Or Attach Copy of USGS Map



Site No.

Present Owners D&L Coal Company parcel owner Phone # WV Conservation Agency has easement for operation and maintenance of dam	Owners Mailing Address
Describe Setting _ Acres Located on an unnamed tributary of New Creek approximately 1 mile southwest of the center of Keyser, WV. It is boarded to the southeast and southwest by residential development and to the north by undeveloped land consisting of fields and forested areas. <u>No</u> Archaeological Artifacts Present	
Description of Building or Site (Original and Present) _ Stories _ Front Bays The earthfill dam is 41.7-foot-high by 945-foot-long and was constructed for the purpose of flood control. The earthfill embankment has two spillways that consist of the main two-stage spillway and an auxiliary spillway that is an open channel covered in vegetation. Both spillways are uncontrolled and the main spillway carries all the discharge until the pool level reaches the level of the auxiliary spillway. A drawdown gate was constructed to lower or drain the reservoir. The reservoir covers an approximate area of 3.35 acres. (Use Continuation Sheets)	
Alterations ☐ Yes ☒ No If yes, describe:	
Additions ☐ Yes ☒ No If yes, describe:	
Describe All Outbuildings: N/A	
(Use Continuation Sheets)	
Statement of Significance MI 0249 is associated with mid-twentieth century flood control measures. As stated in the 2011 report; <i>Rehabilitation Assessment Report: New Creek Watershed Site 1</i>, "The purpose of the plan for New Creek Subwatershed was to outline land treatment and structural measures necessary to achieve the maximum practical erosion control and alleviate flood damage. Installation of planned structural measures were to assist in providing floodwater protection to dwellings, roads, fields, crops, and businesses, and to permit more intensive land use by reducing damage to land in the flood regions and also make uplands more attractive and productive. A total of 9 floodwater retarding dams were constructed on tributaries within the New Creek Watershed" (Gannett Fleming 2011). Research did not reveal any significant events that would rise to the level that would make the site eligible under Criterion A. Research revealed no significant persons associated with MI 0249 and is not recommended as eligible for listing in the NRHP under Criterion B. (Use Continuation Sheets)	
Bibliographical References Gannett Fleming Inc. 2019 Rehabilitation Assessment Report New Creek Watershed Site 1 Mineral County, West Virginia. Technical Report. Harrisburg, Pennsylvania. (Use Continuation Sheets)	
Form Prepared By: Robert W. Ball, MHP	
Date: 12/5/19	
Name/Organization: Cultural Resource Analysts, Inc. Address: 3556 Teays Valley Road, Suite 3 Hurricane, WV 25526 Phone #: 304-562-7233	



West Virginia Division of Culture and History
 State Historic Preservation Office

This program receives federal funds from the National Park Service. Regulations of the U. S. Department of the Interior prohibit unlawful discrimination in department Federally Assisted Programs on the basis of race, color, national origin, age or handicap. Any person who believes he or she has been discriminated against in any program, activity, or facility operated by a recipient of Federal Assistance should write to: Director, Equal Opportunity Program, U.S. Department of the Interior, National Park Service, P.O. Box 37127, Washington, D.C. 20013-7127.

WEST VIRGINIA HISTORIC PROPERTY FORM

CONTINUATION SHEET

NAME: New Creek Site 1 Watershed Dam **SITE#** MI-0249

Statement of Significance cont.

The structure is not a particularly outstanding example of mid-twentieth century flood control. The structure does not contain any unique or distinctive characteristics that would set it apart from other earthen dams. As a result, this site does not appear eligible for listing in the NRHP under Criterion C.

Consequently, CRA recommends that MI-0249 is not eligible for inclusion in the NRHP under Criterion A, B, or C.

WEST VIRGINIA HISTORIC PROPERTY FORM

CONTINUATION SHEET

NAME New Creek Site 1 Watershed Dam SITE# MI-0249



Photo 2: Reservoir, looking southwest.



Photo 3: Crest of the dam, looking northeast.

WEST VIRGINIA HISTORIC PROPERTY FORM

CONTINUATION SHEET

NAME New Creek Site 1 Watershed Dam SITE# MI-0249



Photo 4: Northeast end of the dam, looking southwest.



Photo 5: Overview of dam, looking northeast.

WEST VIRGINIA HISTORIC PROPERTY FORM

CONTINUATION SHEET

NAME New Creek Site 1 Watershed Dam SITE# MI-0249



Photo 6: Principal spillway riser structure, looking south.



Photo 7: Downstream embankment slope, looking southwest.





The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300

Randall Reid-Smith, Commissioner

Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562

EEO/AA Employer

Mr. Brian Farkas
Executive Director
West Virginia Conservation Agency
1900 Kanawha Boulevard, East
Charleston, West Virginia 25305

RE: New Creek Site 1 Watershed Dam Project
FR#: 17-312-MI-1

Dear Mr. Farkas:

We have reviewed the additional information submitted for the above-mentioned project to determine its effects to cultural resources. As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

According to the submitted information, the West Virginia Conservation Agency proposes upgrades to the New Creek Site 1 Watershed Dam located near Keyser, West Virginia. Through a federal cost-share program with the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) the proposed project will address current dam design safety and engineering criteria and performance standards. This project was initially reviewed by our office in a letter dated February 22, 2017 (FR#:17-312-MI).

Architectural Resources:

Thank you for the submission of the requested Historic Property Inventory form. We have reviewed the submitted documentation and concur with the consultant that the New Creek Site 1 Watershed Dam (MI-0249) is not eligible for the National Register of Historic Places. Therefore, we have determined that no architectural properties eligible for or included in the National Register will be affected by the proposed project. No further consultation is necessary regarding architectural resources; however, we ask that you contact our office if your project should change.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Benjamin M. Riggle, Structural Historian, at (304) 558-0240.*

Sincerely,

A handwritten signature in blue ink that reads "Susan M. Pierce".

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/BMR

RE: [External Email]New Creek 1 tribal coordination

From: Stumpf, Tyler - FPAC-NRCS, Lexington, KY <Tyler.Stumpf@usda.gov>

Sent: Thursday, October 14, 2021 12:39 PM

To: O'Leary, Erin - FPAC-NRCS, Morgantown, WV <Erin.OLeary@usda.gov>; Sharpe, Katherine E. <ksharpe@gfnet.com>

Cc: Neast, Eric C. <eneast@GFNET.com>; Yost, Pamela - NRCS, Morgantown, WV <pamela.yost@usda.gov>; Deichert, Andy - NRCS, Morgantown, WV <andy.deichert@usda.gov>

Subject: RE: [External Email]New Creek 1 tribal coordination

[EXTERNAL EMAIL]: This email originated from outside the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Afternoon all,

I have attached a Word document with some edits to the CR section of the EA, as well as a summary of the tribal consultation process up to this point. As Erin mentioned previously I am continuing to seek comments from the Shawnee but we can proceed with the next phase of the process. I will be making phone calls in the coming weeks to some of these tribes that I will need to include in the final EA. Let me know if you have any questions, comments, or concerns. If this is not what you were looking for in terms of a record of communication, let me know and I'll work to get you additional information.

Tyler Stumpf
Archaeologist / Cultural Resource Specialist
USDA Natural Resources Conservation Service
Kentucky State Office
771 Corporate Drive
Suite 300
Lexington, KY 40503
Office: 859.224.7312
Cell: 270.339.2401
Tyler.Stumpf@usda.gov

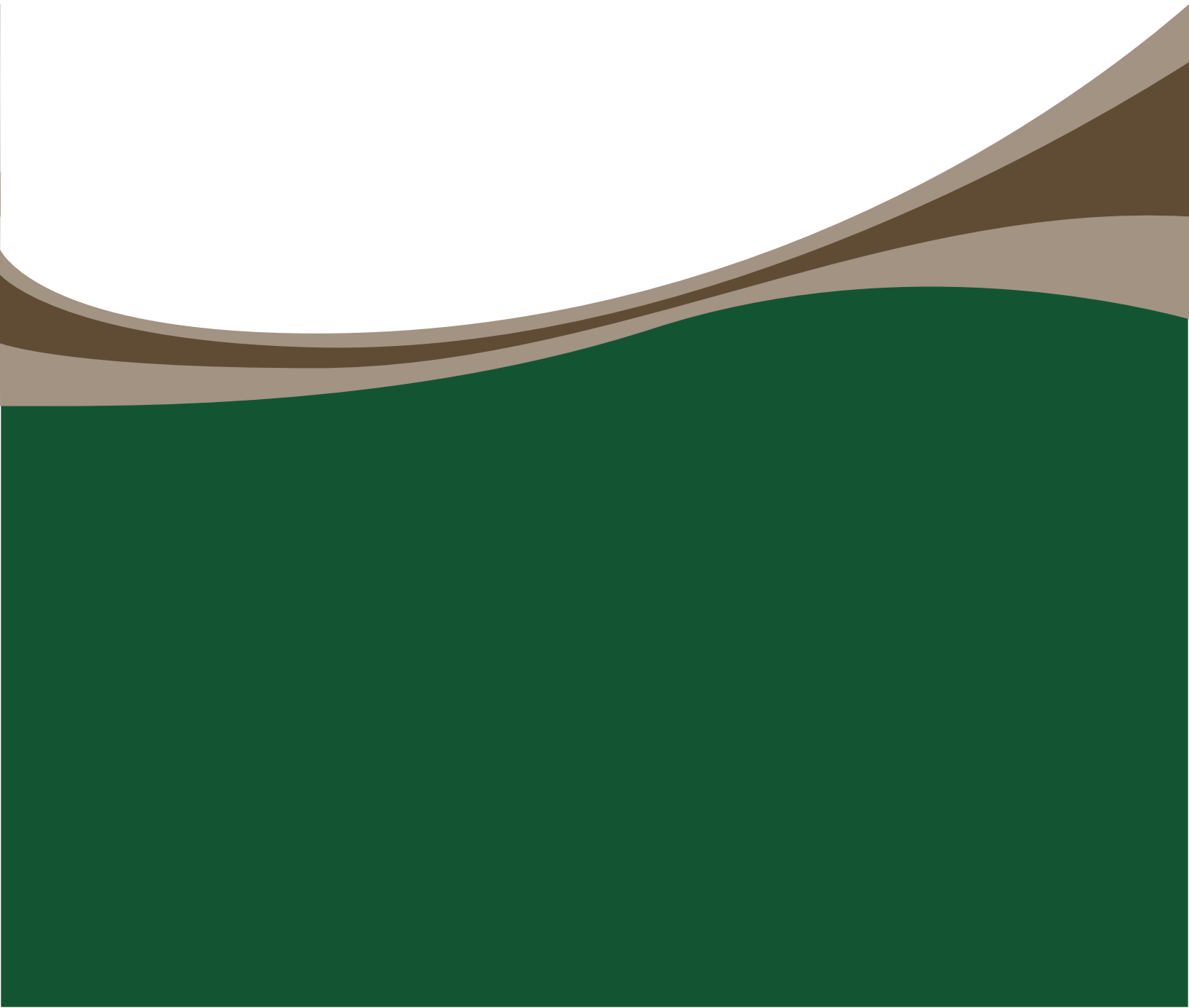
Record of Communication & Tribal Consultation

Tribal Ancestral Lands Consultation (TALC) was initiated by West Virginia NRCS on May 24, 2021. This consultation sought to include twenty federally recognized tribes with potential areas of interest within the state, of which West Virginia NRCS received three responses, as of October 14, 2021. The Osage Nation and the Seneca Nation of Indians' ancestral lands areas of interest do not include Mineral County, where this project is being conducted. West Virginia NRCS is continuing efforts to contact and include additional tribes in consultation for this project.

- May 24, 2021 – Official, wet-ink TALC letters sent to twenty federally recognized tribes seeking to initiate TALC.
- June 25, 2021 – Official, email letters sent to twenty federally recognized tribes seeking to initiate TALC.
- June 28 & 29, 2021 – Open Tribal Listening Sessions held to mark the initiation of TALC.
- July 22, 2021 – Tribal Listening Session with the Osage Nation held to mark the initiation of TALC.
 - Three tribes responded to initial TALC meeting requests: Osage Nation, Seneca Nation of Indians, Shawnee Tribe.
 - On July 22, 2021 The Osage Nation provided WV NRCS with a list of counties included in their ancestral land areas of interest. Mineral County is not included on this list.
 - On August 27, 2021 an email was sent to the Seneca Nation of Indians requesting their areas of interest for TALC and specifically for consultation on the New Creek 1 Project. On August 30, 2021 a response was received including their ancestral land areas of interest. Mineral County is not included on this list.
 - The Shawnee Tribe have been sent communication on 8/27/21 and 10/12/21 requesting a list of their ancestral land areas of interest. To date no response has been received. Continued attempts at communication are occurring.

Appendix B

Project Maps



**Site Location in
Mineral County, WV**

New Creek
Site 1



Legend

- Project Area
- Reservoir Boundary

Appendix B - Figure 1
New Creek Site 1
USGS Topographic Map
WEST VIRGINIA
CONSERVATION AGENCY
 Mineral County, WV

Scale

0 500 1,000 2,000
 Feet

1 inch = 1,000 feet

 **Gannett Fleming**

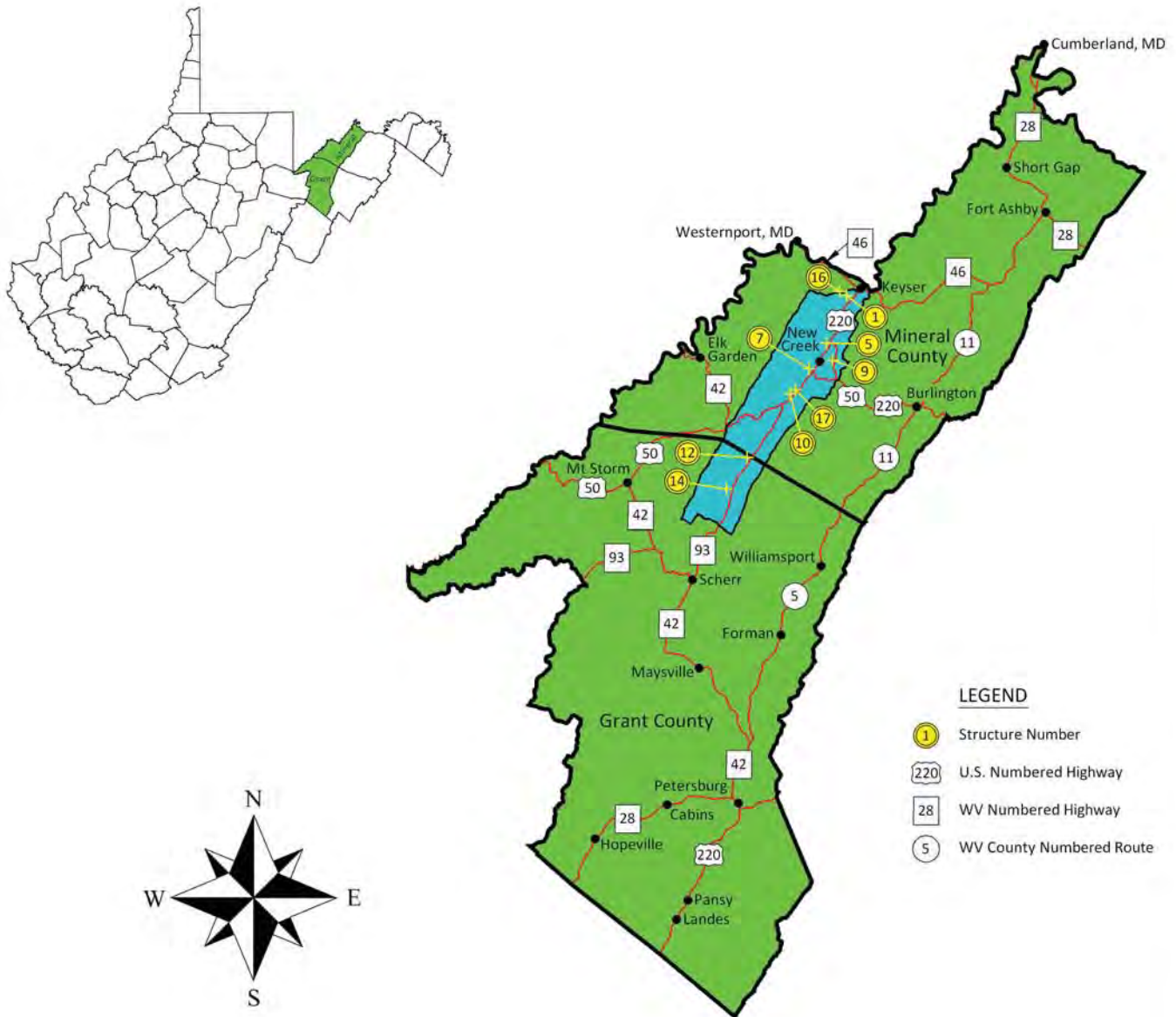
Map Prepared: 8/12/2016





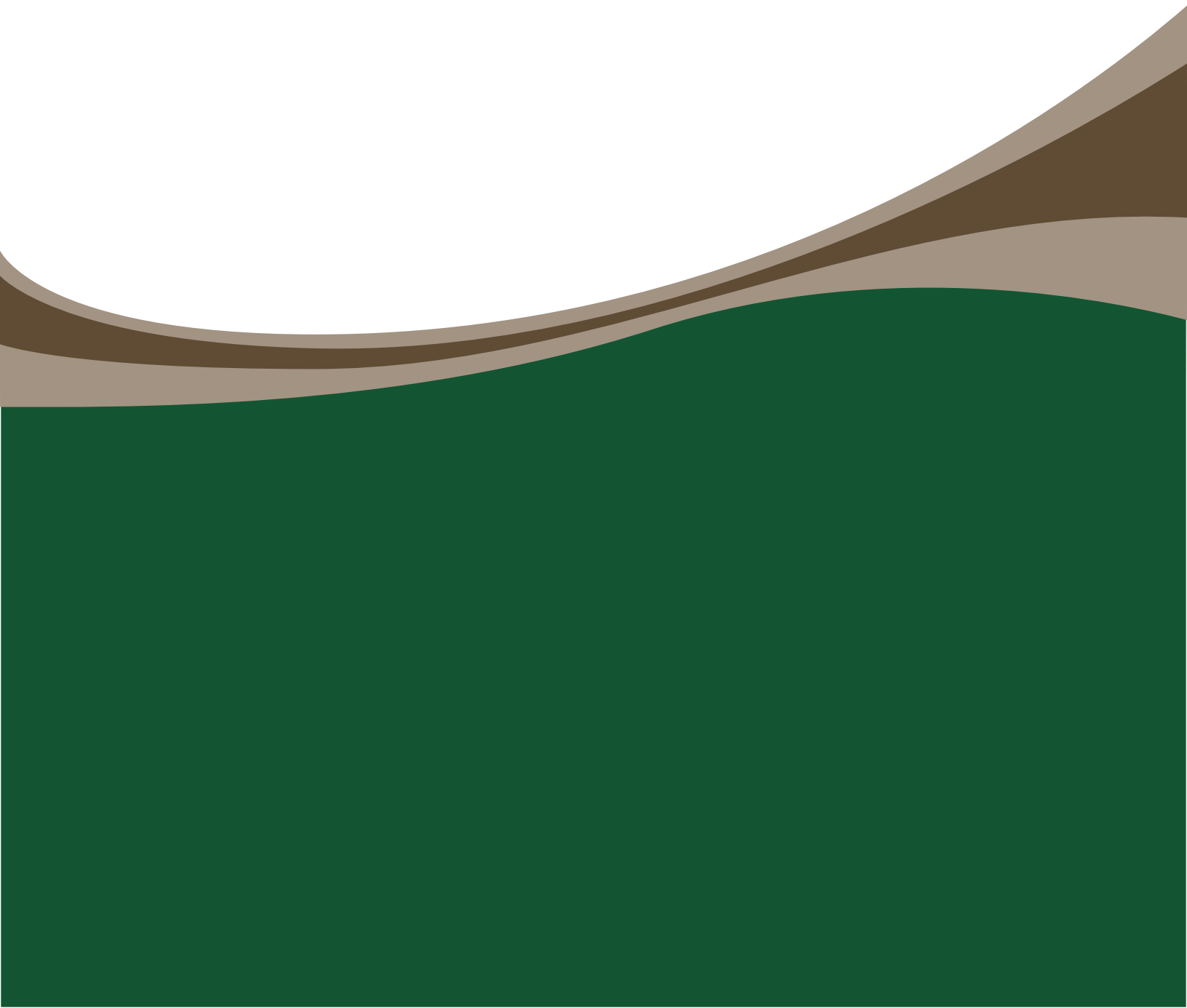
Appendix B - Figure 3

NEW CREEK WATERSHED MINERAL AND GRANT COUNTY, WEST VIRGINIA



Appendix C

Support Maps and Documentation





Legend

- Project Area
- Mineral County Soils

Appendix C - Figure 1 New Creek Site 1 Soil Survey Map WEST VIRGINIA CONSERVATION AGENCY Mineral County, WV

Scale

0 125 250 500
Feet

1 inch = 250 feet



Gannett Fleming

Map Prepared: 5/17/2021





Legend

- Project Study
- Lacustrine - NC 1 Normal Pool 906 ft (Approx)
- Waterways Delineated**
- Seep
- Perennial
- Intermittent
- Perennial Stream
- RBP Stream Evaluation

Appendix C - Figure 2 New Creek Site 1 Stream Sampling Reach Map WEST VIRGINIA CONSERVATION AGENCY Mineral County, WV

Scale

0 100 200 400 Feet

1 inch = 200 feet



Gannett Fleming

Map Prepared: 1/12/2017





Legend

- Project Area
- NWI Mapping**
- Freshwater Pond

Appendix C - Figure 3 New Creek Site 1 National Wetlands Inventory Map WEST VIRGINIA CONSERVATION AGENCY Mineral County, WV

Scale

0 100 200 400
Feet

1 inch = 200 feet



Gannett Fleming

Map Prepared: 1/11/2017



Appendix C - Figure 4

National Flood Hazard Layer FIRMMette



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

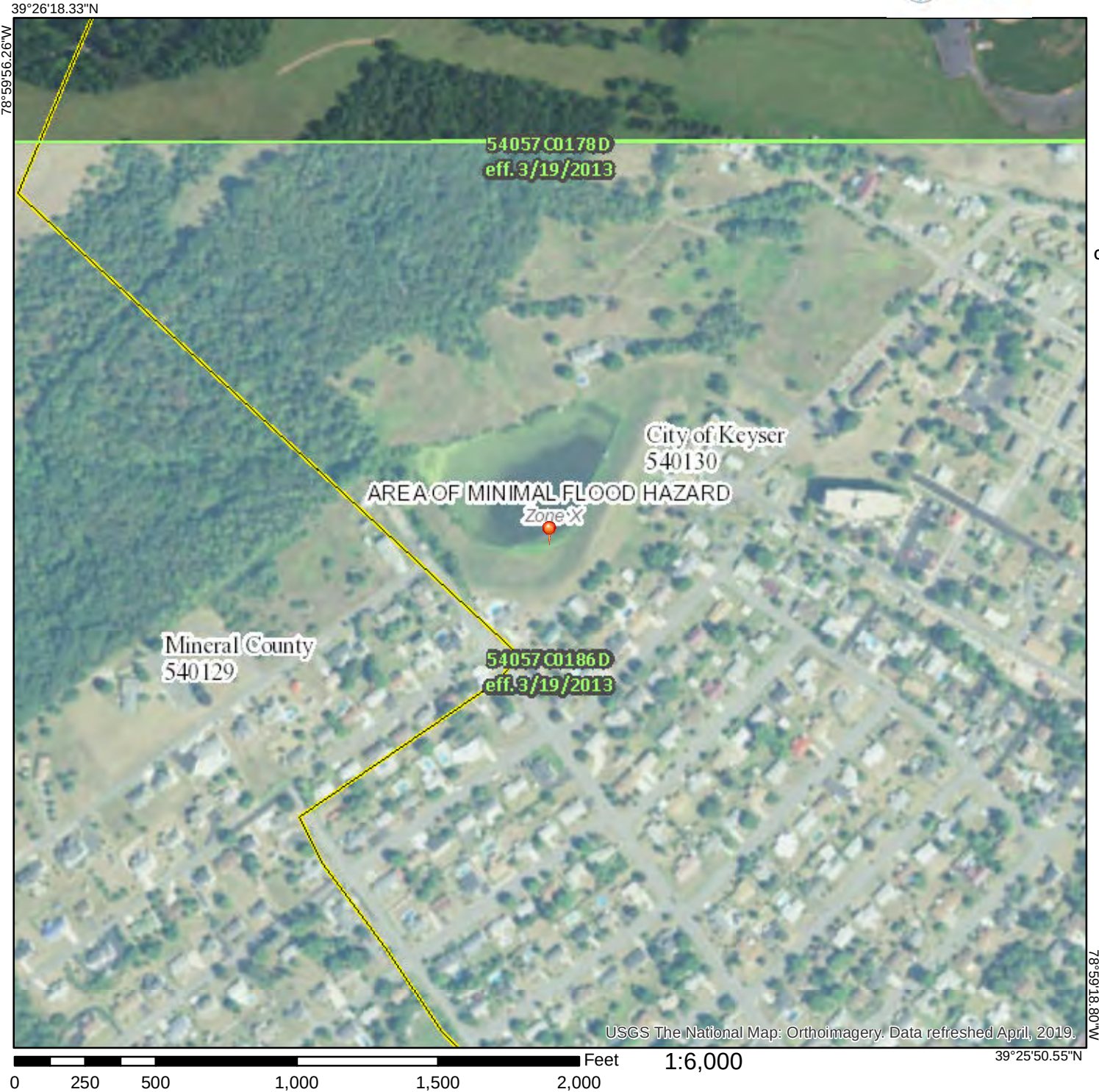


The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/2/2020 at 11:28:42 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

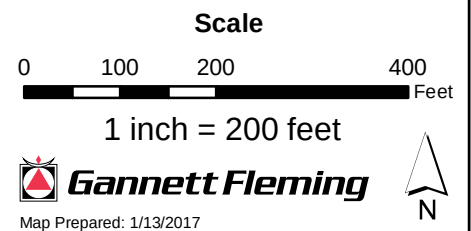
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.





- Legend**
- ▬ Project Study Area Boundary
 - ▬ Lacustrine - NC 1 Normal Pool 906 ft (Approx)
 - Waterways Delineated**
 - ▬ Seep
 - ▬ Perennial
 - ▬ Intermittent
 - ▬ Perennial Stream Area
 - Wetlands Delineated**
 - ▬ PEM
 - ▬ PSS

Appendix C - Figure 5
New Creek Site 1
Delineated Features Map
WEST VIRGINIA
CONSERVATION AGENCY
 Mineral County, WV





Appendix C - Figure 6
New Creek Site 1
25 Year Flood Boundary
Comparison Map



West Virginia
Conservation Agency

Mercer County, WV



Legend

- NHD Stream Centerline
- NC 1 Reservoir Polygon
- 25 Year Flood Boundary without Dam
- 25-500 Year Flood Boundary with Dam

Overview Map New Creek Site 1:



Location Map New Creek Site 1:



0 250 500 1,000
Feet

1 inch = 500 feet



Aerial Imagery provided by ESRI online web service.
Flood boundaries modeled by Gannett Fleming. Project Number 061371.305

Appendix C - Figure 7
New Creek Site 1
50 Year Flood Boundary
Comparison Map



West Virginia
Conservation Agency

Mercer County, WV



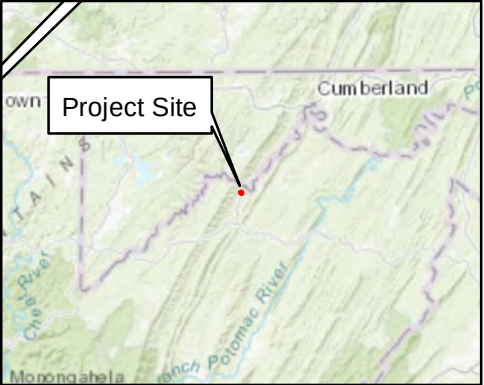
Legend

- NHD Stream Centerline
- NC 1 Reservoir Polygon
- 50 Year Flood Boundary without Dam
- 25-500 Year Flood Boundary with Dam

Overview Map New Creek Site 1:



Location Map New Creek Site 1:



0 250 500 1,000
Feet

1 inch = 500 feet



Aerial Imagery provided by ESRI online web service.
Flood boundaries modeled by Gannett Fleming. Project Number 061371.305

New Creek Site 1

Keyser City

Potomac
Valley Hospital

Keyser Primary
School

Mineral County
Technical Center

Keyser Middle School

Mineral County
Board of
Education

Appendix C - Figure 8 New Creek Site 1 100 Year Flood Boundary Comparison Map



West Virginia
Conservation Agency

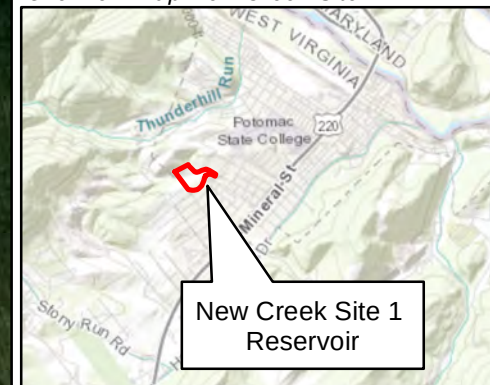
Mercer County, WV



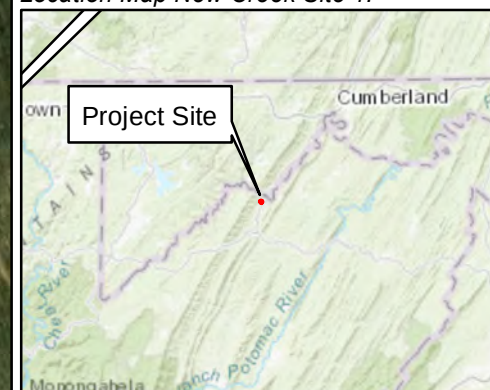
Legend

- NHD Stream Centerline
- NC 1 Reservoir Polygon
- 100 Year Flood Boundary without Dam
- 25-500 Year Flood Boundary with Dam

Overview Map New Creek Site 1:



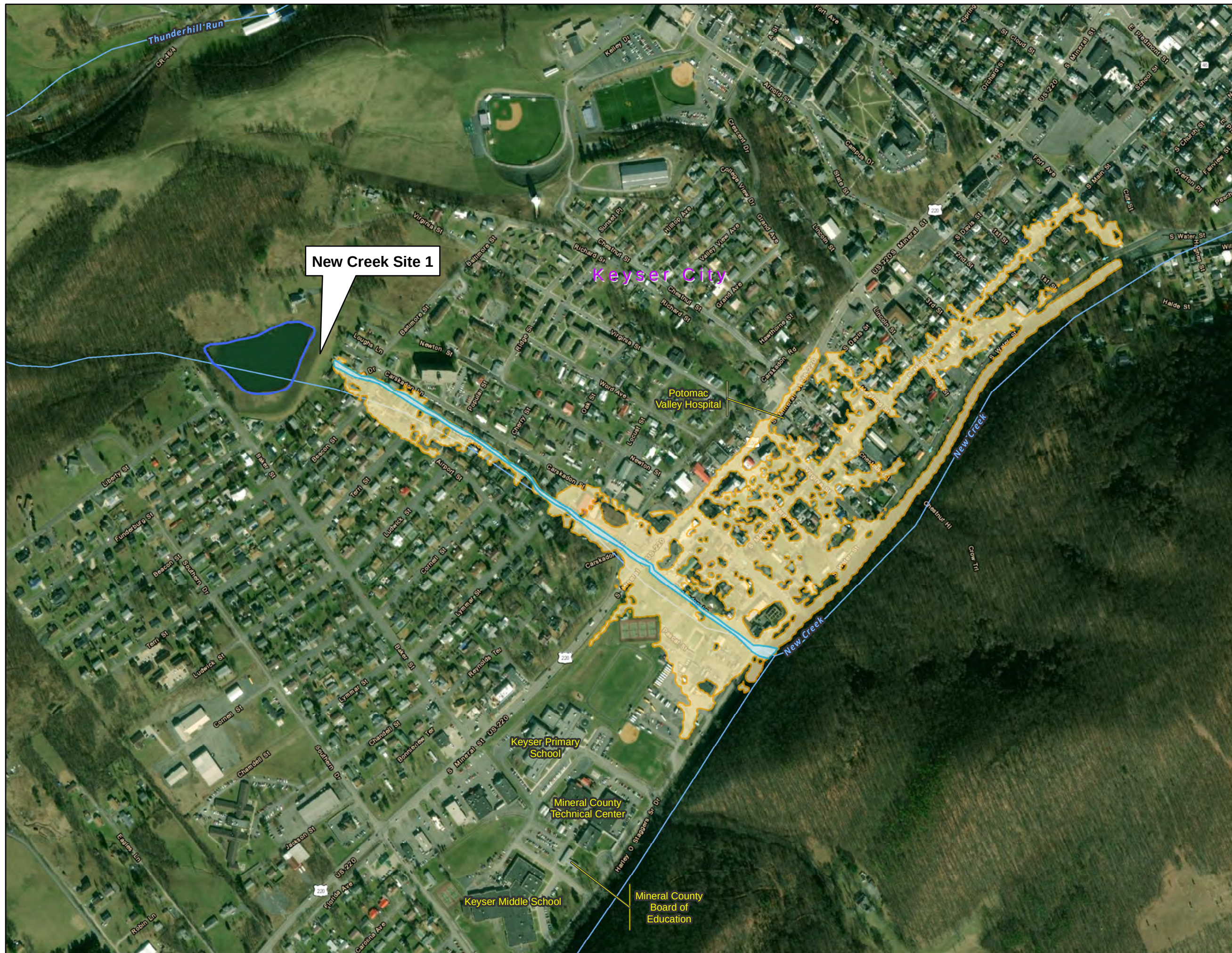
Location Map New Creek Site 1:



1 inch = 500 feet



Aerial Imagery provided by ESRI online web service.
Flood boundaries modeled by Gannett Fleming. Project Number 061371.305





Appendix C - Figure 9
New Creek Site 1
500 Year Flood Boundary
Comparison Map



West Virginia
Conservation Agency

Mercer County, WV



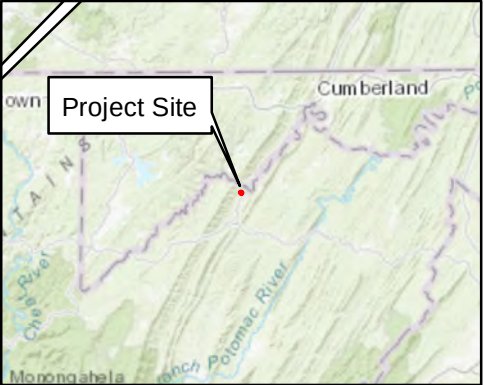
Legend

- NHD Stream Centerline
- NC 1 Reservoir Polygon
- 500 Year Flood Boundary without Dam
- 25-500 Year Flood Boundary with Dam

Overview Map New Creek Site 1:



Location Map New Creek Site 1:



0 250 500 1,000
Feet

1 inch = 500 feet



Aerial Imagery provided by ESRI online web service.
Flood boundaries modeled by Gannett Fleming. Project Number 061371.305

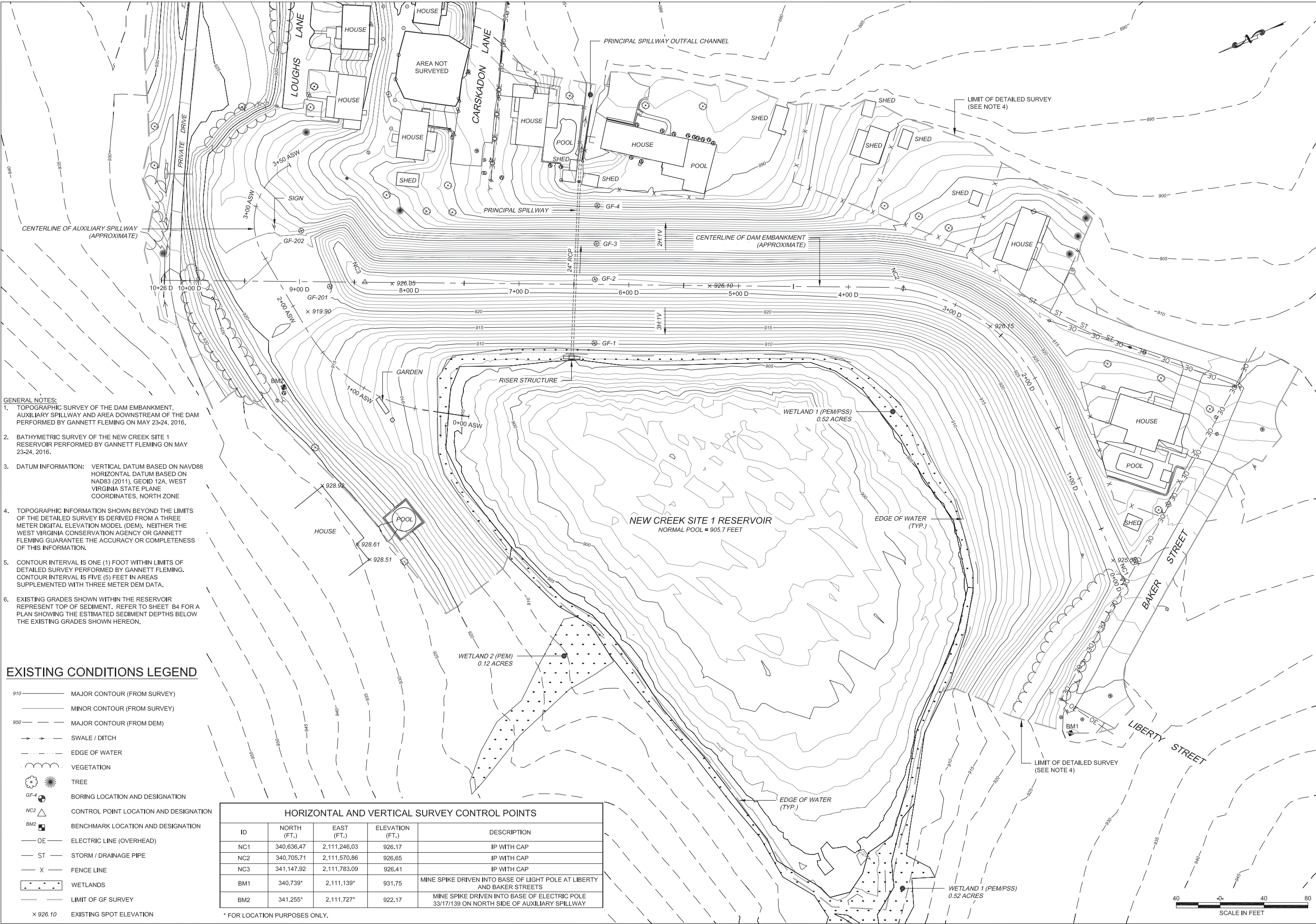
- GENERAL NOTES:
1. TOPOGRAPHIC SURVEY OF THE DAM EMBANKMENT, AUXILIARY SPILLWAY AND AREA DOWNSTREAM OF THE DAM PERFORMED BY GANNETT FLEMING ON MAY 23-24, 2016.
 2. BATHYMETRIC SURVEY OF THE NEW CREEK SITE 1 RESERVOIR PERFORMED BY GANNETT FLEMING ON MAY 23-24, 2016.
 3. DATUM INFORMATION: VERTICAL DATUM BASED ON NAVD88 HORIZONTAL DATUM BASED ON NAD83 (2011), GEOID 12A, WEST VIRGINIA STATE PLANE COORDINATES, NORTH ZONE
 4. TOPOGRAPHIC INFORMATION SHOWN BEYOND THE LIMITS OF THE DETAILED SURVEY IS DERIVED FROM A THREE METER DIGITAL ELEVATION MODEL (DEM). NEITHER THE WEST VIRGINIA CONSERVATION AGENCY OR GANNETT FLEMING GUARANTEE THE ACCURACY OR COMPLETENESS OF THIS INFORMATION.
 5. CONTOUR INTERVAL IS ONE (1) FOOT WITHIN LIMITS OF DETAILED SURVEY PERFORMED BY GANNETT FLEMING. CONTOUR INTERVAL IS FIVE (5) FEET IN AREAS SUPPLEMENTED WITH THREE METER DEM DATA.
 6. EXISTING GRADES SHOWN WITHIN THE RESERVOIR REPRESENT TOP OF SEDIMENT, REFER TO SHEET B4 FOR A PLAN SHOWING THE ESTIMATED SEDIMENT DEPTHS BELOW THE EXISTING GRADES SHOWN HEREON.

EXISTING CONDITIONS LEGEND

- 910 — MAJOR CONTOUR (FROM SURVEY)
— MINOR CONTOUR (FROM SURVEY)
950 — MAJOR CONTOUR (FROM DEM)
— SWALE / DITCH
— EDGE OF WATER
— VEGETATION
— TREE
GF-4 — BORING LOCATION AND DESIGNATION
NC2 — CONTROL POINT LOCATION AND DESIGNATION
BM2 — BENCHMARK LOCATION AND DESIGNATION
— OE — ELECTRIC LINE (OVERHEAD)
— ST — STORM / DRAINAGE PIPE
— X — FENCE LINE
— WETLANDS
— LIMIT OF GF SURVEY
x 926.10 — EXISTING SPOT ELEVATION

HORIZONTAL AND VERTICAL SURVEY CONTROL POINTS				
ID	NORTH (FT.)	EAST (FT.)	ELEVATION (FT.)	DESCRIPTION
NC1	340,636.47	2,111,246.03	926.17	IP WITH CAP
NC2	340,705.71	2,111,570.86	926.65	IP WITH CAP
NC3	341,147.92	2,111,783.09	926.41	IP WITH CAP
BM1	340,739*	2,111,139*	931.75	MINE SPIKE DRIVEN INTO BASE OF LIGHT POLE AT LIBERTY AND BAKER STREETS
BM2	341,255*	2,111,727*	922.17	MINE SPIKE DRIVEN INTO BASE OF ELECTRIC POLE 33/17/139 ON NORTH SIDE OF AUXILIARY SPILLWAY

* FOR LOCATION PURPOSES ONLY.



NEW CREEK WATERSHED PROJECT
FLOOD CONTROL DAM
NEW CREEK SITE 1 REHABILITATION PLAN AND ENVIRONMENTAL ASSESSMENT
MINERAL COUNTY, WEST VIRGINIA

Appendix C - Figure 10A
EXISTING CONDITIONS PLAN

File No.

Drawing No.

Sheet 1 of 4

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

Designed: WCH
Drawn: WCH
Checked: ECN
Approved: PGS
Approved: _____

Date:
MAY 2017
MAY 2017
MAY 2017
MAY 2017

\\V\20\active_jobs\5071 - WV\CVS\Working\New Creek\1\0\0\DD\Design Set\Existing Plan with UAS Image.dwg
Plotted By: Helenbach, Wesley C., Plot Date: 5/7/2017 3:05 PM



- GENERAL NOTES:
1. TOPOGRAPHIC SURVEY OF THE DAM EMBANKMENT, AUXILIARY SPILLWAY AND AREA DOWNSTREAM OF THE DAM PERFORMED BY GANNETT FLEMING ON MAY 23-24, 2016.
 2. BATHYMETRIC SURVEY OF THE NEW CREEK SITE 1 RESERVOIR PERFORMED BY GANNETT FLEMING ON MAY 23-24, 2016.
 3. DATUM INFORMATION: VERTICAL DATUM BASED ON NAVD88 HORIZONTAL DATUM BASED ON NAD83 (2011), GEOID 12A, WEST VIRGINIA STATE PLANE COORDINATES, NORTH ZONE
 4. TOPOGRAPHIC INFORMATION SHOWN BEYOND THE LIMITS OF THE DETAILED SURVEY IS DERIVED FROM A THREE METER DIGITAL ELEVATION MODEL (DEM). NEITHER THE WEST VIRGINIA CONSERVATION AGENCY OR GANNETT FLEMING GUARANTEE THE ACCURACY OR COMPLETENESS OF THIS INFORMATION.
 5. CONTOUR INTERVAL IS ONE (1) FOOT WITHIN LIMITS OF DETAILED SURVEY PERFORMED BY GANNETT FLEMING. CONTOUR INTERVAL IS FIVE (5) FEET IN AREAS SUPPLEMENTED WITH THREE METER DEM DATA.
 6. EXISTING GRADES SHOWN WITHIN THE RESERVOIR REPRESENT TOP OF SEDIMENT. REFER TO SHEET B4 FOR A PLAN SHOWING THE ESTIMATED SEDIMENT DEPTHS BELOW THE EXISTING GRADES SHOWN HEREON.

EXISTING CONDITIONS LEGEND

- 910 MAJOR CONTOUR (FROM SURVEY)
- MINOR CONTOUR (FROM SURVEY)
- 950 MAJOR CONTOUR (FROM DEM)
- SWALE / DITCH
- EDGE OF WATER
- VEGETATION
- TREE
- GF-4 BORING LOCATION AND DESIGNATION
- NC2 CONTROL POINT LOCATION AND DESIGNATION
- BM2 BENCHMARK LOCATION AND DESIGNATION
- OE ELECTRIC LINE (OVERHEAD)
- ST STORM / DRAINAGE PIPE
- X FENCE LINE
- WETLANDS
- LIMIT OF GF SURVEY
- X 926.10 EXISTING SPOT ELEVATION

HORIZONTAL AND VERTICAL SURVEY CONTROL POINTS				
ID	NORTH (FT.)	EAST (FT.)	ELEVATION (FT.)	DESCRIPTION
NC1	340,636.47	2,111,246.03	926.17	IP WITH CAP
NC2	340,705.71	2,111,570.86	926.65	IP WITH CAP
NC3	341,147.92	2,111,783.09	926.41	IP WITH CAP
BM1	340,739*	2,111,139*	931.75	MINE SPIKE DRIVEN INTO BASE OF LIGHT POLE AT LIBERTY AND BAKER STREETS
BM2	341,255*	2,111,727*	922.17	MINE SPIKE DRIVEN INTO BASE OF ELECTRIC POLE 33/17/139 ON NORTH SIDE OF AUXILIARY SPILLWAY

* FOR LOCATION PURPOSES ONLY.

WCH

DESIGNED

WCH

DRAWN

ECN

CHECKED

PGS

APPROVED

APPROVED

DATE

MAY 2017

DATE

MAY 2017

DATE

MAY 2017

DATE

MAY 2017

DATE

MAY 2017

NEW CREEK WATERSHED PROJECT
FLOOD CONTROL DAM
NEW CREEK SITE 1 REHABILITATION PLAN AND ENVIRONMENTAL ASSESSMENT
MINERAL COUNTY, WEST VIRGINIA

Appendix C - Figure 10B

EXISTING CONDITIONS PLAN WITH UAS ORTHO

NRCS

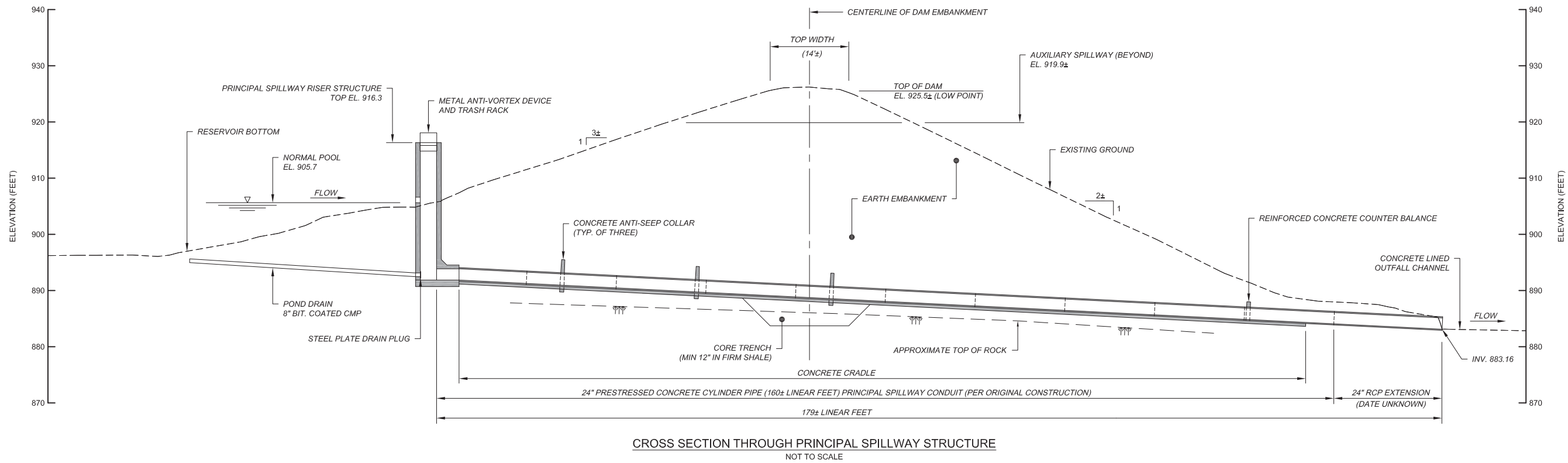
Natural Resources Conservation Service
United States Department of Agriculture

File No.

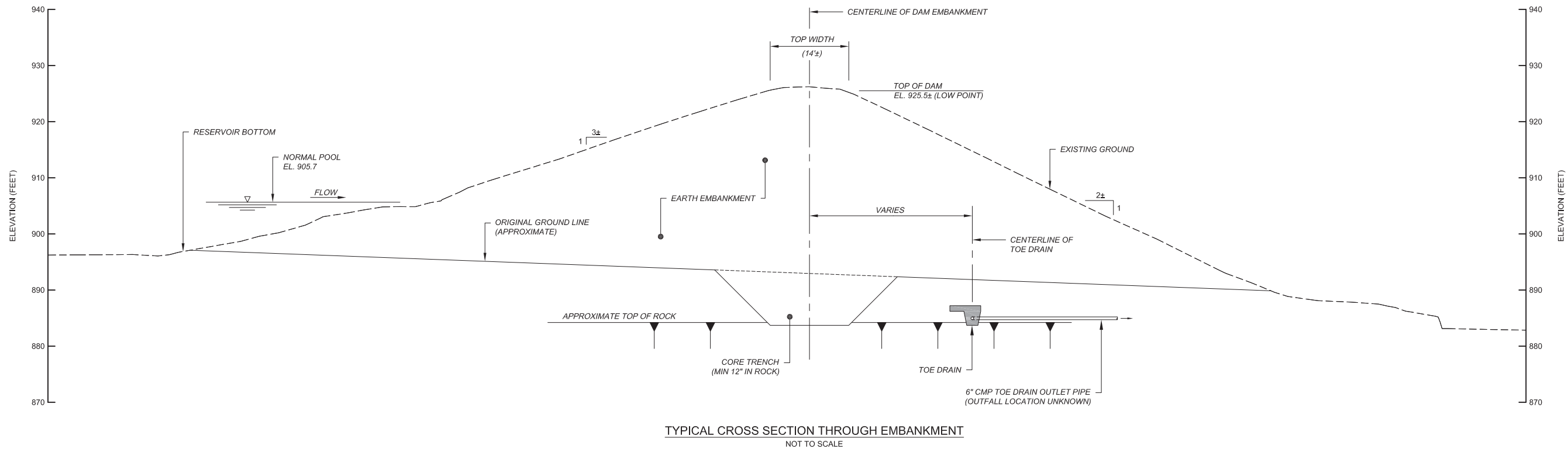
Drawing No.
B2

Sheet 2 of 4

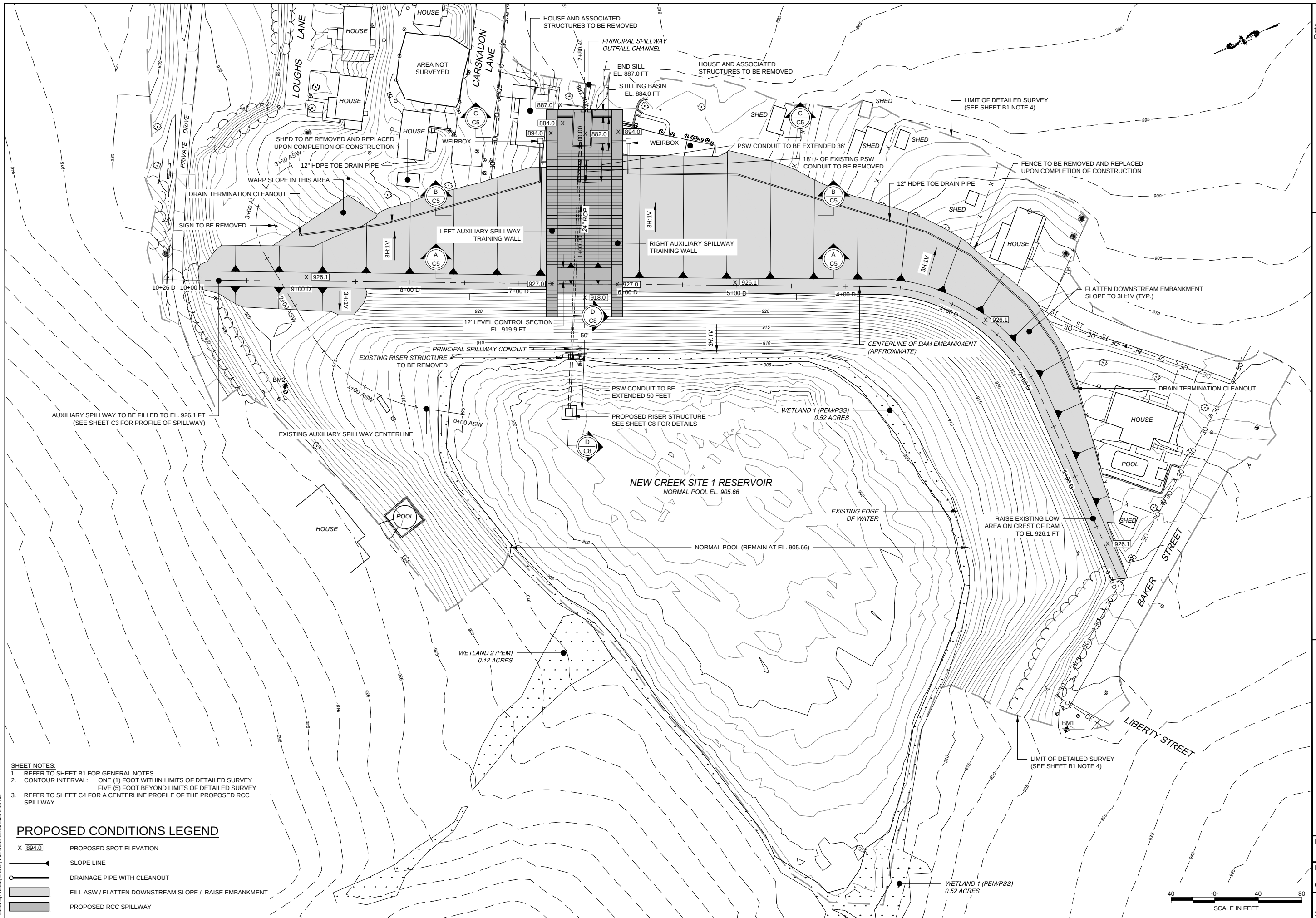
\\s025\caddes_jobs\610371 - MNC\0505 Working\New Creek - I\CADD\Design Set\Existing Floodway
Plotted By: Holmabach, Wesley C., Plot Date: 9/7/2017 3:06 PM



CROSS SECTION THROUGH PRINCIPAL SPILLWAY STRUCTURE
NOT TO SCALE



TYPICAL CROSS SECTION THROUGH EMBANKMENT
NOT TO SCALE



PROPOSED CONDITIONS LEGEND

W:\4261061371-WVCA\05 Working\New Creek 1\CADD\Design Set\Proposed Conditions Plan - New Concrete Spillway.dwg

NEW CREEK WATERSHED PROJECT
FLOOD CONTROL DAM
NEW CREEK SITE 1 REHABILITATION PLAN AND ENVIRONMENTAL ASSESSMENT
MINERAL COUNTY, WEST VIRGINIA

APPENDIX C - FIGURE 11A

PROPOSED CONDITIONS PLAN (PREFERRED ALTERNATIVE)

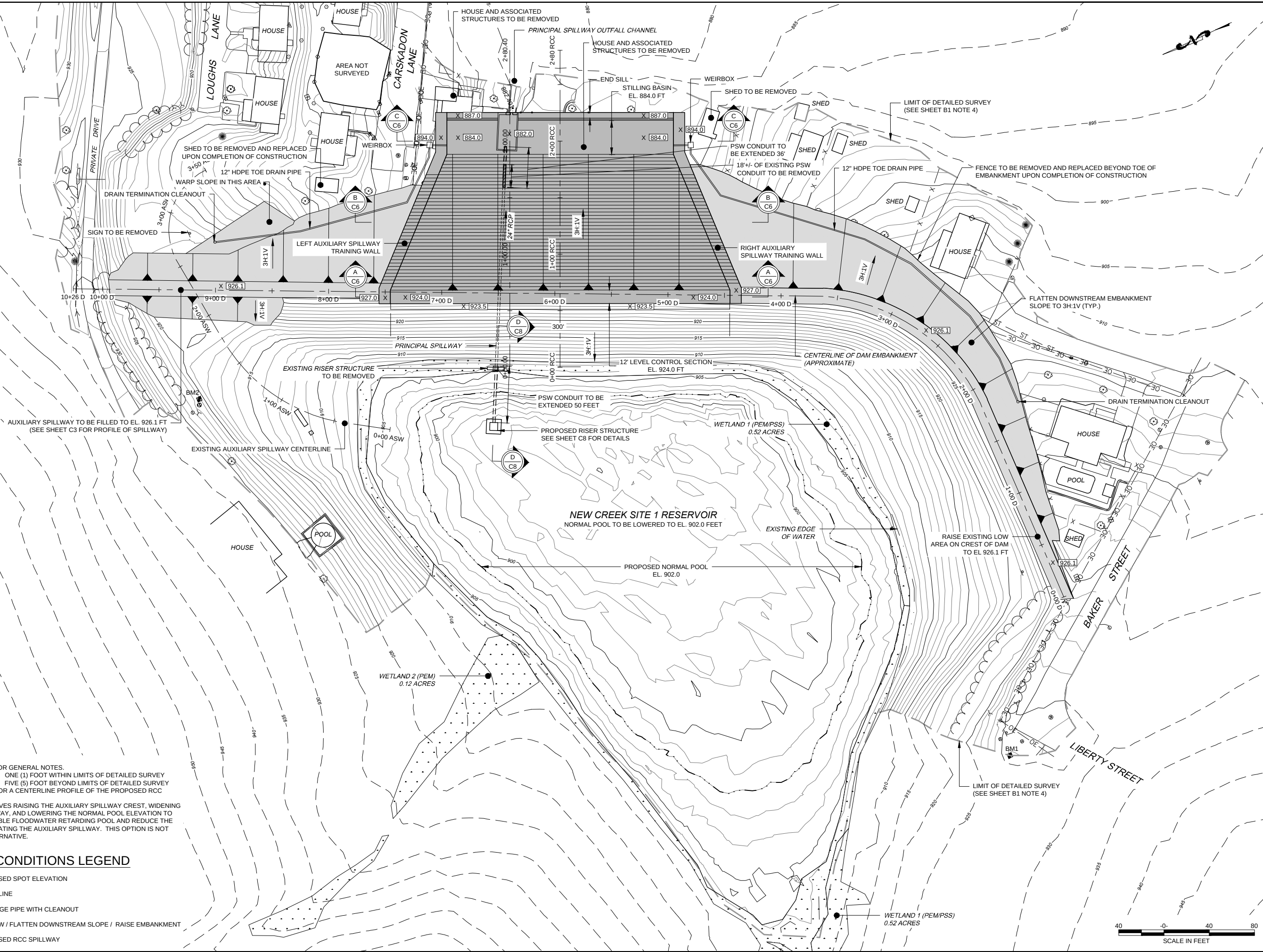
File No.
Drawing No.
C1
Sheet 1 of 10

\\V02050371\NVCASE\Working\New Creek\1\CAD\Design_Sett\Proposed Conditions Plan - New Concrete Spillway.dwg
Plotted By: Nestor, Eric C., Plot Date: 12/01/2021 9:25 AM

- SHEET NOTES:
1. REFER TO SHEET B1 FOR GENERAL NOTES.
 2. CONTOUR INTERVAL: ONE (1) FOOT WITHIN LIMITS OF DETAILED SURVEY
FIVE (5) FOOT BEYOND LIMITS OF DETAILED SURVEY
 3. REFER TO SHEET C4 FOR A CENTERLINE PROFILE OF THE PROPOSED RCC SPILLWAY.
 4. OPTION SHOWN INVOLVES RAISING THE AUXILIARY SPILLWAY CREST, WIDENING THE AUXILIARY SPILLWAY, AND LOWERING THE NORMAL POOL ELEVATION TO INCREASE THE AVAILABLE FLOODWATER RETARDING POOL AND REDUCE THE FREQUENCY OF ACTIVATING THE AUXILIARY SPILLWAY. THIS OPTION IS NOT THE PREFERRED ALTERNATIVE.

PROPOSED CONDITIONS LEGEND

- | | |
|-----------|--|
| X [894.0] | PROPOSED SPOT ELEVATION |
| —▲— | SLOPE LINE |
| —○— | DRAINAGE PIPE WITH CLEANOUT |
| ■ | FILL ASW / FLATTEN DOWNSTREAM SLOPE / RAISE EMBANKMENT |
| ■ | PROPOSED RCC SPILLWAY |



Date	---	MAY 2017	---	MAY 2017	---	MAY 2020	---	MAY 2020
Designed	WCH	---	WCH	---	ECN	---	PGS	---
Drawn	---	---	---	---	---	---	---	---
Checked	---	---	---	---	---	---	---	---
Approved	---	---	---	---	---	---	---	---

NEW CREEK WATERSHED PROJECT
FLOOD CONTROL DAM
NEW CREEK SITE 1 REHABILITATION PLAN AND ENVIRONMENTAL ASSESSMENT
MINERAL COUNTY, WEST VIRGINIA

APPENDIX C - FIGURE 11B

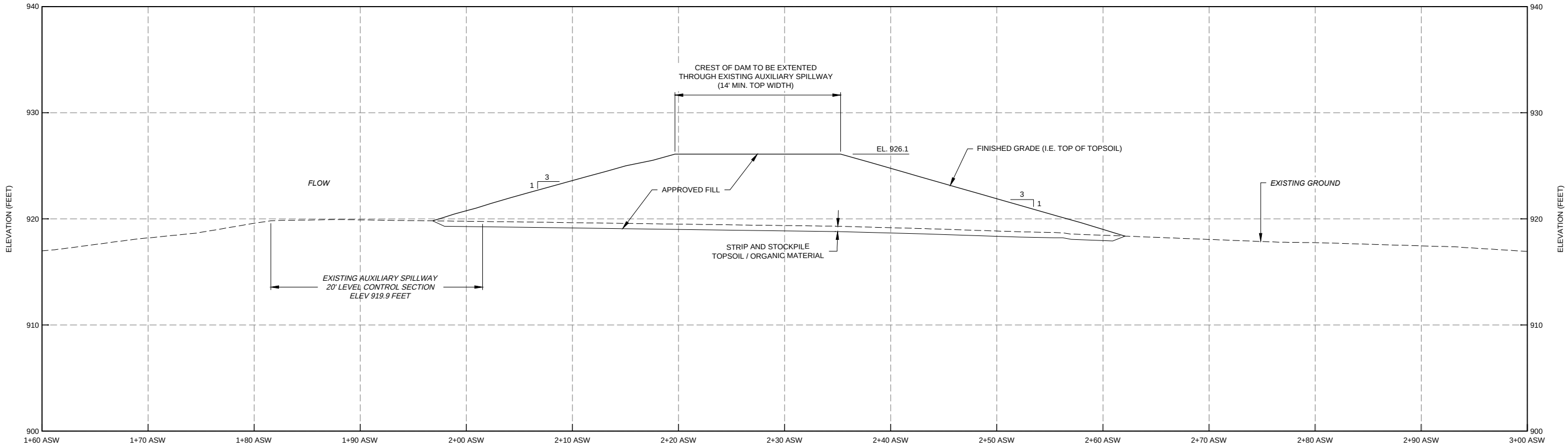
PROPOSED CONDITIONS PLAN-RAISED AND WIDENED SPILLWAY



Natural Resources Conservation Service
United States Department of Agriculture

File No.
Drawing No. C2
Sheet 2 of 10

\\V020\drive_b\hds\071 - MDC\MS Windows\New Creek\1CADD\Design SelfProposed Conditions Plan - New Concrete Spillway.dwg
Plotted By: Nestl, Eric C., Plot Date: 5/3/2020 11:03 AM



PROFILE ALONG CENTERLINE OF EXISTING AUXILIARY SPILLWAY
(OPTIONS 1, 2 AND 3)
SCALE: 1" = 5'

SHEET NOTES:
1. PROFILE SHOWN IS ALONG THE CENTERLINE OF THE EXISTING AUXILIARY SPILLWAY.
DAM CREST WIDTH AND 3H:1V SLOPES SHOWN ARE MEASURED PERPENDICULAR TO
THE CENTERLINE OF THE DAM CREST.



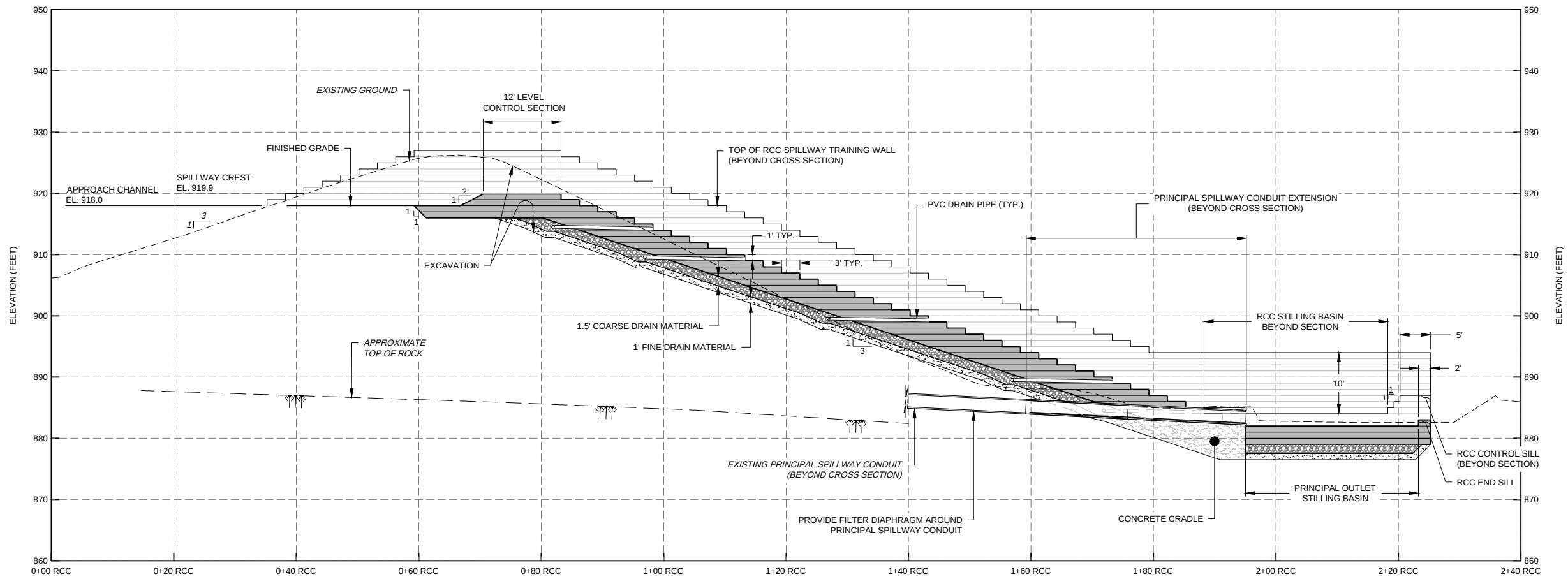
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Checked	ECN	---	---	---	---		MAY 2020
Approved	PGS	---	---	---	---		MAY 2020
Approved	---	---	---	---	---		---

NEW CREEK WATERSHED PROJECT
FLOOD CONTROL DAM
NEW CREEK SITE 1 REHABILITATION PLAN AND ENVIRONMENTAL ASSESSMENT
MINERAL COUNTY, WEST VIRGINIA
Appendix C - Figure 11C
PROPOSED PROFILE OF PREVIOUS AUXILIARY SPILLWAY



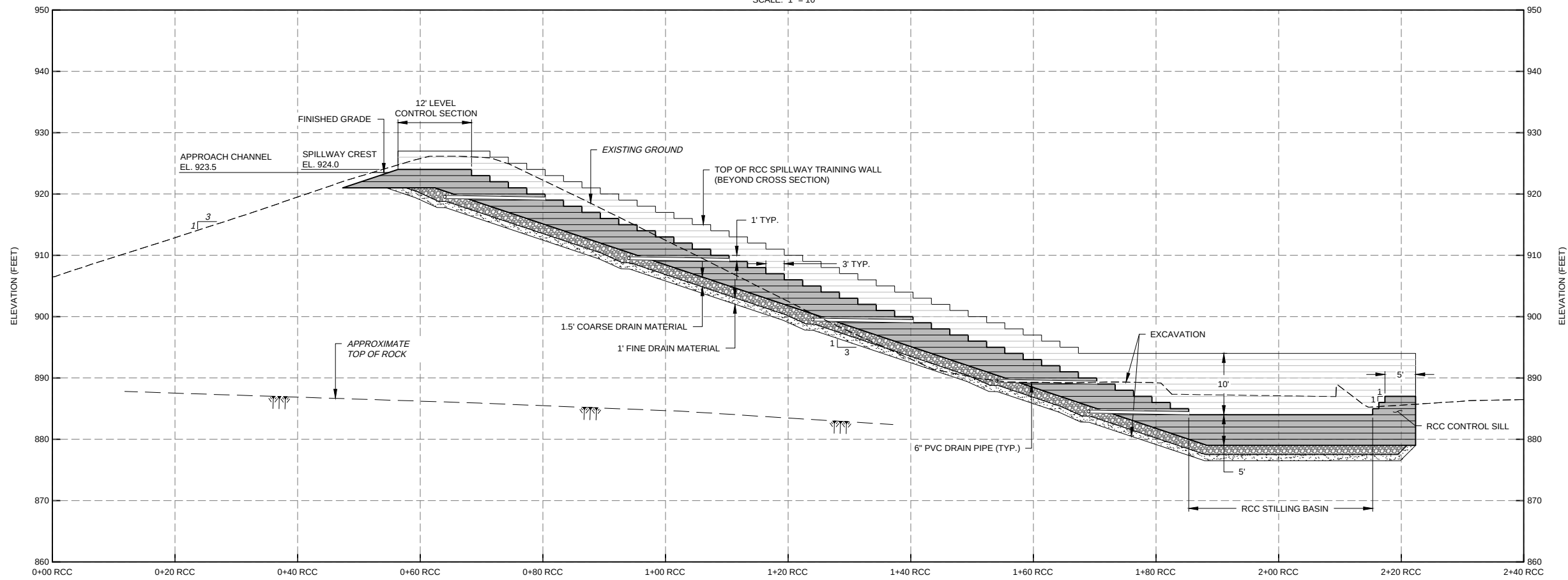
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Drawing No.
C3
Sheet 3 of 10

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Plotted By: Nest, Eric C., Plot Date: 5/2/2020 11:03 AM



PROFILE OF PROPOSED RCC SPILLWAY CENTERLINE
(OPTIONS 1 AND 2)

SCALE: 1" = 10'



PROFILE OF PROPOSED RCC SPILLWAY CENTERLINE
(OPTION 3)

SCALE: 1" = 10'



Date	MAY 2017
Designed	WCH
Drawn	WCH
Checked	ECN
Approved	PGS
Approved	---

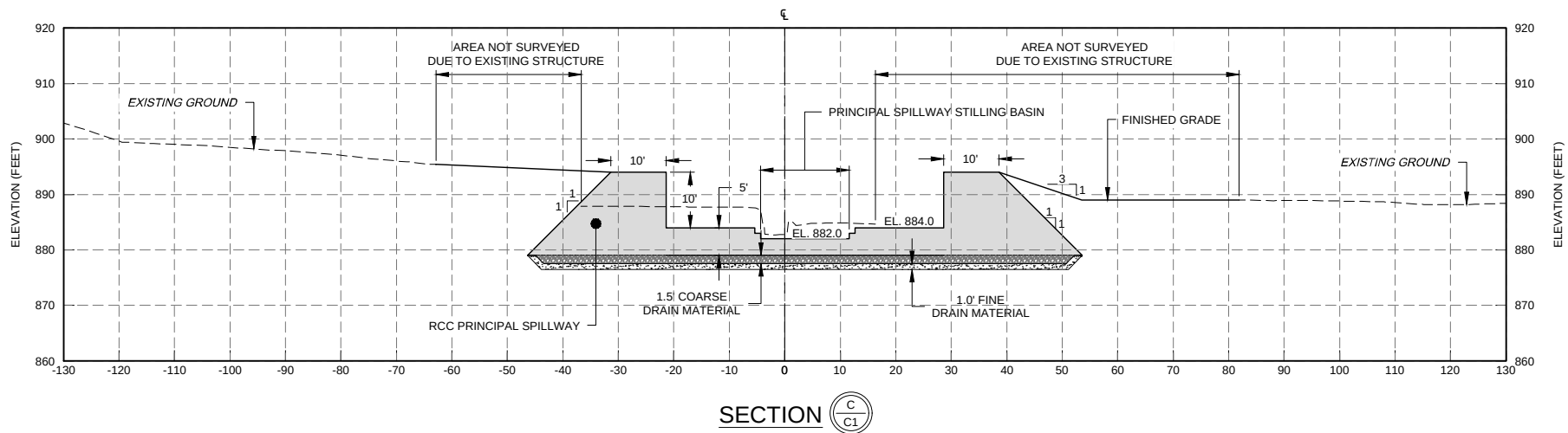
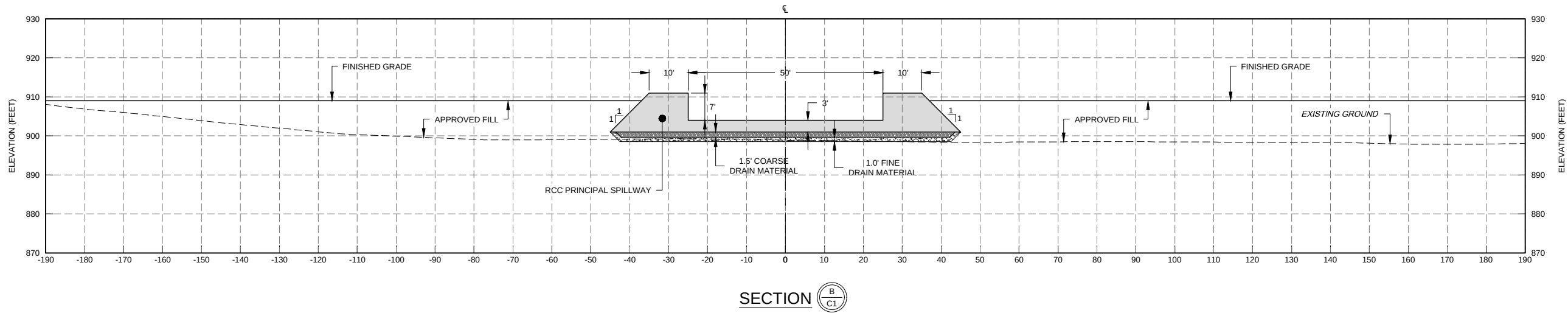
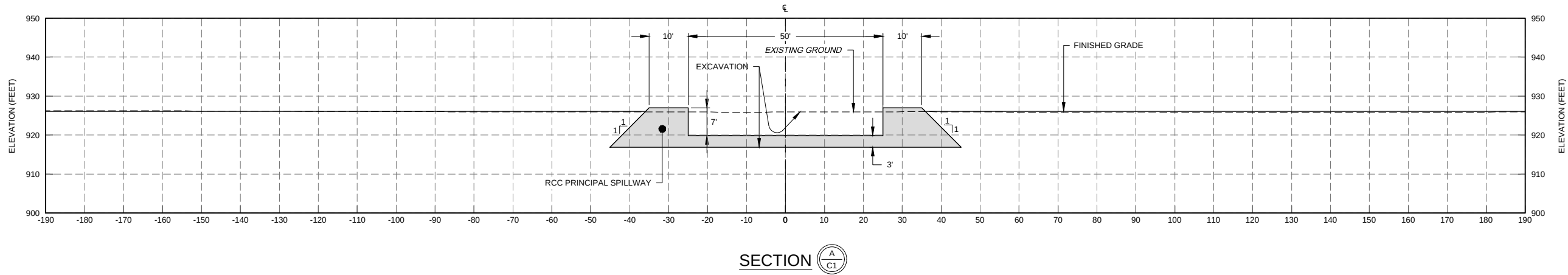
NEW CREEK WATERSHED PROJECT
FLOOD CONTROL DAM
NEW CREEK SITE 1 REHABILITATION PLAN AND ENVIRONMENTAL ASSESSMENT
MINERAL COUNTY, WEST VIRGINIA

Appendix C - Figure 11D
PROPOSED SPILLWAY PROFILE



File No.
Drawing No.
C4
Sheet 4 of 10

\\C05051371\N\CAD\SS Working\New Creek\1\CAD\Design Set\Proposed Conditions Plan - New Concrete Spillway.dwg
Plotted By: Nestor, Eric C., Plot Date: 12/02/2021 9:33 AM



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Checked	ECN		MAY 2020
Approved	PGS		MAY 2020
Approved			

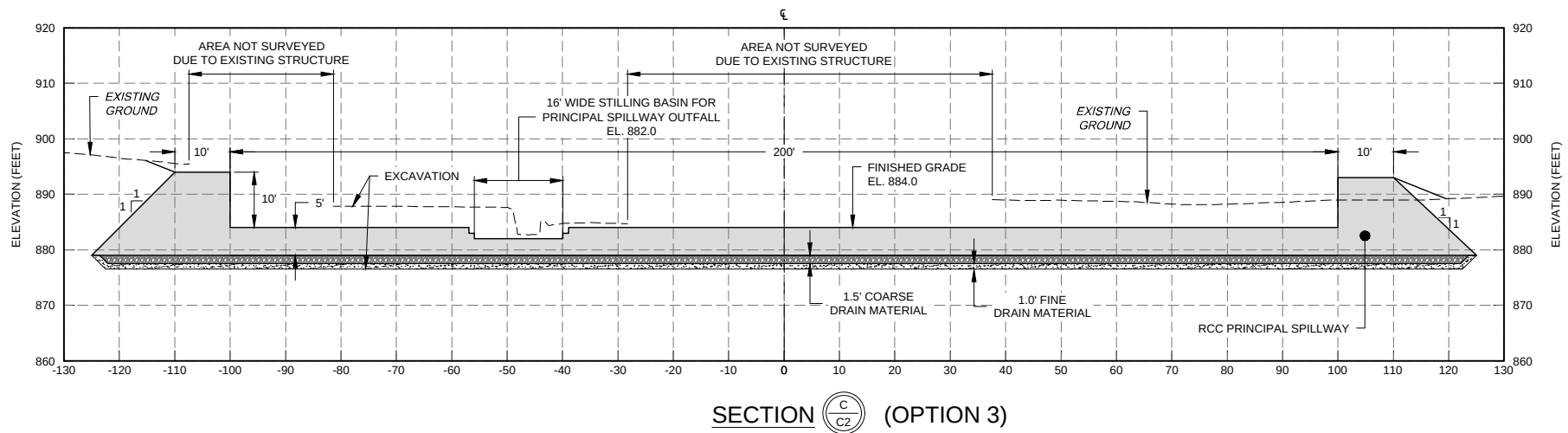
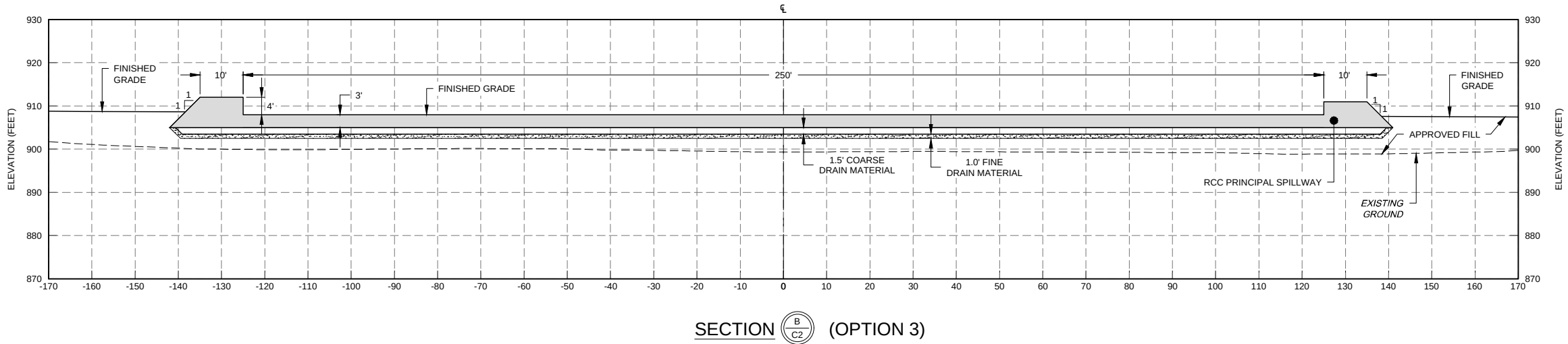
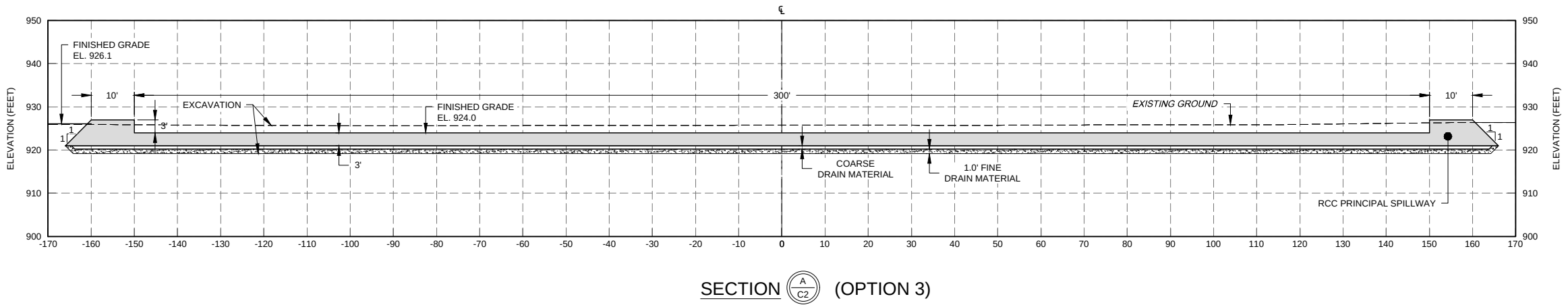
NEW CREEK WATERSHED PROJECT
FLOOD CONTROL DAM
NEW CREEK SITE 1 REHABILITATION PLAN AND ENVIRONMENTAL ASSESSMENT
MINERAL COUNTY, WEST VIRGINIA

APPENDIX C - FIGURE 11E
PROPOSED SPILLWAY SECTIONS - PREFERRED ALTERNATIVE



File No.
Drawing No.
C5
Sheet 5 of 10

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Plotted By: Nestor, Eric C., Plot Date: 12/02/2021 9:40 AM



SHEET NOTES:
1. OPTION SHOWN INVOLVES RAISING THE AUXILIARY SPILLWAY CREST, WIDENING THE AUXILIARY SPILLWAY, AND LOWERING THE NORMAL POOL ELEVATION TO INCREASE THE AVAILABLE FLOODWATER RETARDING POOL AND REDUCE THE FREQUENCY OF ACTIVATING THE AUXILIARY SPILLWAY. THIS OPTION IS NOT THE PREFERRED ALTERNATIVE.



Date	DESIGNED	WCH	MAY 2017
Drawn	WCH	MAY 2017	
Checked	ECN	MAY 2020	
Approved	PGS	MAY 2020	
Approved			

NEW CREEK WATERSHED PROJECT
FLOOD CONTROL DAM
NEW CREEK SITE 1 REHABILITATION PLAN AND ENVIRONMENTAL ASSESSMENT
MINERAL COUNTY, WEST VIRGINIA

APPENDIX C - FIGURE 11F

PROPOSED SPILLWAY SECTIONS-RAISED & WIDENED SPILLWAY

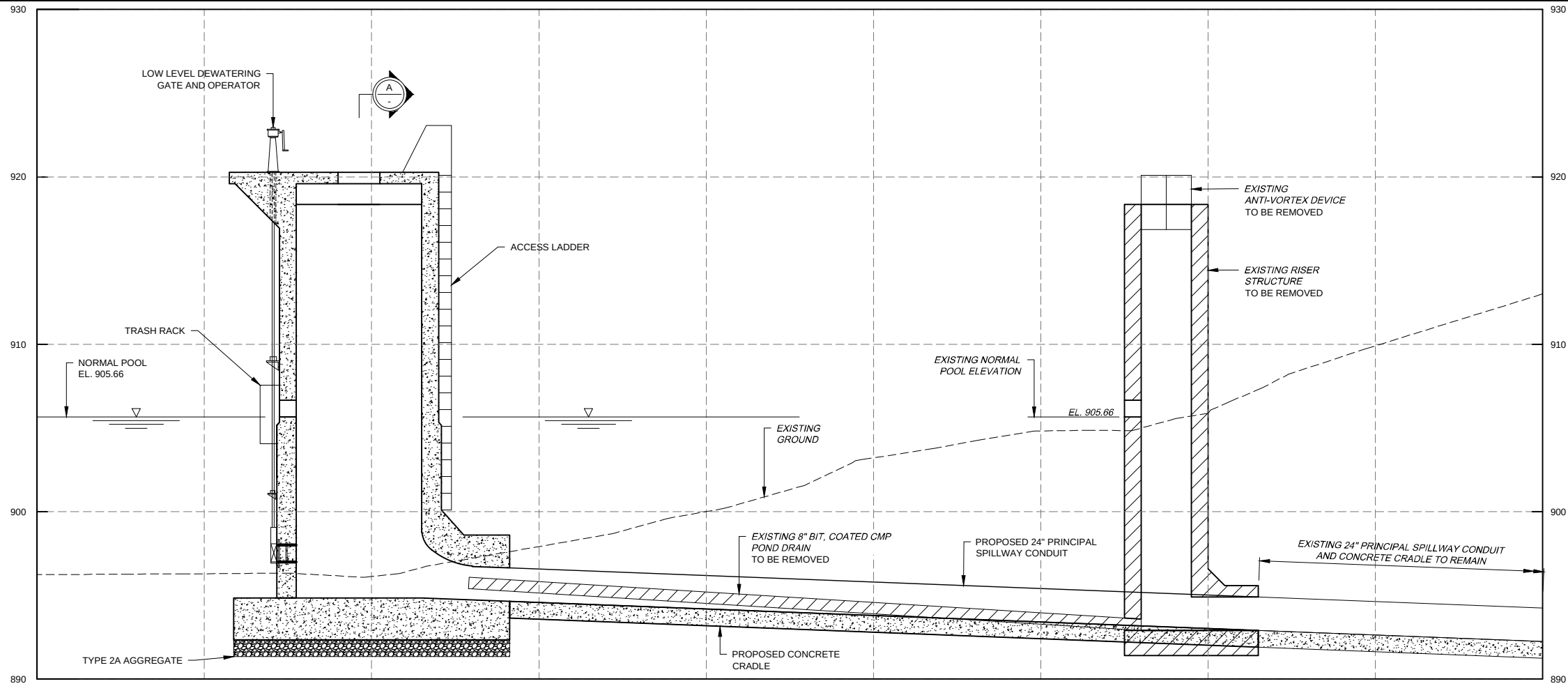


File No.
Drawing No.
C6
Sheet 6 of 10

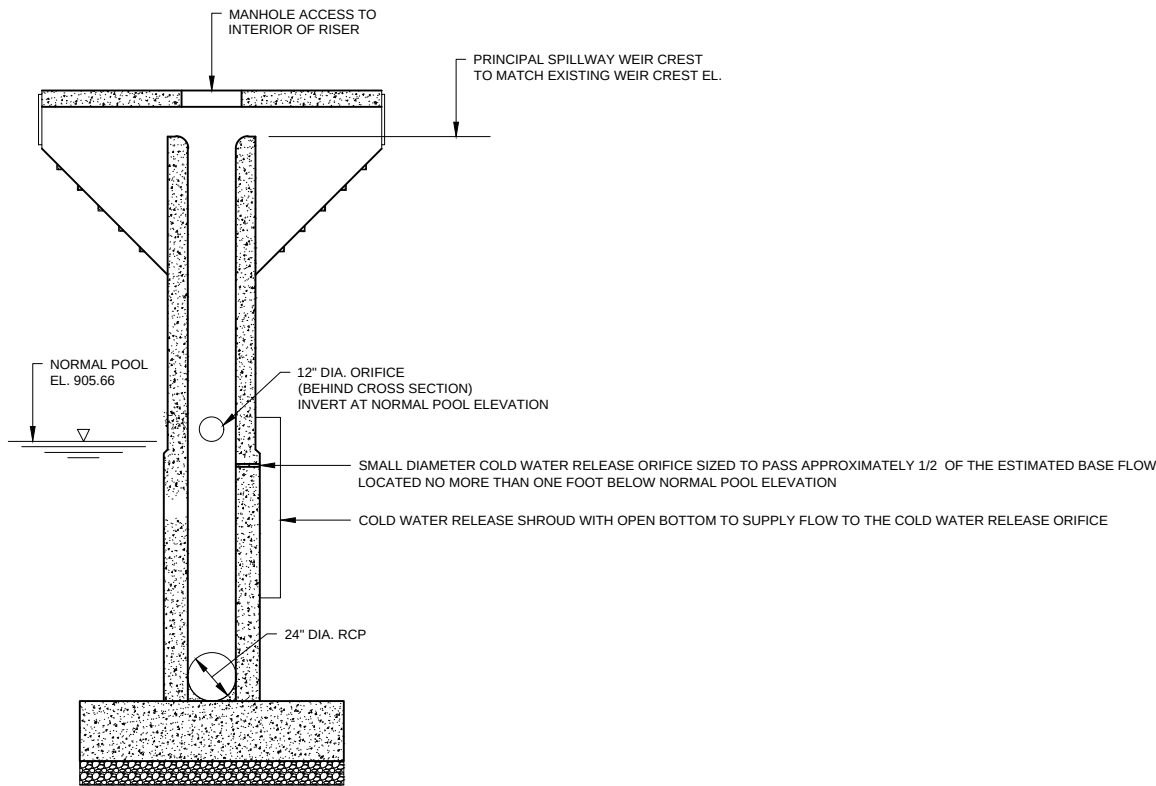


SCALE: 1" = 5'

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Plotted By: Nestor, Eric C., Plot Date: 12/20/2021 10:50 AM



SECTION D
C1 SECTION D
C2
(SEE NOTE 1)



SECTION A

SHEET NOTES:
1. PROPOSED RISER SECTIONS AND DETAILS SHOWN REPRESENT THE PREFERRED ALTERNATIVE SHOWN ON SHEET C1 (FIGURE 11A). FOR THE RAISED AND WIDENED AUXILIARY SPILLWAY OPTION SHOWN ON SHEET C2 (FIGURE 11B), THE NORMAL POOL ORIFICE WOULD BE LOWERED TO EL. 902.0 AND THE COLD WATER RELEASE SYSTEM WOULD BE LOWERED ACCORDINGLY.



Designed	WCH	Date	MAY 2017
Drawn	WCH		MAY 2017
Checked	ECN		MAY 2020
Approved	PGS		MAY 2020
Approved			

NEW CREEK WATERSHED PROJECT
FLOOD CONTROL DAM
NEW CREEK SITE 1 REHABILITATION PLAN AND ENVIRONMENTAL ASSESSMENT
MINERAL COUNTY, WEST VIRGINIA
APPENDIX C - FIGURE 11H
RISER DETAILS - PREFERRED ALTERNATIVE



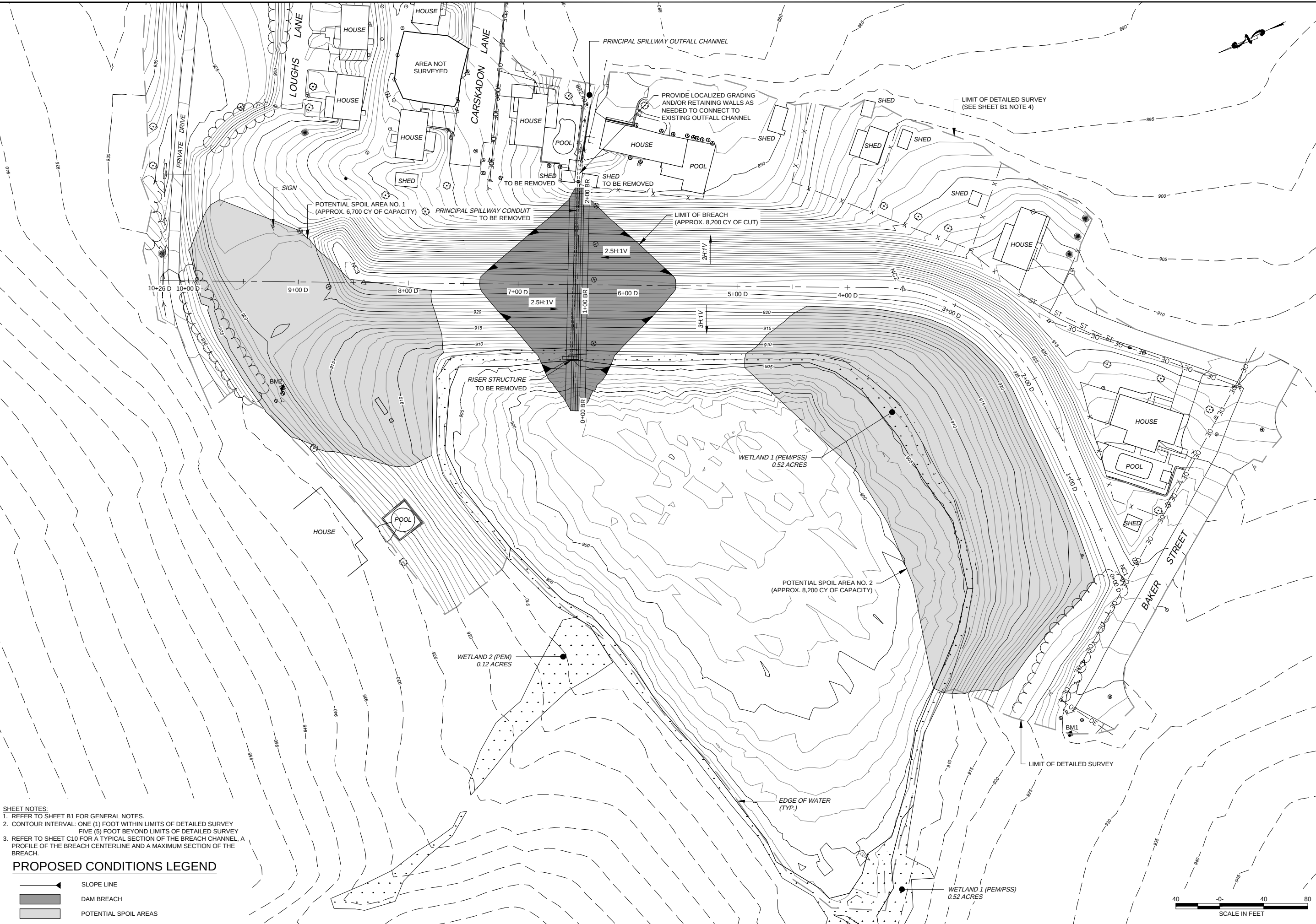
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Drawing No.
C8
Sheet 8 of 10

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Plotted By: Neale, Eric C., Plot Date: 5/2/2020 11:14 AM

- SHEET NOTES:
1. REFER TO SHEET B1 FOR GENERAL NOTES.
 2. CONTOUR INTERVAL: ONE (1) FOOT WITHIN LIMITS OF DETAILED SURVEY
FIVE (5) FOOT BEYOND LIMITS OF DETAILED SURVEY
 3. REFER TO SHEET C10 FOR A TYPICAL SECTION OF THE BREACH CHANNEL, A
PROFILE OF THE BREACH CENTERLINE AND A MAXIMUM SECTION OF THE
BREACH.

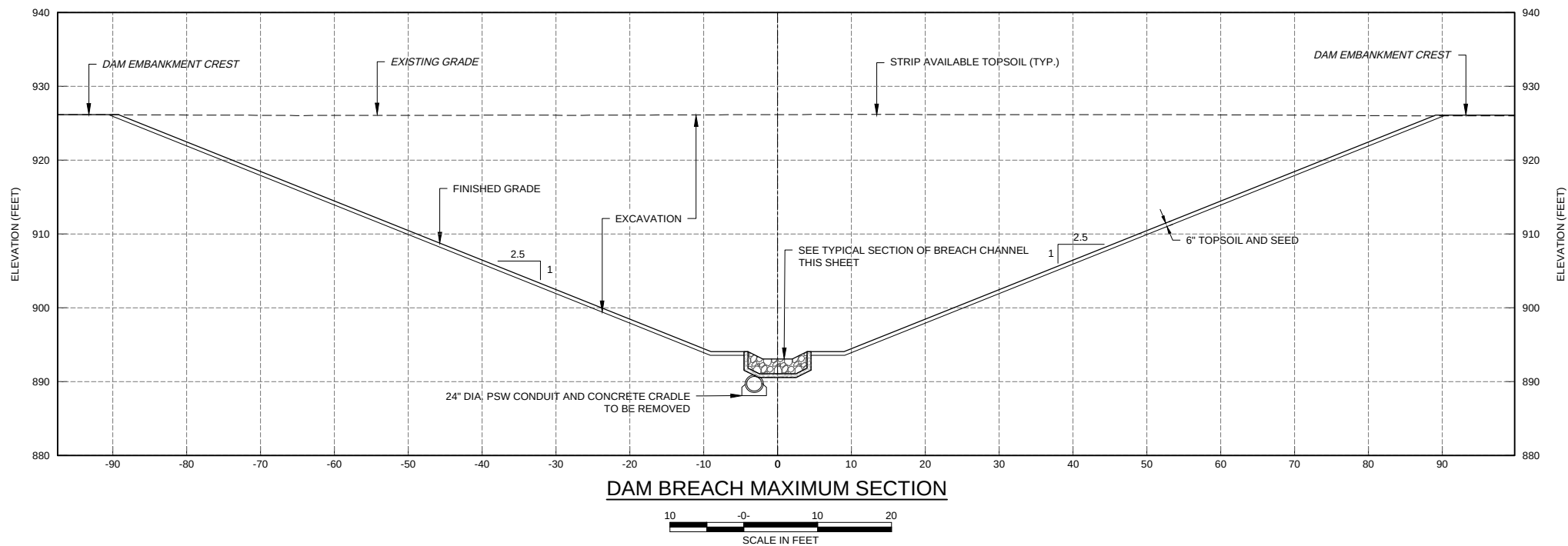
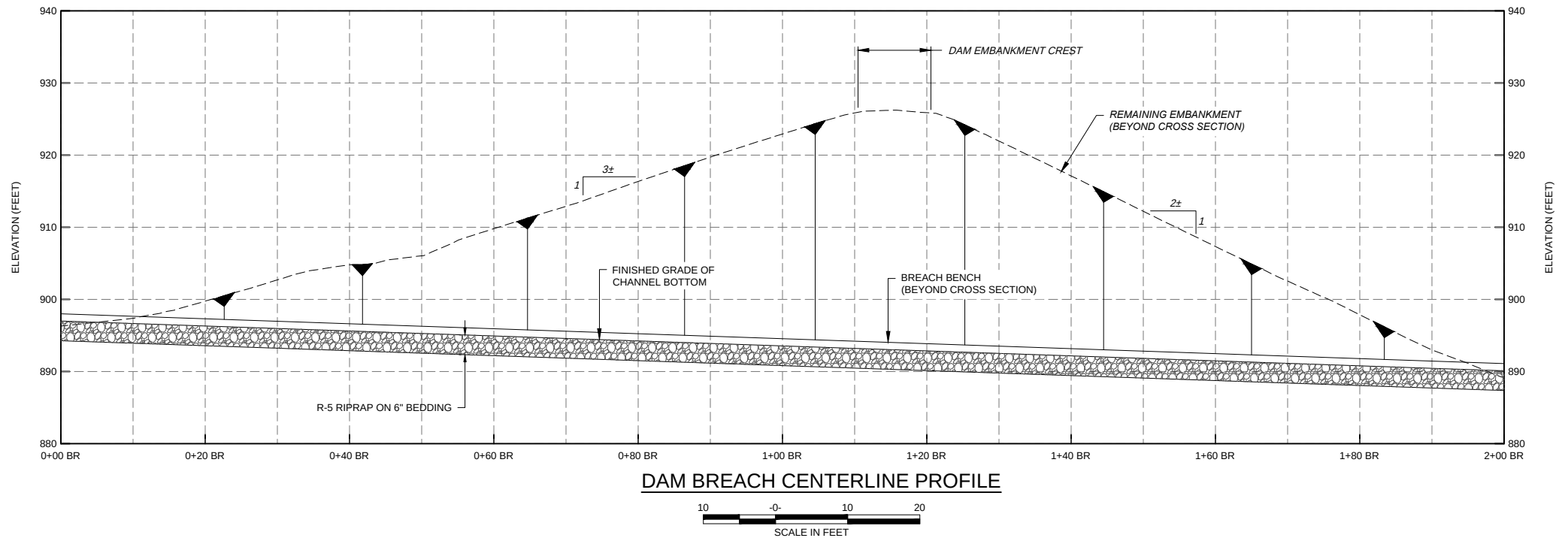
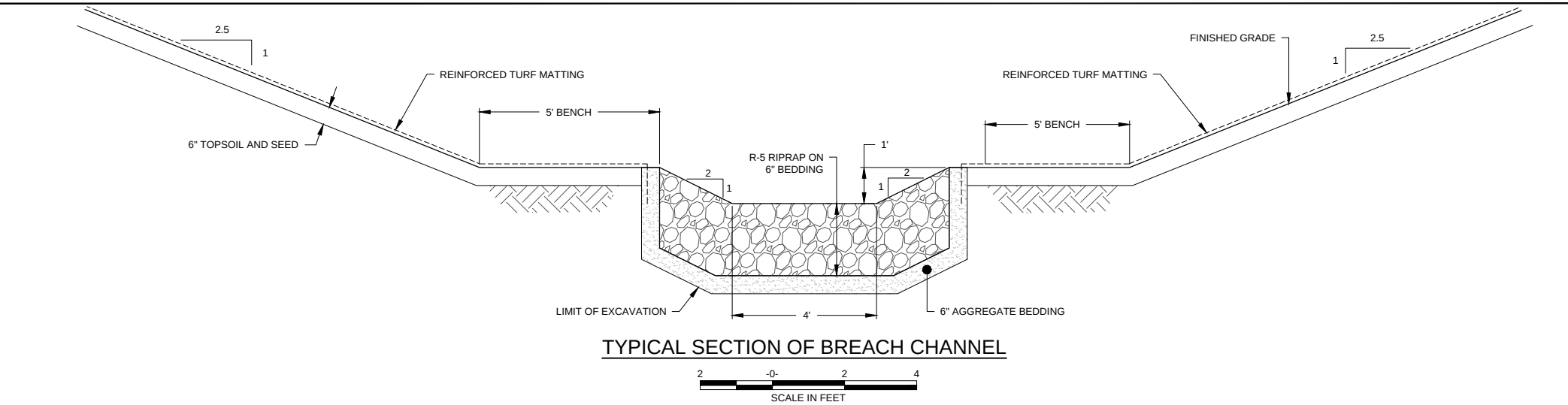
PROPOSED CONDITIONS LEGEND

- SLOPE LINE
- DAM BREACH
- POTENTIAL SPOIL AREAS



NEW CREEK WATERSHED PROJECT FLOOD CONTROL DAM NEW CREEK SITE 1 REHABILITATION PLAN AND ENVIRONMENTAL ASSESSMENT MINERAL COUNTY, WEST VIRGINIA	Date	MAY 2017
	Designed	WCH
	Drawn	WCH
	Checked	ECN
	Approved	PGS
Appendix C - Figure 111 DAM BREACH PLAN	Date	MAY 2017
	Designed	WCH
	Drawn	WCH
	Checked	ECN
	Approved	PGS
NRCS Natural Resources Conservation Service United States Department of Agriculture	File No.	
	Drawing No.	C9
	Sheet	9 of 10

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Plotted By: Nestor, Eric C., Plot Date: 5/3/2020 11:15 AM



Designed	WCH	Date	MAY 2017
Drawn	WCH	Date	MAY 2017
Checked	ECN	Date	MAY 2020
Approved	PGS	Date	MAY 2020
Approved		Date	

NEW CREEK WATERSHED PROJECT
FLOOD CONTROL DAM
NEW CREEK SITE 1 REHABILITATION PLAN AND ENVIRONMENTAL ASSESSMENT
MINERAL COUNTY, WEST VIRGINIA

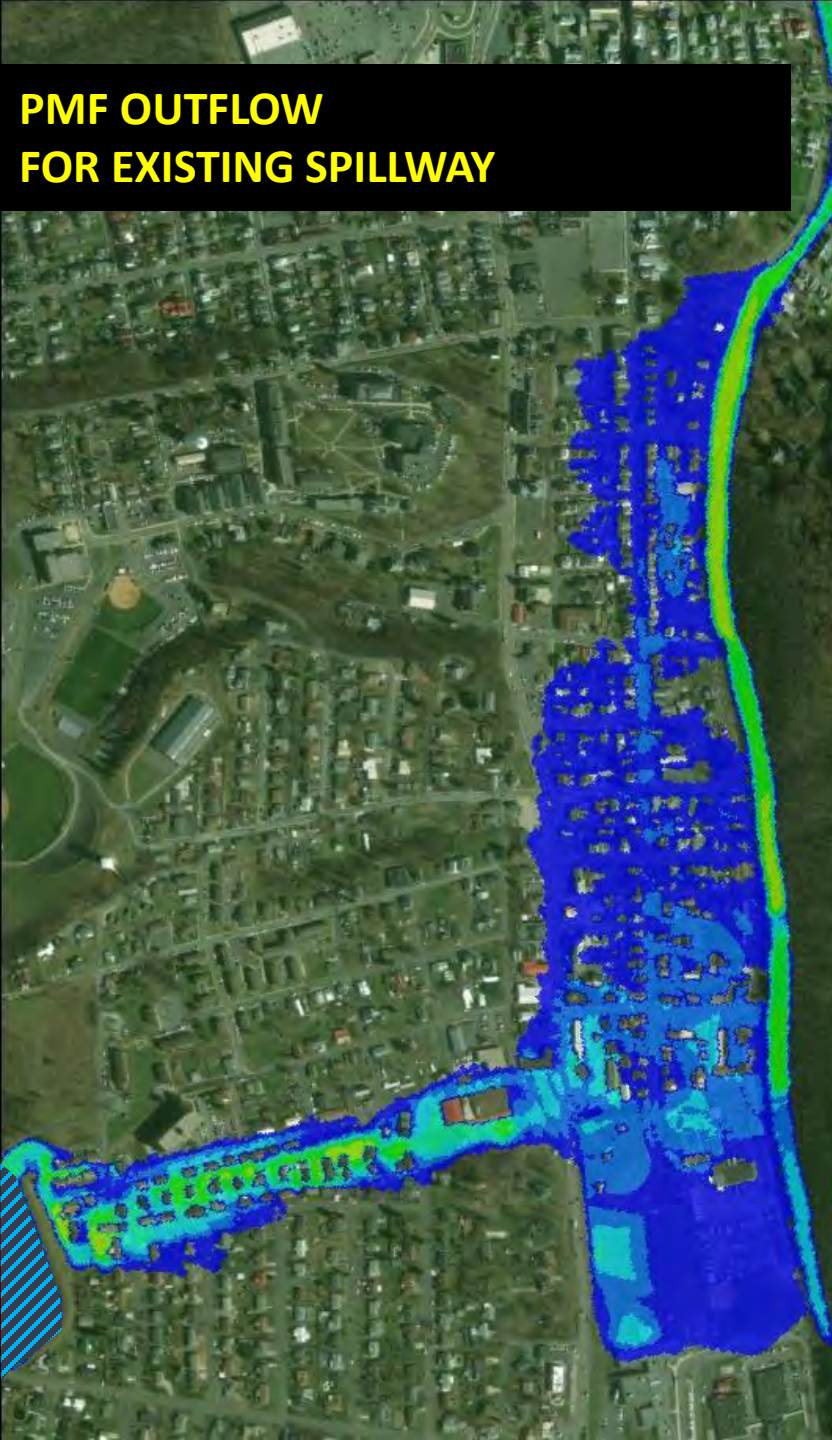
Appendix C - Figure 11J

DAM BREACH PROFILE AND SECTIONS



File No.
Drawing No.
C10
Sheet 10 of 10

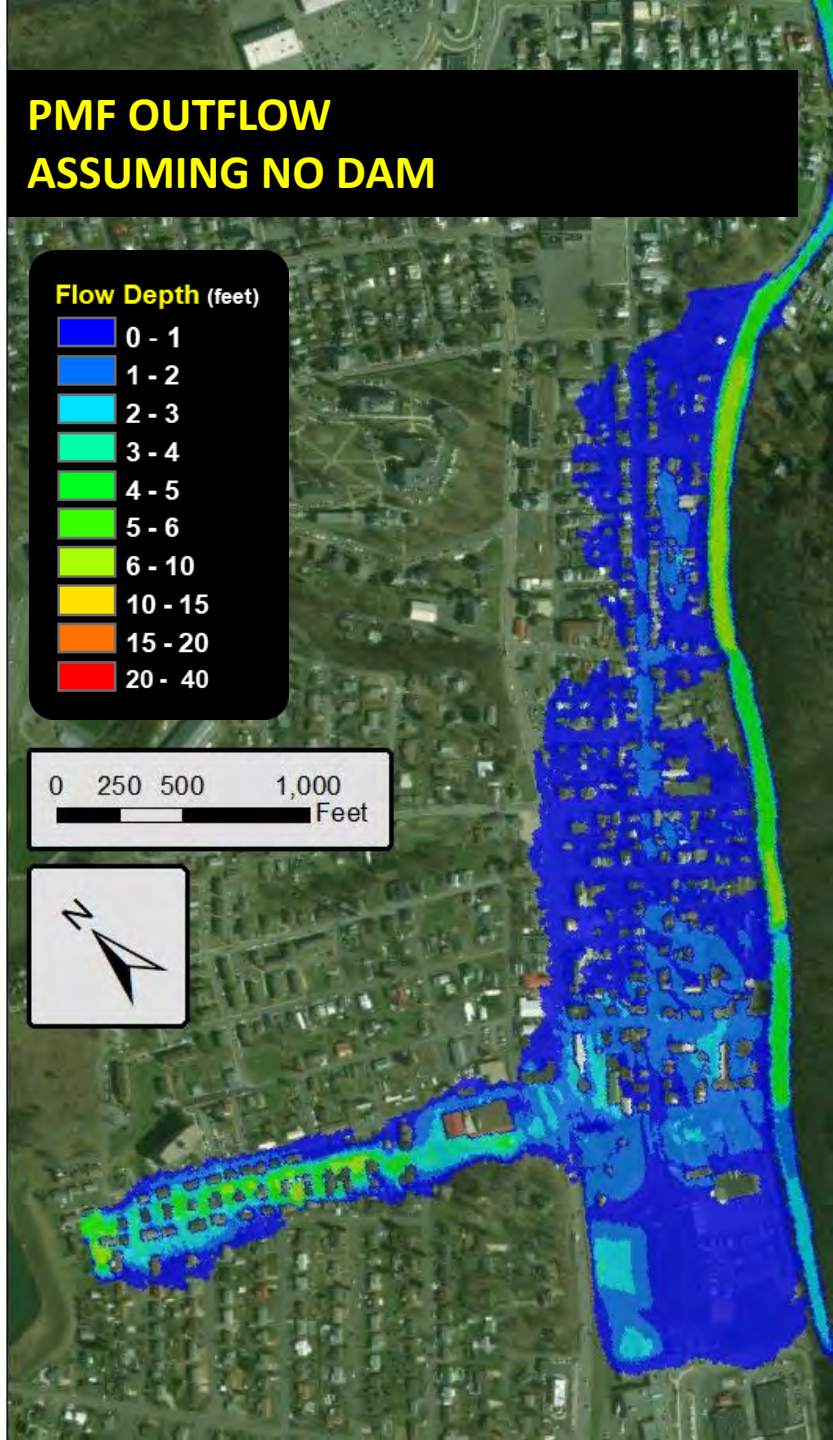
**PMF OUTFLOW
FOR EXISTING SPILLWAY**



**PMF OUTFLOW
FOR PROPOSED SPILLWAY**



**PMF OUTFLOW
ASSUMING NO DAM**





Appendix C- Figure 13
New Creek Site 1
2,000 Year Flood Boundary
Comparison Map

West Virginia
Conservation Agency

Mercer County, WV

Legend

- NHD Stream Centerline
- NC 1 Reservoir Polygon
- 2,000 Year Flood Boundary without Dam
- 25-2,000 Year Flood Boundary with Dam

Overview Map New Creek Site 1:

Location Map New Creek Site 1:

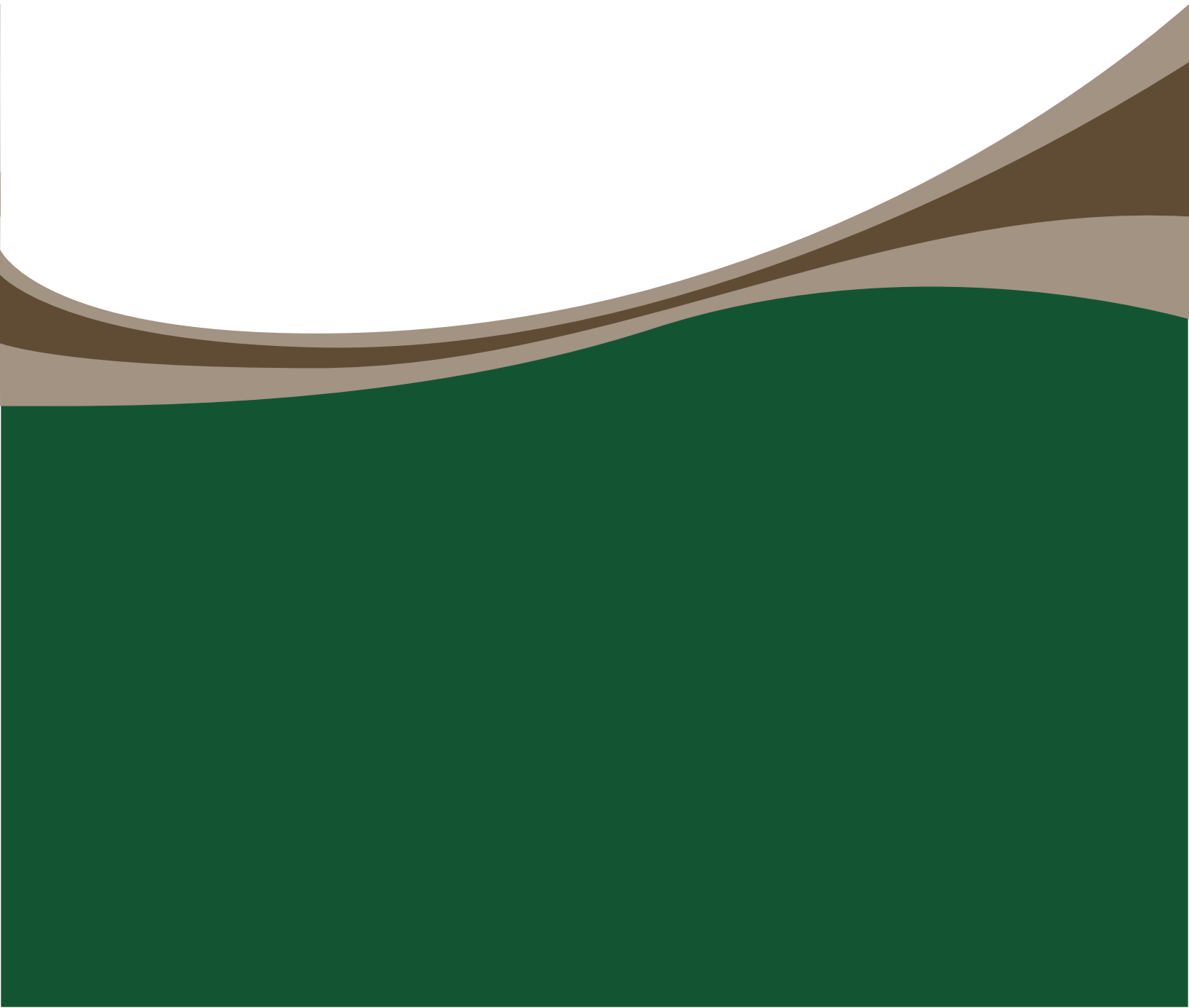
0 250 500 1,000 Feet

1 inch = 500 feet

Aerial Imagery provided by ESRI online web service.
Flood boundaries modeled by Gannett Fleming. Project Number 061371.305

Appendix D

Investigation and Analysis



PLANNING ENGINEERING

Background

New Creek Site 1 Watershed Dam (New Creek Site 1) is a single-purpose dam used for flood control. New Creek Site 1 is located in Mineral County, West Virginia, approximately 1 mile from the center of Keyser (39° 26' 4.8" N, 78° 59 35.5" W) and is one of nine floodwater retarding dams constructed on tributaries within the New Creek Watershed.

The original New Creek-White's Run Subwatersheds Work Plan Agreement (Plan) was signed on March 11, 1957 with five supplemental work plans approved since the original signing of the plan. The purpose of the Plan for the New Creek Watershed was to outline land treatment and structural measures necessary to achieve the maximum practical erosion control and alleviate flood damage. Installation of planned structural measures were to assist in providing floodwater protection to dwellings, roads, fields, crops, and businesses, to permit more intensive land use by reducing damage to land in the flood regions, and also to make uplands more attractive and productive.

Completed in 1957, New Creek Site 1 discharges via a concrete lined channel to New Creek, approximately 0.6 mile to the southeast. The dam collects runoff from approximately 0.33 square miles of the New Creek watershed. According to the original design reports and As-Built drawings from 1957, the structure consists of a zoned earthfill embankment, 42 feet high and 950+ feet long, with a 78-foot-wide vegetated auxiliary spillway located at the right abutment of the dam.

New Creek Site 1 is currently in planning for rehabilitation to meet current NRCS and State dam safety requirements while maintain existing flood control benefits.

Purpose

This document summarizes the investigations and analysis completed for the dam rehabilitation planning engineering of New Creek Site 1. This includes a summary and reference for the existing conditions, breach, deficiencies, alternatives studied and the selected rehabilitation alternative for New Creek Site 1. The assumptions, investigations, analysis performed, and the conclusions developed are described in detail within a document entitled "*Planning Level Technical Memorandum, New Creek Site 1 Watershed Dam*", last revised May 2020, 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

The West Virginia Conservation Agency (WVCA) commissioned Gannett Fleming to provide engineering assistance with the development of the New Creek Site 1 planning study to evaluate the current condition of the dam and to develop alternatives to bring New Creek Site 1 up to current dam safety criteria. Work by Gannett Fleming included topographic and bathymetric surveys, hydrologic analysis, spillway integrity analysis, spillway capacity analysis, subsurface investigations and geotechnical analysis, and visual inspection of the dam. Detailed

descriptions of the existing dam, reservoir and spillways are located in the *Planning Level Technical Memorandum, New Creek Site 1 Watershed Dam*.

A visual inspection of the dam identified deficiencies requiring monitoring and maintenance, including but not limited to filling rodent holes, removal of obstructions (small garden plot and no trespassing sign) within the auxiliary spillway, and relocation of a water pipeline currently crossing the auxiliary spillway to a location outside of the footprint of the dam and backfilling of the existing pipeline trench.

The existing principal spillway discharge is confined to a concrete trough immediately downstream of the dam and additionally restricted by downstream urban development that has occurred since original construction. The conveyance capacity of the concrete trough is estimated to be slightly less than the full flow capacity of the principal spillway conduit. The plunge pool has been completely backfilled and the principal spillway conduit extended to allow the construction of several residential structures immediately adjacent to the outlet. The conduit extension is significantly misaligned with open joints.

With the elimination of the plunge pool, no energy dissipation structure is in place and the outlet channel capacity is greatly diminished by the confined walls on both sides of the outlet channel. These downstream restrictions may result in localized flooding when the principal spillway conduit is flowing at or near capacity. CMP drains shown on the as-built drawings have been buried or interrupted by the residential development at the principal spillway outlet. Visual observations also noted discharge from the underside of the principal spillway conduit, believed to be flow from the misaligned principal spillway pipe joints.

It is recommended that the downstream end of the principal spillway conduit be removed and reconstructed. The new conduit should provide watertight joints and be set on a concrete cradle. Improvements should be designed to ensure that the toe drain outlet pipe is operational and free draining. Proposed improvements involving regrading of the downstream embankment slope should include a toe drain system meeting current NRCS requirements

A very large tree was noted on the 2010 inspection near the principal spillway conduit outlet and toe of the dam. The tree has since been cut down but the stump remains. Other large trees remain near the left and right downstream toe. It is recommended that all trees within 25 feet of the footprint of the dam be removed and that tree stumps be removed in their entirety and backfilled with compacted fill and stabilized with topsoil, seeded and mulched.

Additionally, based on the current development downstream of the dam, activation of the auxiliary spillway will result in flooding of homes. The proposed modifications to the dam should be performed in such a manner to prevent downstream flooding impacts beyond those expected to occur under current conditions. It is recommended that alternatives be considered that reduce the likelihood of activating the auxiliary spillway to reduce the potential for downstream flooding.

Reservoir Storage

New Creek Site 1 was originally designed to provide flood storage and sediment storage. To determine the current reservoir storage, bathymetric and sediment surveys were completed by Gannett Fleming in May 2016. The sediment

survey estimated sediment volume, including the location and depth of sediment throughout the reservoir. This information can be used to determine the historic yearly sedimentation rate.

The results of the 2016 bathymetric and sediment surveys for New Creek Site 1 estimate approximately 16.9 acre-feet of remaining storage below normal pool and approximately 4.0 acre-feet of accumulated sediment since the original construction of the dam in 1957 (approximately 60 years of service) resulting in an annual sedimentation rate of approximately 0.07 acre-feet per year. **Exhibit D.1** compares the as-built storage volumes to the volumes observed in 2016.

Exhibit D.1 - New Creek Site 1 Storage Capacity

Description	Storage Capacity (As-Built Value)	Storage Capacity (Observed Value – 2016)
Submerged Sediment (Below Normal Pool)	20.9 acre-feet ⁽¹⁾	16.9 Acre-Feet ⁽²⁾
Aerated Sediment (Above Normal Pool)	0.0 acre-feet ⁽³⁾	0.0 acre-feet ⁽³⁾
Auxiliary Spillway Crest (Flood Pool)	61.4 acre-feet ⁽⁴⁾	75.8 acre-feet ⁽⁵⁾
Auxiliary Spillway Crest (Storage Capacity)	82.3 acre-feet ⁽⁶⁾	92.7± Acre-Feet

¹ As-built submerged sediment volume = Measured reservoir volume of 16.9 acre-feet plus 4.0 acre-feet of measured sediment.

² Reservoir volume below El. 1104.1 (normal pool) per Gannett Fleming 2016 bathymetric survey is 16.9 acre-feet.

³ Available aerated sediment volume = Design volume of 0.0 acre-feet. No aerated sediment observed during 2016 surveys.

⁴ Flood pool as-built value taken from original design documents.

⁵ Current reservoir storage volume calculated using one-meter LiDAR data between normal pool (El. 905.7) and the auxiliary spillway crest (El. 919.9) is approximately 75.8 acre-feet. Flood pool storage = 75.8 acre-feet minus aerated sediment volume of 0.0 acre-feet = 75.8 acre-feet.

⁶ Storage Capacity = Flood pool volume plus aerated sediment volume plus submerged sediment volume.

Assuming future sedimentation rates are similar to those observed over the first 60 years of service (0.07 acre-feet per year), the remaining sediment pool of 16.9 acre-feet would be able to contain approximately 241 years of sediment.

Dam Rehabilitation Alternatives

Rehabilitating New Creek Site 1 to meet current NRCS criteria requires substantial modifications to the structure. Dam rehabilitation includes (1) addition of measures to filter, collect and discharge seepage through the embankment, (2) flatten the downstream embankment slope to increase slope stability factors of safety, (3) replacement of the principal spillway riser structure, (4) reallocation of approximately 9.7 acre-feet of sediment storage to the floodwater pool, (5) abandonment of the existing auxiliary spillway and relocation via construction of an RCC spillway over the dam embankment, (6) reconstruction of the downstream end of the principal spillway outlet conduit including filter diaphragm and energy dissipation features, (7) and maintenance activities to remove existing obstructions. To implement the preferred alternative, displacement of two residential properties would be required.

Construct a Blanket and Toe Drain System near the Downstream Toe of Dam. The outlet pipe of the toe drain system at New Creek Site 1 Dam as shown on As-built drawings could not be located in the field. Also, piezometer data indicate the existing toe drain system is not functioning as designed to reduce pore pressures near the downstream embankment toe. The Draft TR 60 requires the rehabilitation to be designed with sound defensive measures to reduce, filter and discharge seepage. It is recommended that a new blanket drain and toe drain system be constructed at the downstream embankment toe (refer to Drawings C1, C2 and C7 in **Appendix C**). The new drain system should include a dual-aggregate filter system, collector pipes and weir boxes to monitor seepage flow rates.

Flatten the Downstream Embankment Slope. Flattening of the downstream slope to 3.0H:1V is recommended to provide slope stability factors of safety that meet the minimum requirements of TR-60 and the State of West Virginia. The flatter slope angle will also facilitate maintenance and mowing of the downstream slope and provides cover over the proposed blanket and toe drain system. The embankment crest should be restored to a uniform width of 14-feet (per the original design) as part of grading activities associated with the flattening of the downstream embankment.

Replacement Principal Spillway Riser Structure. It is recommended that the principal spillway riser structure be replaced with a new structure that complies with current NRCS requirements. The new riser structure could be constructed in front of the existing riser which allows the existing riser and outlet pipe to function as a bypass system during construction of the new riser. Moving the riser upstream, near the upstream embankment toe, allows for the addition of a low-level dewatering gate for draining the reservoir.

Relocate the Auxiliary Spillway. The auxiliary spillway exit channel does not comply with the requirements of the TR-60 because it directs flow towards the downstream toe of the dam embankment. Due to impacts to private property associated with realigning the existing exit channel, it is recommended that the existing auxiliary spillway be abandoned and a new RCC spillway be constructed over the embankment in line with the discharge channel from the principal spillway. An RCC auxiliary spillway with a 50-foot width would be adequate to pass the freeboard hydrograph (maintaining the existing auxiliary spillway crest elevation). Refer to Exhibit 4.1 for a comparison of the downstream inundation area during the freeboard hydrograph between the existing conditions and with the relocated auxiliary spillway in place.

Reconstruct Downstream End of the Principal Conduit. The principal spillway conduit has been extended and the original rock-lined plunge pool has been removed to support the residential development which has occurred at the downstream toe of the dam. The conduit extension contains open joints and is misaligned and the removal of the plunge pool reduces the ability of the outfall to dissipate energy. Recommend removing and replacing the conduit extension with the new extension set in a concrete cradle. Energy dissipation features are recommended at the conduit outfall and may be incorporated into the proposed RCC auxiliary spillway stilling basin. A filter diaphragm is recommended in the area of the outlet conduit reconstruction to satisfy the Draft TR-60 requirement that rehabilitations of all dams include a filter diaphragm around all conduit penetrations.

Maintenance Activities. Maintenance activities such as backfilling animal burrows, removing trees and tree stumps, and removing the water pipeline from the footprint of the dam should be performed in order to extend the life of the structure and ensure that the facility continues to operate as intended.

Modes of Failure and Breach Study

A dam breach hydraulic analysis was performed using the XPSWMM two-dimensional computer model in order to determine the downstream inundation limits of the flood wave created by a sudden breach of the dam. The hazard classification evaluation consisted of evaluating the downstream area within the breach inundation zone. The dam was then classified according to West Virginia State Dam Safety definitions and NRCS definitions in NEM, Part 520, Subpart C – Dams.

The inflow hydrograph, reservoir stage-storage relationship, and other inputs used to describe the dam in the two-dimensional model were obtained from the 6 hour FBH SITES output and as-built drawings. The dam breach parameters, including the time to breach, breach bottom width and side slopes were determined by trial and error until the peak breach discharge criteria specified in TR-60 was satisfied. The two-dimensional dam breach analysis and downstream unsteady flow modeling of the flood wave was performed using a four-foot horizontal resolution LiDAR terrain data. Landuse data was digitized using Geographic Information System (GIS) tools and aerial imagery to characterize the surface runoff features of the downstream terrain.

The breach analysis was performed for two scenarios namely, (1) a Sunny Day failure of the dam with the reservoir at normal pool, and (2) a FBH storm plus failure, with the failure occurring when the reservoir is at the peak pool level. The FBH storm was only assumed to occur in the watershed upstream of the dam. Inundation mapping was extended to the city of Keyser, approximately 1.4 miles downstream of the dam, until the flood wave was largely within the banks of New Creek.

According to West Virginia State Dam Safety definitions and NRCS definitions in NEM, Part 520, Subpart C – Dams, High Hazard dams are those dams where failure may cause loss of life or serious damage to homes, commercial or industrial buildings, main highways or railroads, or important public utilities. This classification must be used if failure may result in loss of human life. Existing and future downstream development including controls for future development must be considered when classifying the dam.

A total of approximately 19 dwellings were judged to experience flooding of the adjacent ground by a depth of more than 3 feet based on the dam breach hydraulic analysis. The corresponding persons at risk (PAR) assuming an average of 3.0 persons per dwelling is 57 persons, confirming the High Hazard classification.

Multiple dwellings were identified within the downstream inundation zone that are less than 1000 feet from the toe of the dam. According to the two-dimensional model results, it is also noted that it will take less than 60 minutes for a flood wave created by a sudden failure of New Creek Site 1 to reach its peak flood level at Keyser. There is, therefore, a limited amount of warning time available.

Summary of Data Sources for Planning Engineering

Land Cover and Soils Information

The Runoff Curve Number (CN) for the New Creek Site 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 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) (NEH, Part 630, Chapter 9: Hydrologic Soil-Cover Complexes-July 2004).

Watershed Boundaries

Delineation of the watershed was performed using a GIS-based approach that uses a digital elevation model (DEM). The DEM was developed based on masspoints and breaklines spaced regularly at 3-meter intervals. The 213 acre watershed is relatively uniform in shape without any significant topographic variability or internal obstructions (i.e., major roadway crossings, upstream dams, etc.). Therefore, a single sub-basin was used for the watershed delineation.

Rainfall Data

The analysis considered both a short-duration (6-hour) and long duration (24-hour) storm (27.2- and 34.6-inches of rainfall respectively, from HMR-51) in evaluating the required top of dam elevation and the 100-year flood event (5.79-inches of rainfall from NOAA Atlas 14) for the auxiliary spillway crest elevation criteria. Supporting data is provided at the end of this Appendix.

Gannett Fleming		New Creek Site 1 Dam Mineral County, West Virginia Time of Concentration Calculation Summary	
Project: <u>Planning Level Study for New Creek 1</u>		By: <u>WCH</u>	Date: <u>2/13/2017</u>
Location: <u>Keyser, Mineral County, WV</u>		Checked: <u>NCC</u>	Date: <u>3/20/2017</u>
Subwatershed: <u>New Creek Watershed</u>			
Sheet Flow Properties			
Segment ID		SH-1	
		Woods - Light Underbrush	
1. Surface description			
2. Manning's roughness coefficient, n (NRCS NEH, Table 15-1)		0.400	
3. Flow length, L (ft)		100	
4. Two-year 24-hour rainfall, P2 (in) (NOAA 14 Precip. Data)		2.34	
5. Land slope, s (ft/ft)		0.17310	
$T_t = \frac{0.007 (nL)^{0.8}}{(P2)^{0.5} (s)^{0.4}}$		$T_t = 0.18 \text{ hours}$	
Shallow Concentrated Flow Properties			
Segment ID		SC-1	SC-2
		Minimum tillage cultivation, contour or strip-cropped, and woodlands	Short-grass pasture
6. Surface description (NRCS NEH, Table 15-3)			
7. Flow length, L (ft)		1458	561
8. Watercourse slope, s (ft/ft)		0.33800	0.17900
9. Average velocity, V (NRCS NEH, Table 15-3)		2.925	2.946
		$V = 5.032(s)^{0.5}$	$V = 6.962(s)^{0.5}$
$T_t = \frac{L}{3600V}$		$T_t = 0.14 \text{ hours}$	$T_t = 0.05 \text{ hours}$
Open Channel Flow Properties			
Segment ID		CH-1	
10. Two-year peak flow (cfs)		24.61	
11. Bottom width, B (ft)		4	
12. Depth flowing full, D (ft)		1.20	
13. Channel side slope, z H : 1 V		2	
14. Cross sectional area, A (sq ft)		7.68	
15. Wetted perimeter, P (ft)		9.37	
16. Hydraulic radius, r = A/P (ft)		0.82	
17. Channel slope, s (ft/ft)		0.08285	
18. Manning's roughness coefficient, n		0.040	
19. Velocity, V (ft/sec)		9.39	
$V = \frac{1.49(r^{2/3})(s^{1/2})}{n}$		$Q \text{ (cfs)} = 72.137992$	
20. Flow length, L (ft)		4008	
$T_t = \frac{L}{3600V}$		$T_t = 0.12 \text{ hours}$	
Results			
Time of Concentration =		0.49 hours	= 29.18 minutes
Lag Time =		0.29 hours	= 17.51 minutes

Time of Concentration

The time of concentration for the New Creek Site 1 watershed was determined through the segmental travel time approach consistent with the hydrologic analyses for other nearby NRCS projects. GIS techniques, in combination with sensitivity analyses, were used to determine the longest watercourse within the reservoir drainage system.

NATURAL RESOURCES

On behalf of the West Virginia Conservation Agency (WVCA), Gannett Fleming, Inc. prepared a Natural Resources Report (NRR), dated September 2017, for New Creek Site 1 Watershed Dam in Mineral County, West Virginia. The NRR documented baseline conditions of wetlands, streams, waterbodies, and protected species within the project study area. The NRR was used as a tool during project planning and development to evaluate and compare potential environmental impacts associated with each project alternative considered. As the preferred alternative was selected and advanced into final design, the NRR served as a basis for future permitting efforts with the U.S. Army Corps of Engineers (USACE) under the purview of Section 404 of the Clean Water Act and the West Virginia Department of Environmental Protection (WV DEP) for Section 401 Water Quality Certification.

GF field scientists conducted the wetland delineation and stream evaluation efforts in June 2016. The New Creek Site 1 project study area totaled 12.41 acres. The reservoir encompassed approximately 3.21 acres of the project study area. The remaining 9.20 acres of land surrounding the reservoir were dominated by mowed lawn around the dam, and mowed and fallow fields around the perimeter of the reservoir. Forested land was located along the west and north edge of the project study area. Residential properties were located at the toe of the dam and at the end of the spillway. The wetland investigation was conducted in accordance with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)* (USACE, 2012). Perennial streams were evaluated and surveyed for benthic macroinvertebrates in accordance with the Rapid Bioassessment Protocols (RBP) for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish (Second Edition) (Barbour et al., 1999).

GF coordinated with the U.S. Fish & Wildlife Service (USFWS) and the West Virginia Division of Natural Resources Natural Heritage Program (WVDNR) to determine if there were any known occurrences of threatened or endangered species within the project study area. The USFWS and WVDNR responded through written correspondence that no known occurrences of protected species were known to be within, or adjacent to the project study area.

A summary of the regulated natural resources that were identified, mapped, classified and evaluated is provided in the following tables and further described in the NRR. **Exhibit D.2** depicts the mapped features identified in the NRR.

Exhibit D.3, Regulated Features Summary presents a total project inventory of wetlands, waterways, and waterbodies identified and delineated within the project study area.

Exhibit D.4, Stream Evaluation Summary presents a total scoring matrix for Rapid Bioassessment Protocol (RBP) and West Virginia Stream Condition Index (WVSCI) streams identified and sampled within the project study area.



- Legend**
- ▬ Project Study Area Boundary
 - Lacustrine - NC 1 Normal Pool 906 ft (Approx)
 - Waterways Delineated**
 - ▬ Seep
 - ▬ Perennial
 - ▬ Intermittent
 - ▬ Perennial Stream Area
 - Wetlands Delineated**
 - PEM
 - PSS

Exhibit D.2 - Delineated Features Map

ap

**WEST VIRGINIA
CONSERVATION AGENCY**
Mineral County, WV

Scale

0 100 200 400
Feet

1 inch = 200 feet



Gannett Fleming

Map Prepared: 1/13/2017



Exhibit D.3 - Regulated Features Summary

Wetlands		
Types Identified	Numbers Present	Total Mapped Acreage
PEM	2	0.17
PEM/PSS	1	0.52
Totals	3	0.69
Waterways		
Types Identified	Numbers Present	Total Linear Feet Mapped
Perennial	2	649.00
Totals	2	649.00
Waterbody		
Types Identified	Number Present	Total Mapped Acreage
Lacustrine (New Creek Site 1 Reservoir)	1	3.21
Totals	1	3.21

Note: Palustrine Emergent (PEM), Palustrine Scrub-Shrub (PSS), and Palustrine Forested (PFO)

Exhibit D.4 - Stream Evaluation Summary

Streams	RBP Habitat Assessments		WVSCI	
	RBP Scoring Criteria	RBP Habitat Assessment Score	WVSCI Scoring Criteria	WVSCI Score
1	Sub-Optimal (159 to 110)	143	Unimpaired/Very Good (100.00 to 78.01)	86.18
2	Poor (59 to 0))	20	Impaired Moderately (45.00 to 22.01)	41.39

Note: RBP = Rapid Bioassessment Protocol; WVSCI = West Virginia Stream Condition Index

CULTURAL RESOURCES

Project information and requests for comment were sent to the West Virginia Division of Culture and History State Historic Preservation Office (WV SHPO) to help identify relevant cultural resource concerns within the study area and to ensure potential impacts are adequately avoided, minimized, or mitigated. Information provided to WV SHPO noted that the proposed project is in a previously disturbed area. Review of the WV SHPO Interactive Map Viewer did not identify any potential historic resources in the vicinity of the New Creek Site 1 dam. Supporting documentation is provided in Appendix E: Other Supporting Information.

WV SHPO verified in a letter dated February 2017 that no recorded archaeological resource existed within the study area, and therefore no effect on archaeological historic properties is anticipated. Per WV SHPO's request to address architectural resource concerns, an Historic Property Inventory form was prepared for the New Creek Site 1 Watershed Dam to determine the dam's eligibility for listing on the National Register of Historic Places (NR). The form was completed by cultural resource professionals that meet the Secretary of the Interior's Historic Preservation Professional Qualification Standards. The form, applicable maps, photos, and a recommendation for the dam's listing eligibility were submitted to WV SHPO in December 2019. WV SHPO concluded in a letter dated January 2020 that the dam is not eligible for listing on the NR, and no historical architectural resources are within the proposed project area. The Historic Property Inventory form and coordination letters are available in Appendix A: Comments and Responses.

In addition, the Plan-EA requires further consultation with WV SHPO if any intact cultural materials are encountered during the proposed work, or if the project is modified to require new ground disturbance.

ECONOMICS

The benefit-cost analysis follows the procedures outlined in the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (P&G) and the *National Watershed Program Manual* (2018). Unless otherwise noted, values in the analysis are in 2020 prices and annual values have been discounted using the Fiscal Year (FY) 2020 federal discount rate for water resources projects of 2.75 percent.

The original Work Plan for the New Creek – White's Run Sub Watershed of the Upper Potomac River Watershed was signed in March 1957, and supplemented in December 1959, January 1961, October 1961 and August 1991. Twelve structures and a floodwater diversion were planned as of the 1959 Supplement, and nine structures, as well as the floodwater diversion, were constructed over time.

Within the 1959 Supplemental Work Plan, benefits identified consisted of flood damage reduction quantified by individual structure. Sedimentation and erosion effects were determined to be co-mingled with flooding damages, and were included in the flood damage reduction benefits quantified. The presence of additional non-quantified benefits was noted, including incidental recreation activities, wildlife habitat, water conservation and community benefits.

This analysis updates the flood damage reduction benefits quantified in the original watershed plan using the United States Army Corps of Engineers (USACE) Hydrologic Engineering Centers Flood Impact Analysis

Software (HEC-FIA) version 3.0 to estimate structures and vehicle damages, and Geographic Information System (GIS) analysis to estimate damages to study area infrastructure.

The study area for the analysis was defined as the inundation limits of the 500-year floodplain in the absence of the dam (without-dam floodplain). This boundary encompasses the farthest extent of flooding for the flood events examined within the scope of the project. The study area is approximately 48 acres (0.08 square miles), beginning at New Creek Site 1 and extending to South Water Street, bounded by 2nd Street and East Southern Drive (see **Exhibit D.5 - Economic Analysis Study Area**). The study area consists of developed land in downtown Keyser, WV. Study area land uses include residential, commercial, institutional, and infrastructure.

In addition to flood damage reduction benefits, a second benefit category was added to the current analysis: administrative cost savings to the National Flood Insurance Program (NFIP) from a reduction in the number of properties that must participate.

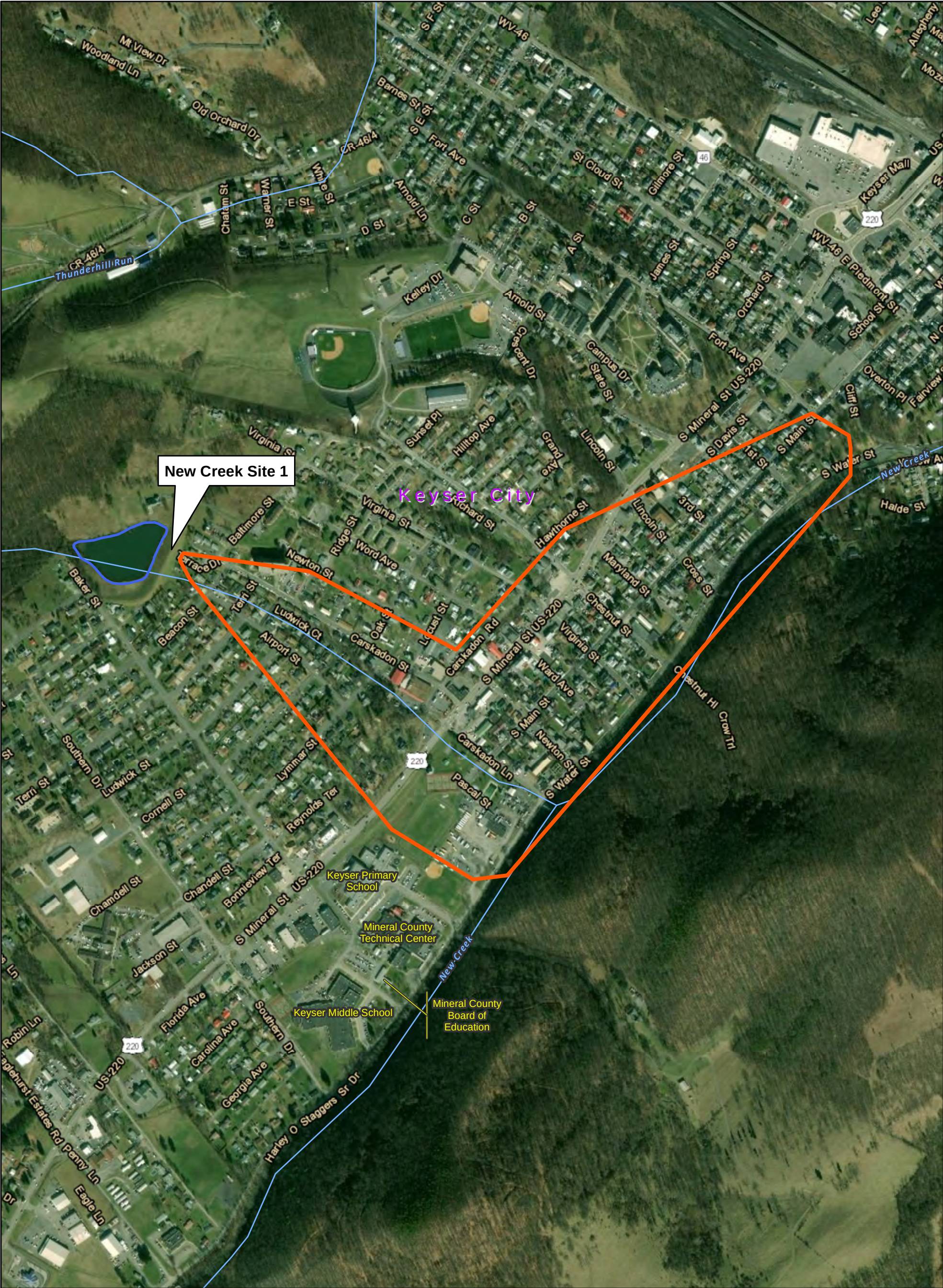
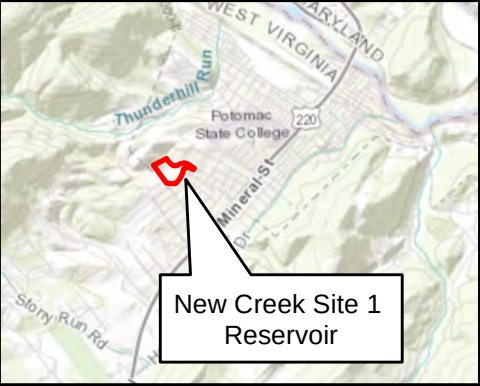


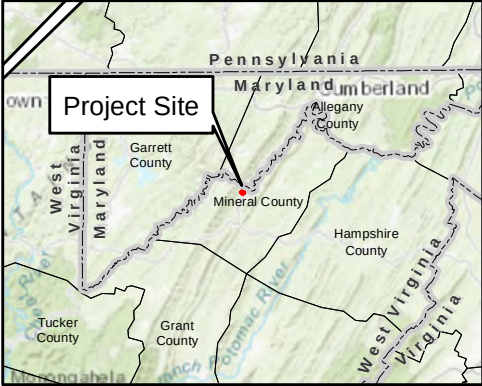
Exhibit D.5
New Creek Site 1
Economic Analysis
Study Area Boundary



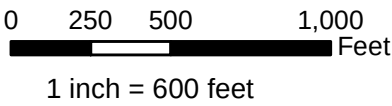
Overview Map New Creek Site 1:



Location Map New Creek Site 1:



- Legend**
- NHD Stream Centerline
 - NC 1 Reservoir Polygon
 - Study Area Boundary



Study Area Inventory

Structures and Vehicles

Study area structures were identified and categorized by land use type using GIS tax parcel data obtained from the Mineral County Tax Assessors Office. The accuracy of the parcels database was verified through a field view and examination of aerial photography. A total of 158 structures fell within the inundation limits of the 500-year without-dam flood event, and a total of 127 structures fell within the inundation limits of the 100-year without-dam flood event.

Structures within the 500-year without-dam floodplain boundary consisted of 107 single family residences, four small apartment buildings, three mobile homes, 13 garages, 21 commercial buildings, Potomac Valley Hospital medical office buildings, City of Keyser office and maintenance buildings, the Mineral County bus garage office and bus storage, the Moose Lodge, and a municipal park. Commercial businesses included restaurants, medical and other offices, the Mineral County Museum, auto care, and retail stores. The Potomac Valley Hospital medical office is characterized as a critical facility under 7 CFR 650.25, *Floodplain Management*.

Structure value was estimated using the assessed value of buildings from the Mineral County tax database. Contents values for residential structures were valued at 50% of the total structure value, or 25% for garages, and commercial/institutional structures were valued at 200% of total structure value, based on NRCS guidance on prior projects.

Vehicles were included in the model. It was assumed that during flooding, each household would be unable to move one personal vehicle. The Federal Emergency Management HAZUS-MH MR3 Technical Manual methodology (FEMA HAZUS) was used to estimate personal vehicle value (FEMA, 2018). The FEMA HAZUS methodology provides vehicle age distribution data by vehicle classification, and uses half of the average new car value for average used car vehicle values, based on National Automobile Dealers Association (NADA) data. Based on a 2020 average transaction price for a new mid-sized car (Kelley Blue Book, 2020), the average study area vehicle was assumed to be valued at \$14,500. No vehicles were assigned to commercial or institutional structures in the model, which is a conservative estimate to avoid over counting flooded vehicles.

Infrastructure

Study area infrastructure consists of paved roadways, two bridges, and utilities. Total mileage for roadway in the study area was estimated using ArcGIS. Paved roadways consist of US Route 220, South Water Street (which runs parallel to New Creek), and other local streets. Based on flood depths and velocities for the various storms, it was assumed that transmission poles would not be damaged.

Flood Damage Reduction

Structures and Vehicles

The HEC-FIA model uses the following parameters to estimate the flooding depth and cost of damages to structures and vehicles:

- ▶ Flood frequency and depth, duration and arrival time gridded data from the output flood model.
- ▶ Terrain elevation grid in combination with user defined parameters to determine first floor elevation.

- ▶ Foundation heights were assumed to be either 0.5 feet or 1.0 feet from ground elevation, depending on structure type.
- ▶ Point locations of all structures.
- ▶ Type and value of each structure and contents within the structure
- ▶ Damage coefficient data for each type of structure and contents

HEC-FIA uses the gridded data to determine depth, arrival, and duration of water at each structure point. The model then analyzes the water depth and first floor elevation with the default or user defined depth damage curve to determine damages for each flood event.

Depth-damage factors for the various structure types and contents were obtained from USACE data provided by NRCS (NRCS 2018). The 25-year, 50-year, 100-year, and 500-year flood events were modeled for without-dam and with-dam conditions. The model extents continue to the point at which flow becomes channelized, and no more damage occurs.

For the with-dam condition, flows remain channelized through the 500-year event. Therefore, flood damages are estimated at \$0 for the with-dam flood events. It is recognized that damages would accrue from floods of greater magnitude than the 500-year flood event, but these were not evaluated because these events would not be affected by the structural measures. The with-dam condition represents the proposed rehabilitation alternatives, while the without-dam condition presents a baseline for comparison to estimate flood protection being provided by rehabilitation.

Model results are shown in **Exhibit D.6**, including number of structures inundated under without-dam conditions for the four flood events modeled. Although outside the scope of the analysis, damages would continue to accrue for flood events smaller than the 25-year event. Please refer to **Appendix C – Figures 6, 7, 8, and 9** for floodplain delineation mapping showing the inundation limits for the flood events modeled.

Exhibit D.6 - HEC-FIA Model Results, Without-Dam Conditions

Flood Event	# of Structures Affected ¹	Affected Structures by Type			Total Structure Damage	Total Contents Damage	Total Vehicle Damage ²	Total Damage
		Residential	Commercial	Institutional				
500-year	129	114	12	3	\$545,584	\$541,693	\$0	\$1,087,278
100-year	127	114	10	3	\$500,400	\$458,129	\$0	\$958,529
50-year	127	114	10	3	\$481,288	\$440,683	\$0	\$921,972
25-year	127	114	10	3	\$470,605	\$419,150	\$0	\$889,755

¹ A total of 158 structures are located in the 500-year floodplain, but flood depths were below levels that would result in damages for some structures.

² Flood depths were below levels that would result in damages to vehicles.

Exhibit D.7 presents the calculation of the expected annual damage for structures and vehicles under without-dam conditions, which was estimated at \$37,900. Calculation of the expected annual damage accounts for the probability of exceedance of each flood event magnitude. The expected annual damage is the area under the frequency-damage curve.

Exhibit D.7 - Expected Annual Flood Damages to Structures and Vehicles under Without-Dam Conditions

Flood Event	Exceedance Probability	Damages	Average Height	Width	Area
500	0.002	\$1,087,278	\$1,087,278	0.002	\$2,175
100	0.01	\$958,529	\$1,022,903	0.008	\$8,183
50	0.02	\$921,972	\$940,251	0.010	\$9,403
25	0.04	\$889,755	\$905,863	0.020	\$18,117
Total					\$37,878

Infrastructure

Roadway damages from flooding depend on unique study area factors, such as the roadways' height, distance from and position relative to the flood water. Therefore, published damage factors for roadways were not readily available. In order to estimate roadway damages, project civil engineers used project data (fieldview, mapping, and hydraulic modeling) to develop a series of assumptions regarding flood impacts on study area roadways.

Average flood depths for the 100- and 500-year without-dam events ranged from 0.4-0.5 feet (with median depths of 0.3-0.4 feet). While the area inundated increases with flood event size, the velocity and depth of flooding does not vary substantially between the four events.

Cleaning costs per linear foot were estimated by project civil engineers for study area roadways, based on removing flood debris from road surfaces and pipes. It was assumed that 85% of flooded road surface in each event would require cleaning. In addition, it was assumed that South Water Street would suffer more extensive damage due to its proximity to New Creek. Water Street was estimated to require replacement of 10% of its flooded surface. The cost estimates for roadway cleaning and replacement are shown in **Exhibit D.8**.

Exhibit D.8 - Road Replacement Costs**Gannett Fleming**SUBJECT: New Creek Dam - Road Replacement Costs SHEET NO. _____ OF _____

JOB NO. _____

BY DAH DATE 05/29/2020 CHKD. BY DRC DATE 05/29/2020**Paved Roadway Cleaning and Replacement**

Assumed Roadway Width (Water Street and other local streets)	24	ft
Assumed Roadway Width (US 220)	36	ft
Assumed Sidewalk Width	5	ft
Assumed Clearing Area Adjacent to Creek on Water Street	12	ft
Assumed Depth of Debris	0.5	ft
Assumed Depth of Water Street and Local Street Pavement	11.5	in

Construction Items		
Excavation of Debris	\$30	/CY
Pipe Cleaning	\$35	/LF
Foreign Borrow (Soil)	\$20	/CY
Rock Armor	\$95	/CY
Water Street and Local Street Pavement		
1.5" Bituminous Wearing Course	\$11.00	/SY
4" Bituminous Base Course	\$13.50	/SY
6" Subbase	\$6.30	/SY
US 220 Pavement		
1.5" Bituminous Wearing Course	\$11.00	/SY
2.5" Bituminous Binder Course	\$16.50	/SY
7" Bituminous Base Course	\$23.60	/SY
10" Subbase	\$10.50	/SY
Catch Basin	\$4,000	EACH
18" Concrete Pipe	\$90.00	/LF
Curbing	\$55.00	/LF
Sidewalk	\$145	/SY

continued on following page

Exhibit D.8 - Road Replacement Costs (Continued)

SUBJECT: New Creek Dam - Road Replacement Costs SHEET NO. _____ OF _____
 JOB NO. _____
 BY DAH DATE 05/29/2020 CHKD. BY DRC DATE 05/29/2020

Cleaning - Water Street

Assume cleaning is needed for roadway + sidewalk + area next to creek + pipe running length of road beneath centerline

Volume of Debris	41	ft	x	0.5	ft	=	20.5	SF/LF	=	0.76	CY/LF
Excavation of Debris	\$30.00	/CY	x	0.76	CY/LF	=	\$23	/LF			
Pipe Cleaning	\$35.00		x	1	ft pipe/ft road	=	\$35	/LF			
					Total	=	\$58	/LF			
					With 25% Contingency	=	\$72	/LF			

Cleaning - Local Streets

Assume cleaning is needed for roadway + sidewalk (both sides) + 2 pipes running length of road beneath centerline

Volume of Debris	34	ft	x	0.5	ft	=	17	SF/LF	=	0.63	CY/LF
Excavation of Debris	\$30.00	/CY	x	0.63	CY/LF	=	\$19	/LF			
Pipe Cleaning	\$35.00		x	2	ft pipe/ft road	=	\$70	/LF			
					Total	=	\$89	/LF			
					With 25% Contingency	=	\$111	/LF			

Cleaning - US 220

Assume cleaning is needed for roadway + sidewalk (both sides) + 2 pipes running length of road beneath centerline

Volume of Debris	46	ft	x	0.5	ft	=	23	SF/LF	=	0.85	CY/LF
Excavation of Debris	\$30.00	/CY	x	0.85	CY/LF	=	\$26	/LF			
Pipe Cleaning	\$35.00		x	2	ft pipe/ft road	=	\$70	/LF			
					Total	=	\$96	/LF			
					With 25% Contingency	=	\$119	/LF			

Replacement - Water Street

Roadway Subbase & Paving	\$30.80	/SY	x	24	FT (width)	x	200	LF (per 200')	/	9	SF/SY	=	\$16,427
Sidewalk	\$145	/SY	x	5	FT (width)	x	200	LF (per 200')	/	9	SF/SY	=	\$16,111
Curbing	\$55.00	/LF				x	200	LF (per 200')				=	\$11,000
Catch Basin	\$4,000	EA	x			x	1					=	\$4,000
18" pipe	\$90.00	/LF				x	200	LF (per 200')				=	\$18,000
Rock Armor	\$95.00	/CY	x	12	FT (width)	x	200	LF (per 200')	x	3'/27	CF/CY	=	\$25,333
Embankment	\$20.00	/CY	x	29	FT (width)	x	200	LF (per 200')	x	3'/27	CF/CY	=	\$12,889
Subtotal													\$103,760

\$103,760	per 200 feet	=	\$519	per LF
+	cleaning	=	\$58	per LF
	Total	=	\$577	per LF
	With 25% Contingency	=	\$721	per LF

Using ArcGIS, the roadway mileage inundated under each flood event was calculated under without-dam conditions. Mileage inundated was multiplied by the percentage of flooded surface that would require cleaning or repair. Damaged surface (feet) was multiplied by the cleaning or repair cost (per foot) to obtain damages. Expected annual damage to roadways under without-dam conditions was estimated at \$60,700 (**Exhibit D.9**).

GIS analysis was used to determine that the two study area bridges were not overtopped in the modeled flood events.

Exhibit D.9 - Expected Annual Flood Damages to Infrastructure under Without-Dam Conditions

Flood Event	Exceedance Probability	Damages	Average Height	Width	Area
500	0.002	\$2,007,396	\$2,007,396	0.002	\$4,015
100	0.01	\$1,657,492	\$1,832,444	0.008	\$14,660
50	0.02	\$1,460,619	\$1,559,056	0.010	\$15,591
25	0.04	\$1,185,310	\$1,322,965	0.020	\$26,459
Total					\$60,724

Administrative Cost Savings to the National Flood Insurance Program (NFIP)

By reducing the size of the 100-year floodplain, New Creek Site 1 reduces the number of properties that must participate in the NFIP, which enables a savings in the administrative costs of the program. According to NRCS technical guidance based on a FEMA actuarial rate review, each policy is estimated to incur an administrative cost of \$334.45 per year (**Exhibit D.10**) (Townsley, 2016).

Exhibit D.10 - Estimation of Average Administrative Costs Associated with the NFIP Per Policy

Average Administrative Cost Per Policy (2015 dollars)	\$308.53
GDP-Implicit Price Deflator (2020/2015)	1.084
Average Administrative Cost Per Policy (2020 dollars)	\$334.45

Notes:

1. Adapted from Townsley 2016 at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/econ/references/?cid=nrcs143_009725
2. NFIP data from Actuarial Rate Review In Support of the Recommended October 1, 2011, Rate and Rule Changes; Thomas L. Hayes, ACAS, MAAA Actuary and D. Andrew Neal, FSA Actuary Federal Insurance and Mitigation Administration (FIMA)
3. GDP-IPD 2020 Q1 data from BEA 2020. 2012 is base year.

The 100-year floodplains under with- and without-dam conditions were compared using ArcGIS. It was determined that the dam reduces the number of tax parcels required to participate in the NFIP by 122 parcels. This reduction represents a savings in administrative costs of \$40,800 per year.

Total Benefits

New Creek 1 provides a total of \$139,400 in annual flood damage reduction benefits (**Exhibit D.11**). However, because the average annual benefits provided by rehabilitation under the Preferred Alternative or the No Federal Action Alternative are the same, the federally assisted Preferred Alternative has been displayed within a zero-based accounting context in the Plan EA. Local costs avoided are credited as adverse beneficial effects, consistent with P&G 1.7.2(b)(3). Although the average annual benefits of rehabilitation are \$139,400, net benefits of the NED Alternative are zero because the total project cost is equal to the claimed benefits and the resulting benefit/cost ratio is 1:1.

Exhibit D.11 - Total Expected Annual Damages under Without-Dam Conditions

Damage Category	Expected Annual Damage (2020 \$)
Structures and Vehicles	\$37,900
Infrastructure	\$60,700
NFIP	\$40,800
Total	\$139,400

Appendix D - Figure D12A - Itemized Breakdown of Estimated Construction Costs for Dam Rehabilitation (Preferred Alternative)

Item No.	Item Description	Estimated Quantity	Unit	Unit Price	Amount
Mobilization & Demobilization					\$266,080
1.	Mobilization & Demobilization				
	a. General Mob/Demob (~7% of Contract Price)	1	LS	XXX	\$206,951
	b. Bonds & Insurances (~2% of Contract Price)	1	LS	XXX	\$59,129
Site Preparation					\$425,000
2.	Pre-Construction Site Development				
	a. Construction and Maintenance of Access Roads & Staging Areas	1	LS	XXX	\$110,000
	b. Field Office	1	LS	XXX	\$90,000
	c. Traffic Control Signage, Flagmen, Etc.	1	LS	XXX	\$25,000
3.	Field Surveys				
	a. Construction Stakeout, Quantity Verification, As-Builts, Etc.	1	LS	XXX	\$200,000
Erosion and Sediment Control					\$409,750
4.	Miscellaneous Erosion Control Measures				
	a. Rock Construction Entrance	2	EA	4,000.00	\$8,000
	b. Sediment Traps	1	LS	XXX	\$30,000
	c. Sediment Trap Cleanout (Assume 6 Cleanings)	1	LS	XXX	\$9,000
	d. Silt Fence (Assume 1,500 feet)	1,500	LF	7.00	\$10,500
	e. Temporary Stabilization	3	AC	2,750.00	\$8,250
	f. Erosion Control Matting	8,000	SY	5.50	\$44,000
5.	Management of Water				
	a. Diverting Surface Water	1	LS	XXX	\$225,000
	b. Dewatering of Work Area	1	LS	XXX	\$75,000
New RCC Auxiliary Spillway					\$1,007,880
6.	Demolition Activities				
	a. Strip and Stockpile Topsoil (Assume 6")	250	CY	13.00	\$3,250
	b. House and Pool to be removed	2	EA	30,000.00	\$60,000
	c. Sheds to be removed	3	EA	600.00	\$1,800
	d. Fence to be removed	215	LF	2.00	\$430
	e. Tree Removal	3	EA	600.00	\$1,800
	f. Remove Downstream 20' of Existing PSW Conduit	20	LF	100.00	\$2,000
7.	Excavation Activities				
	a. Earth Excavation	2,000	CY	11.00	\$22,000
	b. Rock Excavation (Weathered)	225	CY	40.00	\$9,000
	c. Rock Foundation Preparation	320	SY	30.00	\$9,600

continued on following page

Appendix D - Figure D12A - Itemized Breakdown of Estimated Construction Costs for Dam Rehabilitation (Preferred Alternative) (Continued)

Item No.	Item Description	Estimated Quantity	Unit	Unit Price	Amount
8.	Roller Compacted Concrete Spillway				
	a. Test Section	1	LS	XXX	\$65,000
	b. Roller Compacted Concrete - Complete in Place	3,500	CY	200.00	\$700,000
	c. Fine Drain Material	450	CY	80.00	\$36,000
	d. Coarse Drain Material	600	CY	100.00	\$60,000
	e. Drainage Pipe	440	LF	35.00	\$15,400
	f. 24" RCP Principal Spillway Extension	36	LF	600.00	\$21,600
9.	Clean-up Activities				
	a. Spoil/Disposal of Excess Excavation Material (Assume Offsite)	0	CY	20.00	\$0
Flatten Downstream Slope and Fill Existing ASW					\$446,810
10.	Demolition Activities				
	a. Strip and Stockpile Topsoil	1,350	CY	13.00	\$17,550
	b. Tree Removal	8	EA	600.00	\$4,800
	c. Utility Relocations (Water Line)	1	LS	XXX	\$25,000
	d. Fence Removal	280	LF	2.00	\$560
11.	New Downstream Slope and Fill ASW				
	a. Earth Excavation (Toe Drain)	2,700	CY	11.00	\$29,700
	b. Fine Drain Material (Toe Drain)	1,700	CY	80.00	\$136,000
	c. Coarse Drain Material (Toe Drain)	550	CY	100.00	\$55,000
	d. Drainage Pipe (Toe Drain)	800	LF	35.00	\$28,000
	e. Earth Fill Material (From Onsite)	4,000	CY	7.00	\$28,000
	f. Weir Box	2	EA	3,000.00	\$6,000
12.	Clean-Up Activities				
	a. Topsoil Placement (Assume 12" Thickness)	2,700	CY	30.00	\$81,000
	b. Seed and Mulch all Disturbed Areas	2.0	AC	2,750.00	\$5,500
	c. Replace Fencing	280	LF	40.00	\$11,200
	d. Spoil/Disposal of Excess Excavation Material (Assume Offsite)	925	CY	20.00	\$18,500
Riser Structure Modifications					\$667,000
13.	Demolition Activities				
	a. Remove Existing Riser Structure and Anti-Vortex Device	1	LS	XXX	\$100,000
	b. Remove Existing Pond Drain Pipe	40	LF	50.00	\$2,000
14.	New Riser Structure				
	a. 24" RCP Principal Spillway Extension	50	LF	600.00	\$30,000
	b. New Riser Structure	1	LS	XXX	\$500,000
	c. Install Sluice Gate on Upstream Exterior of Riser Structure	1	LS	XXX	\$35,000
Total Construction Cost (Items Nos. 1 through 14, inclusive):					\$3,222,520
Contingency (Assume 30 Percent):					\$966,756
Planning Level Construction Costs for New Creek Site 1:					\$4,189,000

Appendix D - Figure D12B - Itemized Breakdown of Estimated Construction Costs for Dam Rehabilitation (with Raised and Widened Spillway)

Item No.	Item Description	Estimated Quantity	Unit	Unit Price	Amount
Mobilization & Demobilization					\$389,793
1.	Mobilization & Demobilization				
	a. General Mob/Demob (~7% of Contract Price)	1	LS	XXX	\$303,172
	b. Bonds & Insurances (~2% of Contract Price)	1	LS	XXX	\$86,621
Site Preparation					\$425,000
2.	Pre-Construction Site Development				
	a. Construction and Maintenance of Access Roads & Staging Areas	1	LS	XXX	\$110,000
	b. Field Office	1	LS	XXX	\$90,000
	c. Traffic Control Signage, Flagmen, Etc.	1	LS	XXX	\$25,000
3.	Field Surveys				
	a. Construction Stakeout, Quantity Verification, As-Builts, Etc.	1	LS	XXX	\$200,000
Erosion and Sediment Control					\$393,470
4.	Miscellaneous Erosion Control Measures				
	a. Rock Construction Entrance	2	EA	4,000.00	\$8,000
	b. Sediment Traps	1	LS	XXX	\$30,000
	c. Sediment Trap Cleanout (Assume 6 Cleanings)	1	LS	XXX	\$9,000
	d. Silt Fence (Assume 1,500 feet)	1,500	LF	7.00	\$10,500
	e. Temporary Stabilization	3	AC	2,750.00	\$8,250
	f. Erosion Control Matting	5,040	SY	5.50	\$27,720
5.	Management of Water				
	a. Diverting Surface Water	1	LS	XXX	\$225,000
	b. Dewatering of Work Area	1	LS	XXX	\$75,000
New RCC Auxiliary Spillway					\$2,518,560
6.	Demolition Activities				
	a. Strip and Stockpile Topsoil (Assume 6")	830	CY	13.00	\$10,790
	b. House and Pool to be removed	2	EA	30,000.00	\$60,000
	c. Sheds to be removed	3	EA	600.00	\$1,800
	d. Fence to be removed	215	LF	2.00	\$430
	e. Tree Removal	3	EA	600.00	\$1,800
	f. Remove Downstream 20' of Existing PSW Conduit	20	LF	100.00	\$2,000
7.	Excavation Activities				
	a. Earth Excavation	9,140	CY	11.00	\$100,540
	b. Rock Excavation (Weathered)	530	CY	40.00	\$21,200
	c. Rock Foundation Preparation	900	SY	30.00	\$27,000

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Appendix D - Figure D12B - Itemized Breakdown of Estimated Construction Costs for Dam Rehabilitation (with Raised and Widened Spillway) (Continued)

Item No.	Item Description	Estimated Quantity	Unit	Unit Price	Amount
8.	Roller Compacted Concrete Spillway				
	a. Test Section	1	LS	XXX	\$65,000
	b. Roller Compacted Concrete - Complete in Place	8,000	CY	200.00	\$1,600,000
	c. Fine Drain Material	1,600	CY	80.00	\$128,000
	d. Coarse Drain Material	2,360	CY	100.00	\$236,000
	e. Drainage Pipe	1,400	LF	35.00	\$49,000
	f. 24" RCP Principal Spillway Extension	36	LF	600.00	\$21,600
9.	Clean-up Activities				
	a. Spoil/Disposal of Excess Excavation Material (Assume Offsite)	9,670	CY	20.00	\$193,400
Flatten Downstream Slope and Fill Existing ASW					\$327,005
10.	Demolition Activities				
	a. Strip and Stockpile Topsoil	840	CY	13.00	\$10,920
	b. Tree Removal	8	EA	600.00	\$4,800
	c. Utility Relocations (Water Line)	1	LS	XXX	\$25,000
	d. Fence Removal	280	LF	2.00	\$560
11.	New Downstream Slope and Fill ASW				
	a. Earth Excavation (Toe Drain)	2,140	CY	11.00	\$23,540
	b. Fine Drain Material (Toe Drain)	1,330	CY	80.00	\$106,400
	c. Coarse Drain Material (Toe Drain)	440	CY	100.00	\$44,000
	d. Drainage Pipe (Toe Drain)	620	LF	35.00	\$21,700
	e. Earth Fill Material (From Onsite)	1,880	CY	7.00	\$13,160
	f. Weir Box	2	EA	3,000.00	\$6,000
12.	Clean-Up Activities				
	a. Topsoil Placement (Assume 12" Thickness)	1,680	CY	30.00	\$50,400
	b. Seed and Mulch all Disturbed Areas	1.5	AC	2,750.00	\$4,125
	c. Replace Fencing	280	LF	40.00	\$11,200
	d. Spoil/Disposal of Excess Excavation Material (Assume Offsite)	260	CY	20.00	\$5,200
Riser Structure Modifications					\$667,000
13.	Demolition Activities				
	a. Remove Existing Riser Structure and Anti-Vortex Device	1	LS	XXX	\$100,000
	b. Remove Existing Pond Drain Pipe	40	LF	50.00	\$2,000
14.	New Riser Structure				
	a. 24" RCP Principal Spillway Extension	50	LF	600.00	\$30,000
	b. New Riser Structure	1	LS	XXX	\$500,000
	c. Install Sluice Gate on Upstream Exterior of Riser Structure	1	LS	XXX	\$35,000
Total Construction Cost (Items Nos. 1 through 14, inclusive):					\$4,720,828
Contingency (Assume 30 Percent):					\$1,416,248
Planning Level Construction Costs for New Creek Site 1:					\$6,137,000

Appendix D - Figure D12C - Itemized Breakdown of Estimated Construction Costs for Dam Decommissioning

Item No.	Item Description	Estimated Quantity	Unit	Unit Price	Amount
Mobilization & Demobilization					\$58,646
1.	Mobilization & Demobilization				
	a. General Mob/Demob (~7% of Contract Price)	1	LS	XXX	\$45,613
	b. Bonds & Insurances (~2% of Contract Price)	1	LS	XXX	\$13,032
Site Preparation					\$150,000
2.	Pre-Construction Site Development				
	a. Construction and Maintenance of Access Roads & Staging Areas	1	LS	XXX	\$100,000
	b. Field Office	1	LS	XXX	\$25,000
	c. Traffic Control Signage, Flagmen, Etc.	1	LS	XXX	\$5,000
3.	Field Surveys				
	a. Construction Stakeout, Quantity Verification, As-Builts, Etc.	1	LS	XXX	\$20,000
Erosion and Sediment Control					\$154,600
4.	Miscellaneous Erosion Control Measures				
	a. Rock Construction Entrance	2	EA	4,000.00	\$8,000
	b. Sediment Traps	1	LS	XXX	\$30,000
	c. Sediment Trap Cleanout (Assume 2 Cleanings Each)	1	LS	XXX	\$9,000
	d. Silt Fence	1,000	LF	7.00	\$7,000
	e. Temporary Stabilization	2	AC	2,750.00	\$5,500
	f. Erosion Control Matting	8,200	SY	5.50	\$45,100
5.	Management of Water				
	a. Diverting Surface Water	1	LS	XXX	\$50,000
Dam Breach					\$347,020
6.	Demolition Activities				
	a. Strip and Stockpile Topsoil	1,400	CY	13.00	\$18,200
	b. Remove Principal Spillway Riser Structure	1	LS	XXX	\$100,000
	c. Remove Principal Spillway Conduit and Concrete Cradle	160	LF	100.00	\$16,000
7.	Excavation Activities				
	a. Earth Excavation	8,100	CY	11.00	\$89,100
8.	Pilot Channel Through Breach				
	a. Riprap Channel Lining	150	CY	85.00	\$12,750
	b. Aggregate Bedding	60	CY	67.00	\$4,020
9.	Clean-up Activities				
	a. Spoil Excavated Embankment Material	8,100	CY	7.00	\$56,700
	b. Topsoil Placement	1,400	CY	30.00	\$42,000
	c. Seed and Mulch all Disturbed Areas	3	AC	2,750.00	\$8,250
Environmental Mitigation					\$30,000
10.	Mitigation of Environmental Impacts				
	a. Mitigation Construction & Monitoring of Wetland Bank	0.5	AC	60,000	\$30,000
Total Construction Cost (Items Nos. 1 through 10, inclusive):					\$740,266
Contingency (Assume 30 Percent):					\$222,080
Planning Level Construction Costs for New Creek Site 1 - Dam Decommissioning Option:					\$962,000



NOAA Atlas 14, Volume 2, Version 3
Location name: Keyser, West Virginia, US*
Latitude: 39.4349°, Longitude: -78.9931°
Elevation: 917 ft*
 * source: Google Maps



POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.288 (0.258-0.323)	0.337 (0.302-0.377)	0.405 (0.363-0.453)	0.465 (0.415-0.519)	0.542 (0.480-0.603)	0.606 (0.535-0.671)	0.669 (0.588-0.740)	0.737 (0.644-0.814)	0.832 (0.719-0.916)	0.909 (0.780-1.00)
10-min	0.447 (0.400-0.501)	0.526 (0.471-0.589)	0.630 (0.564-0.704)	0.719 (0.640-0.801)	0.830 (0.735-0.922)	0.918 (0.810-1.02)	1.01 (0.884-1.11)	1.10 (0.961-1.22)	1.22 (1.06-1.35)	1.32 (1.14-1.46)
15-min	0.548 (0.491-0.615)	0.643 (0.576-0.720)	0.773 (0.692-0.865)	0.884 (0.788-0.986)	1.02 (0.907-1.14)	1.14 (1.00-1.26)	1.25 (1.10-1.38)	1.37 (1.20-1.51)	1.52 (1.32-1.68)	1.65 (1.42-1.82)
30-min	0.726 (0.649-0.813)	0.861 (0.771-0.964)	1.06 (0.948-1.18)	1.23 (1.09-1.37)	1.45 (1.28-1.61)	1.62 (1.43-1.80)	1.81 (1.59-2.00)	2.00 (1.74-2.21)	2.26 (1.95-2.49)	2.48 (2.13-2.73)
60-min	0.886 (0.793-0.993)	1.06 (0.946-1.18)	1.33 (1.19-1.49)	1.56 (1.39-1.74)	1.88 (1.66-2.09)	2.14 (1.89-2.37)	2.42 (2.12-2.67)	2.71 (2.37-2.99)	3.13 (2.70-3.44)	3.48 (2.99-3.84)
2-hr	1.02 (0.916-1.15)	1.22 (1.09-1.36)	1.54 (1.37-1.71)	1.83 (1.63-2.03)	2.24 (1.98-2.48)	2.60 (2.29-2.87)	2.98 (2.60-3.28)	3.39 (2.94-3.73)	4.00 (3.43-4.38)	4.52 (3.84-4.95)
3-hr	1.10 (0.989-1.24)	1.30 (1.17-1.46)	1.64 (1.47-1.83)	1.94 (1.73-2.16)	2.37 (2.10-2.63)	2.75 (2.42-3.04)	3.15 (2.77-3.48)	3.60 (3.13-3.96)	4.25 (3.65-4.66)	4.82 (4.10-5.29)
6-hr	1.36 (1.21-1.54)	1.60 (1.43-1.81)	1.98 (1.76-2.24)	2.34 (2.08-2.64)	2.84 (2.50-3.19)	3.29 (2.88-3.68)	3.76 (3.28-4.20)	4.29 (3.71-4.77)	5.05 (4.32-5.61)	5.72 (4.83-6.34)
12-hr	1.65 (1.48-1.87)	1.93 (1.73-2.19)	2.38 (2.13-2.70)	2.81 (2.50-3.17)	3.42 (3.02-3.84)	3.96 (3.49-4.43)	4.55 (3.97-5.08)	5.21 (4.50-5.79)	6.18 (5.27-6.84)	7.03 (5.92-7.76)
24-hr	1.96 (1.80-2.15)	2.34 (2.16-2.58)	2.93 (2.70-3.23)	3.46 (3.17-3.81)	4.27 (3.86-4.69)	4.98 (4.46-5.47)	5.79 (5.13-6.35)	6.70 (5.85-7.36)	8.09 (6.91-8.91)	9.30 (7.80-10.3)
2-day	2.29 (2.12-2.51)	2.74 (2.53-3.00)	3.40 (3.14-3.72)	3.98 (3.65-4.35)	4.85 (4.41-5.29)	5.61 (5.06-6.12)	6.44 (5.74-7.04)	7.37 (6.48-8.06)	8.76 (7.54-9.61)	9.93 (8.41-10.9)
3-day	2.50 (2.32-2.71)	2.99 (2.77-3.24)	3.69 (3.42-3.99)	4.29 (3.96-4.63)	5.18 (4.74-5.60)	5.94 (5.39-6.42)	6.77 (6.08-7.33)	7.67 (6.81-8.33)	9.01 (7.84-9.85)	10.2 (8.71-11.2)
4-day	2.71 (2.53-2.92)	3.24 (3.02-3.48)	3.97 (3.70-4.26)	4.59 (4.27-4.92)	5.50 (5.08-5.90)	6.27 (5.73-6.72)	7.09 (6.42-7.63)	7.97 (7.13-8.61)	9.27 (8.15-10.1)	10.4 (9.01-11.4)
7-day	3.13 (2.94-3.34)	3.72 (3.49-3.98)	4.51 (4.22-4.81)	5.15 (4.81-5.50)	6.06 (5.63-6.46)	6.80 (6.28-7.26)	7.57 (6.93-8.11)	8.37 (7.59-9.00)	9.47 (8.48-10.3)	10.5 (9.21-11.5)
10-day	3.78 (3.57-4.01)	4.48 (4.23-4.75)	5.34 (5.03-5.66)	6.03 (5.68-6.39)	6.97 (6.53-7.39)	7.72 (7.20-8.19)	8.48 (7.86-9.03)	9.28 (8.55-9.92)	10.4 (9.46-11.2)	11.4 (10.3-12.4)
20-day	5.13 (4.89-5.38)	6.01 (5.74-6.31)	6.95 (6.63-7.30)	7.70 (7.33-8.08)	8.69 (8.25-9.12)	9.45 (8.94-9.94)	10.2 (9.60-10.8)	10.9 (10.2-11.6)	11.9 (11.0-12.6)	12.5 (11.6-13.4)
30-day	6.29 (6.03-6.58)	7.34 (7.04-7.69)	8.38 (8.03-8.77)	9.20 (8.81-9.62)	10.3 (9.80-10.7)	11.1 (10.5-11.6)	11.8 (11.2-12.4)	12.6 (11.9-13.3)	13.5 (12.7-14.3)	14.2 (13.2-15.1)
45-day	7.87 (7.57-8.20)	9.15 (8.81-9.55)	10.3 (9.94-10.8)	11.3 (10.8-11.7)	12.4 (11.9-12.9)	13.3 (12.7-13.9)	14.1 (13.4-14.7)	14.8 (14.1-15.5)	15.7 (14.9-16.6)	16.3 (15.4-17.2)
60-day	9.40 (9.04-9.78)	10.9 (10.5-11.4)	12.2 (11.8-12.7)	13.2 (12.7-13.8)	14.5 (13.9-15.1)	15.4 (14.7-16.0)	16.2 (15.5-16.9)	17.0 (16.2-17.8)	17.9 (17.0-18.8)	18.5 (17.5-19.4)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

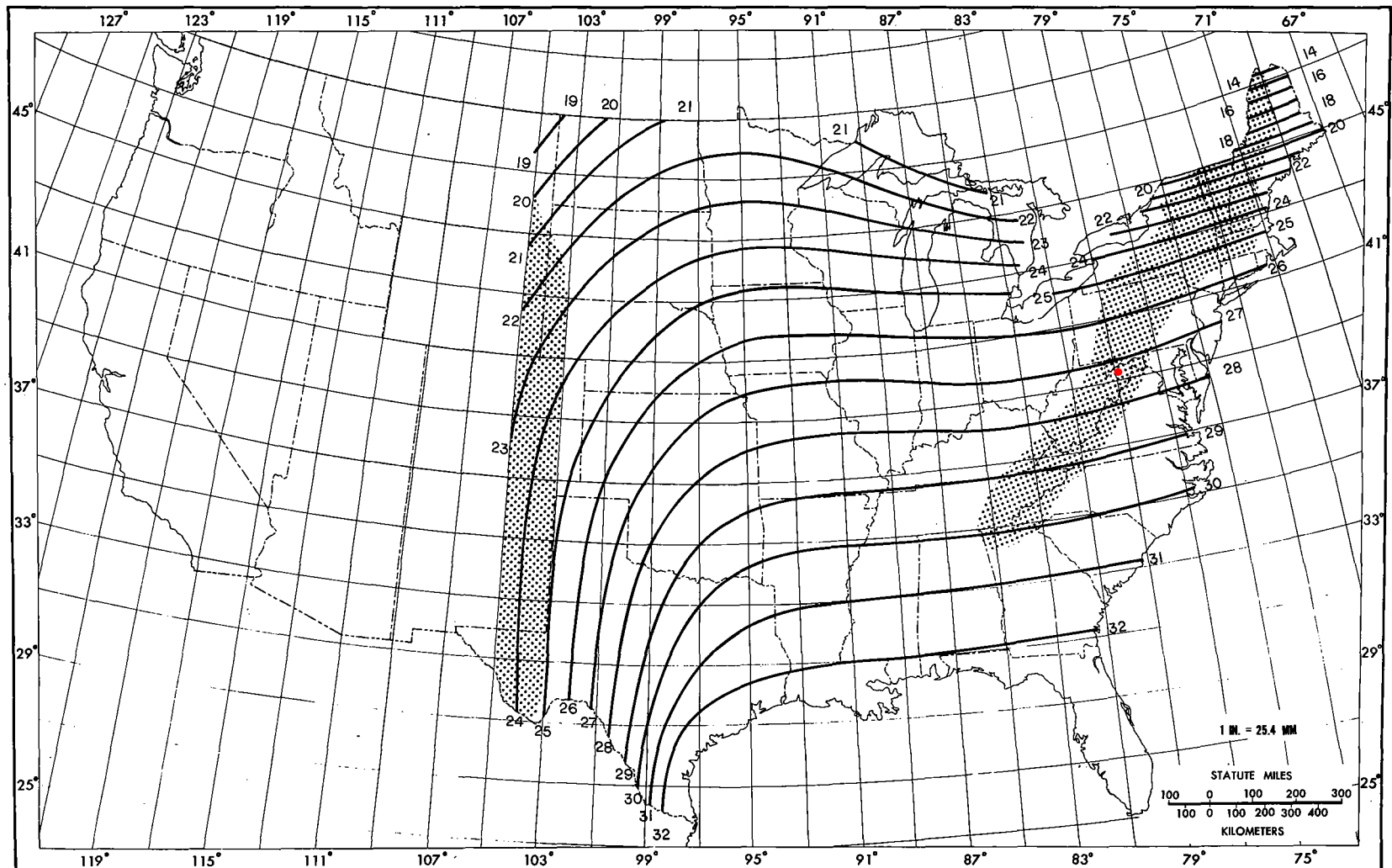


Figure 18.--All-season PMP (in.) for 6 hr 10 mi² (26 km²).

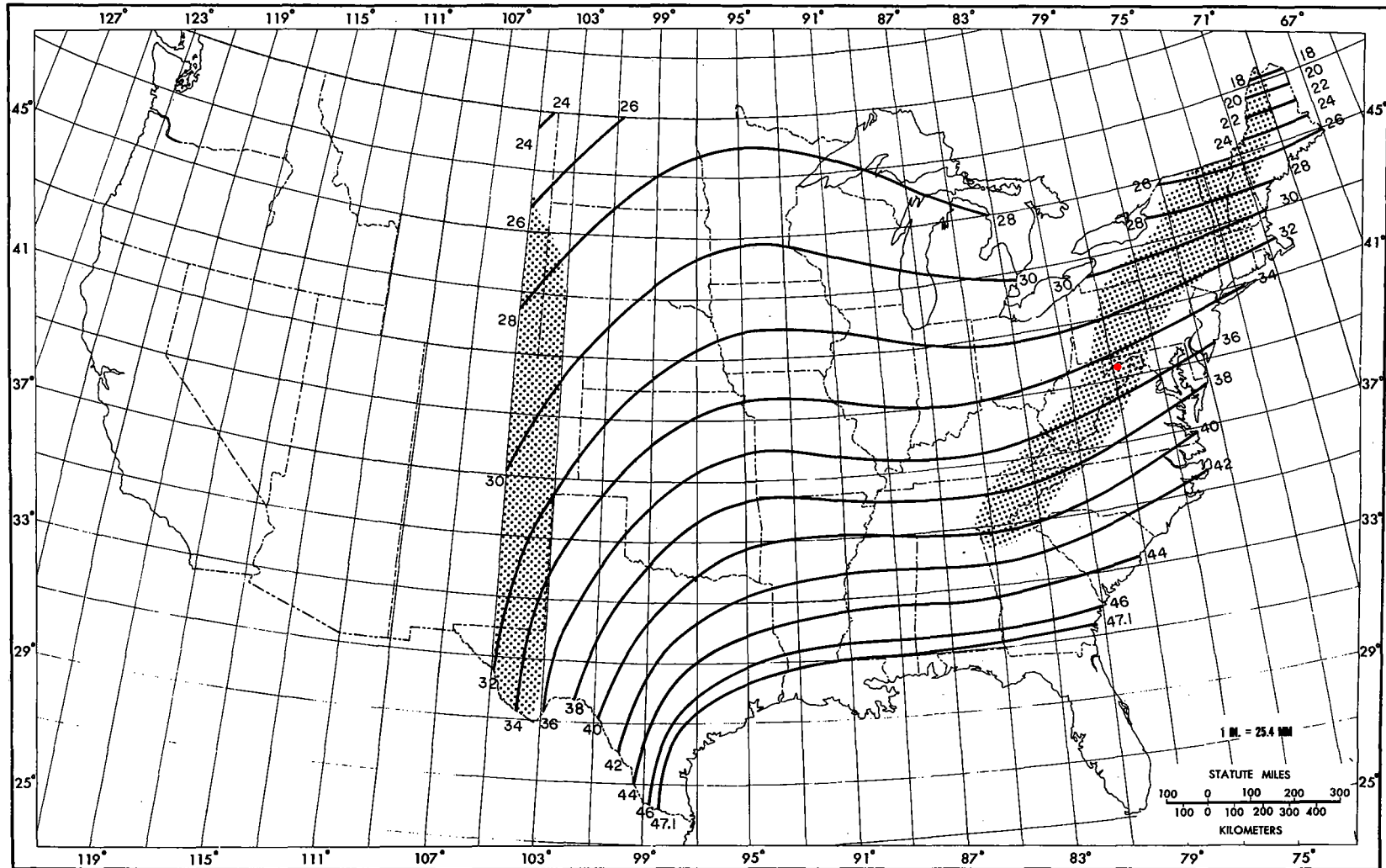
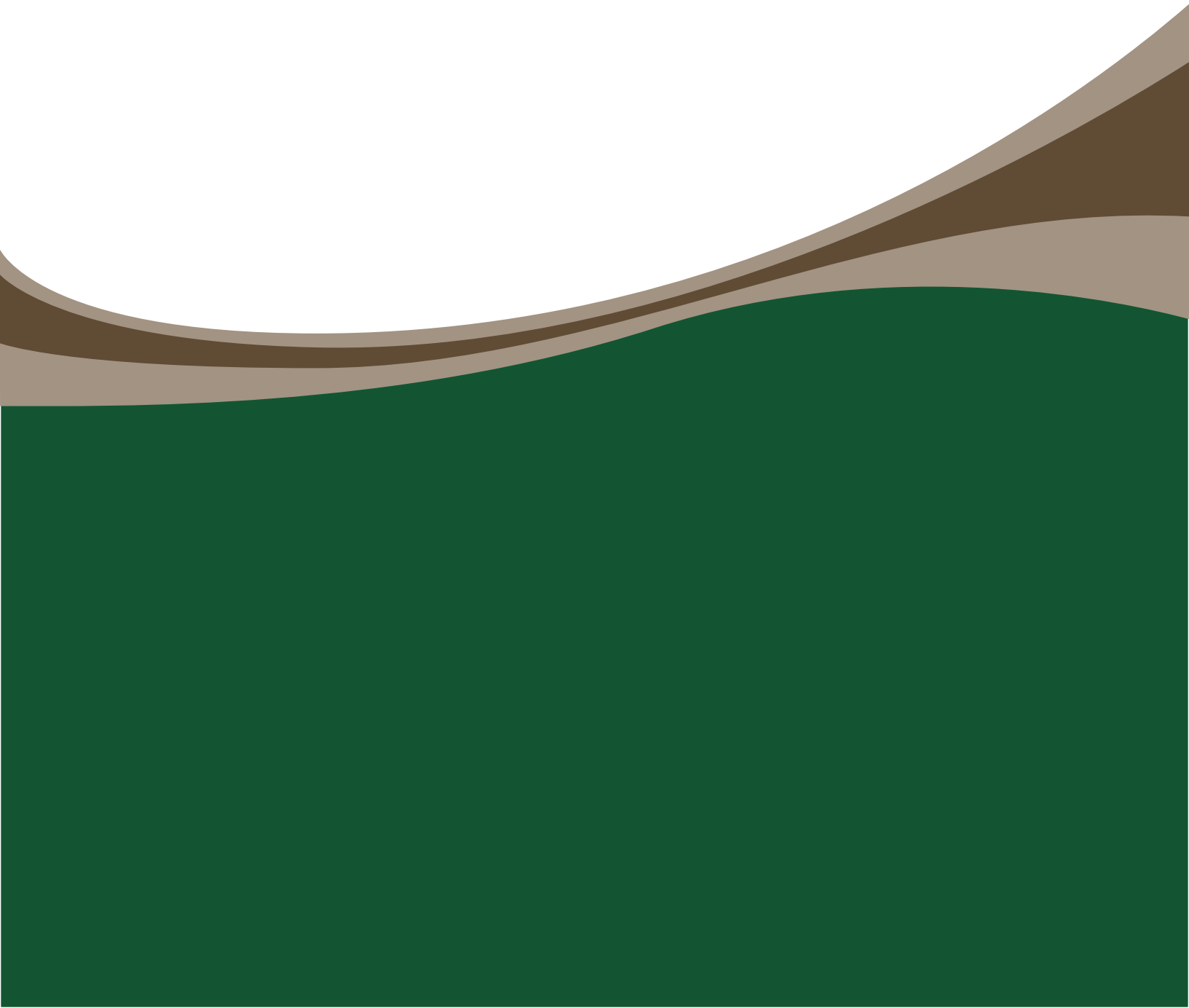


Figure 20.--All-season PMP (in.) for 24 hr 10 mi² (26 km²).

Appendix E

Other Supporting Information



ACRONYMS

ACB	Articulated Concrete Blocks
BMP	best management practices
cfs	cubic feet per second
EA	Environmental Assessment
EAP	Emergency Action Plan
FBH	Freeboard Hydrograph
FEMA	Federal Emergency Management Agency
GIS	geographic information systems
gpm	gallons per minute
HEC-RAS	Hydrologic Engineering Center-River Analysis System (USACE)
HGM	hydrogeomorphic
LF	linear feet
NAAQS	National Ambient Air Quality Standards
NED	National Economic Development
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
NWPM	National Watershed Program Manual
O&M	operation and maintenance
P&G	Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies
PAR	population at risk
PEM	palustrine emergent wetland
Plan-EA	Watershed Plan and Environmental Assessment
PM₁₀	Particulate Matter (10 micrometers or less)
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
PSD	Public Service District
PSS	palustrine scrub-shrub wetland
RBP	rapid bioassessment protocol
SHPO	State Historical Preservation Office
SITES	Water Resources Site Analysis Program
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
WVCA	West Virginia Conservation Agency
WVDEP	West Virginia Department of Environmental Protection
WVDNR	West Virginia Department of Natural Resources
WVSCI	West Virginia Stream Condition Index

GLOSSARY

affected environment - The physical, ecological, economic, and social characteristics of the area impacted by the proposed project.

appurtenances - Ancillary features of a dam such as outlets, spillways, power plants, tunnels, etc.

auxiliary spillway - Any secondary spillway that is designed to be operated infrequently, possibly in anticipation of some degree of structural damage or erosion to the principal spillway that would occur during operation. It is usually located in a saddle or depression in the reservoir rim which leads to a natural or excavated waterway, located away from the dam which permits the planned release of excess flood flow beyond the capacity of the service spillway.

base flow - Stream flow originating entirely from groundwater discharging to the stream.

bathymetry - The measurement of water depth across a water body.

benthic - Refers to the bottom layer of any body of water and the organisms therein.

biotic - Living; as applied to the components of an ecosystem.

breach - An opening through a dam that allows the uncontrolled draining of a reservoir. A controlled breach is a constructed opening. An uncontrolled breach is an unintentional opening caused by discharge from the reservoir. A breach is generally associated with the partial or total failure of the dam.

consequences - Potential loss of life or property damage downstream of a dam caused by floodwaters released at the dam or by waters released by partial or complete failure of dam. Includes effects of landslides upstream of the dam on property located around the reservoir.

construction cost - The expenses incurred during the installation period for labor, material, equipment, and services; contractors overhead and profit; and other direct costs associated with items such as earthwork removal or replacement, purchase and installation of materials and appurtenances, plus a realistic contingency allowance.

cost-share - The agreed upon responsibility for funding of, or a portion of, a federal project among the project sponsors, including federal, state and local agencies and organizations. The percentages of shared costs among project sponsors is based on applicable federal and/or state regulation and is documented via a project specific agreement.

dam - A dam is a physical improvement to confine or raise water for storage or diversion, and may include a sediment pool, conservation pool, and flood pool.

dam failure - Catastrophic type of failure characterized by the sudden, rapid, and uncontrolled release of impounded water or the likelihood of such an uncontrolled release.

decommission - Taking a practice out of service in an environmentally sound and safe manner, or converting it to another purpose.

design life - The intended period of time that the practice will function successfully with only routine maintenance; it is determined during the design phase.

drawdown - Lowering the level of water in a selected portion of an aquatic system; conducted for habitat management purposes with dams or pumps.

Emergency Action Plan (EAP) - A plan of action to be taken to reduce the potential for property damage and loss of life in an area affected by the failure of a dam or other potentially hazardous practice.

engineering cost - Expenses incurred in formulating the engineering design. These expenses include the direct cost of engineers and other technicians for surveys, investigations, designs, and preparation of plans and specifications for structural and nonstructural measures, including associated vegetative work, and preparation of operation and maintenance plans. It does not include the cost of similar services for real property rights, obtaining permits, or contract administration for the project.

environmental assessment (EA) - A concise public document, prepared to comply with the National Environmental Policy Act (NEPA) of 1969, as amended, that briefly provides sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact. The environmental assessment describes the effects of proposed activities on the human and natural environment and measures to mitigate environmental effects.

failure mode - A potential failure mode is a physically plausible process for dam failure resulting from an existing inadequacy or defect related to a natural foundation condition, the dam or appurtenant structures design, the construction, the materials incorporated, the operations and maintenance, or aging process, which can lead to an uncontrolled release of the reservoir.

flood - A temporary rise in water surface elevation resulting in inundation of areas not normally covered by water. Hypothetical floods may be expressed in terms of average probability of exceedance per year such as one-percent-chance-flood, or expressed as a fraction of the probable maximum flood or other reference flood.

flood hydrograph - A graph showing, for a given point on a stream, the discharge, height, or other characteristic of a flood with respect to time.

floodplain - An area adjoining a body of water or natural stream that may be covered by floodwater. Also, the downstream area that would be inundated or otherwise affected by the failure of a dam or by large flood flows. The area of the flood plain is generally delineated by a frequency (or size) of flood.

freeboard - The vertical distance between a stated reservoir elevation and the crest of the dam.

freeboard hydrograph - The hydrograph used to establish the minimum settled elevation of the top of the dam. It is also used to evaluate the structural integrity of the spillway system.

geomorphology - The science that deals with land and submerged relief features (landforms) of the earth's surface; the physical structure of the river floodplain environment.

habitat - The living place of an organism or community, characterized by its physical or biotic properties; habitats can be described on many scales from microhabitat to ecosystems to biomes.

hazard - A situation that creates the potential for adverse consequences such as loss of life, property damage, or other adverse impacts.

Hazard Potential Classification - A system that categorizes dams according to the degree of adverse incremental consequences of a failure or misoperation of a dam. The hazard potential classification does not reflect in any way on the current condition of the dam (i.e., safety, structural integrity, flood routing capacity).

headcut - Downcutting of a flowbed in an upstream direction, forming a gully or depression which can lead to destabilization or failure of an embankment.

hydrograph - A graphic representation of discharge, stage or other hydraulic property with respect to time at a discrete point on a stream.

hydrologic - Pertaining to the cyclic phenomena of waters of the earth, successively as precipitation, runoff, storage and evaporation, and quantitatively as to distribution and concentration.

impoundment - The volume of standing water that is maintained behind a dam.

inundation map - A map showing areas that would be affected by flooding from releases from a dam's reservoir. The flooding may be from either controlled or uncontrolled releases or as a result of a dam failure. A series of maps for a dam could show the incremental areas flooded by larger flood releases.

invasive species - Any species that has the tendency to invade or enter a new location or niche; an introduced species that out competes native species for space and resources; an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.

macroinvertebrate - Small, but visible with the naked eye, animals without backbones (insects, worms, larvae, etc.); water bodies have communities of aquatic macroinvertebrates.

mitigation - Measures included to avoid, minimize, rectify, reduce, or eliminate over time, or compensate for environmental impacts.

National Economic Development (NED) Plan - The plan alternative that reasonably maximizes the net national economic benefits in dollars while protecting the nation's environment. Net economic benefits are benefits minus costs and are not the same as the benefit-cost ratio.

normal pool - For a reservoir whose outflow is controlled wholly or partially by movable gates, siphons or other means, it is the maximum level to which water may rise under normal operating conditions, exclusive of any provision for flood surcharge.

operation and maintenance (O&M) - Activities and costs associated with managing and maintaining an area or structure, includes funding for personnel, minor repairs, and supplies.

planning cost - All expenditures from Public Law 83-566 and other funds for surveys and investigations, environmental studies, evaluation of alternatives, and preparation of plans prior to the authorization of assistance for the installation of works of improvement.

principal spillway - The primary outlet device for a water impoundment. It usually consists of either a riser structure in combination with an outlet conduit, which extends through the embankment, or a weir control section cut through the embankment.

probable maximum precipitation (PMP) - The greatest depth of precipitation for a given duration that is physically possible over a given storm area at a particular geographic location at a certain time of year.

project sponsors - Any State or political subdivision; any soil or water conservation district, flood prevention or control district, or combinations thereof; or any other agency having authority under State law to carry out, maintain, and operate the works of improvement, or any irrigation or reservoir company, water users' association, or similar organization having such authority and not being operated for profit that may be approved by the Secretary; or any Indian Tribe or Tribal organization having authority under Federal, State, or Indian Tribal law to carry out, maintain, and operate works of improvement. Project sponsors must have the legal authority and resources to carry out, operate, and maintain works of improvement.

population at risk (PAR) - All those persons who could be in the flooded area below a dam attributable to the failure of the dam at the time of failure.

Preferred Alternative - The option and course of action that the project sponsors and NRCS agree best addresses the stated purpose and need.

reach - A continuous stretch or expanse. In reference to rivers, it can be used to define portions of rivers at different scales (i.e., pool reach, reach between two river bends).

rehabilitation - Improvements to a natural resource; putting back into good condition or working order.

reservoir - A body of water impounded by a dam and in which water can be stored.

riparian - Ecotones that occur along watercourses or water bodies. 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 would include perennial and intermittent streambanks, floodplains, and lake shores.

sedimentation - The process of sediment being deposited in a given location.

spillway capacity - The maximum spillway outflow that a dam can safely pass with the reservoir at its maximum level.

spillway crest - The lowest level at which water can flow over or through the spillway.

spillway design flood - The flood hydrograph used in the design of a dam and its appurtenant works, particularly for sizing the spillway and outlet works and for determining maximum storage, height of dam, and freeboard requirements.

stakeholder - Those organizations and/or individuals having a vested interest in the outcome of a decision-making process.

storage - The retention of water or delay of runoff either by planned operation, as in a reservoir, or by temporary filling of overflow areas, as in the progression of a flood wave through a natural stream channel.

subwatershed - A subdivision of a watershed, based on hydrology, generally corresponding to the area drained by a small tributary or stream, as opposed to a major river.

threatened and endangered species - Those species that are listed as threatened or endangered under the Federal Endangered Species Act (ESA) of 1973, and those species that are candidates or proposed as candidates for listing under the ESA; listing can occur at the federal or state level or both.

tributary - A stream or river whose water flows into a larger stream or river.

watershed - The area drained by a river or river system or portion thereof. The watershed for a dam is the drainage area upstream of the dam.

H&H Evaluation of Downstream Impacts from the New Creek Site 1 Auxiliary Spillway

This report summarizes the review and analysis of the New Creek Site 1 auxiliary spillway flowage area in regards to the Real Property Rights policy (section 504.3) of the National Watershed Program Manual for the Supplemental Watershed Plan – Environmental Assessment for the Rehabilitation of New Creek Site 1 Watershed Dam (Plan-EA) in Mineral County WV.

Downstream Development

At the time of construction, land use downstream of the New Creek Site 1 dam was primarily agricultural, however over time the population has expanded and open space has been converted to residential development. Figures 1, 2, and 3 show the level of development downstream of the dam following its construction and current conditions, respectively. Based on the current development downstream of the dam, activation of the auxiliary spillway (2025-year recurrence interval) could result in induced flooding of buildings, primarily residential homes.

Figure 1 - Aerial View of New Creek Site 1 Following the Original Construction in 1957.



Figure 2- Aerial view of New Creek Site 1 sometime after construction.



The 2025-year recurrence interval was calculated by linear extrapolation of the NOAA Atlas 14 data based on the rainfall depths required to activate the existing auxiliary spillway (11.78 in.) as detailed in Table 1 below. The 2025-year event has a 4.82% risk of occurring once in the 100-year design life of the dam.

Table 1 - Linear extrapolation to determine recurrence interval of ASW activation

Duration	Average recurrence interval (years)										
	1	2	5	10	25	50	100	200	500	1000	2025
24-hr	1.96	2.34	2.93	3.46	4.27	4.98	5.79	6.7	8.09	9.3	11.78
10-day	3.78	4.48	5.34	6.03	6.97	7.72	8.48	9.28	10.4	11.4	13.45
% of PMP	6%	7%	8%	10%	12%	14%	17%	19%	23%	27%	34%
											*Rainfall Depths required to activate Existing Spillway

Real Property Rights Policy

The Induced Flooding requirement (section 504.3.C.3.ii) of the National Watershed Program Manual states:

- *“The STC may not allow dwellings, including basements, or any other buildings that contain valuable property or that may be used as permanent or seasonal living quarters, to remain in the area upstream of a dam and below the top-of-dam elevation and the area downstream from the dam within the flowage area of the auxiliary spillway, unless they are floodproofed or otherwise protected from damage. Before financial assistance is made available to the SLO, the dwelling or building must be demolished, relocated, raised, floodproofed, or protected by a floodwall. This must be done so that drainage is adequate and ponding of water is not unreasonable.*
- *If requested by the SLO and approved by the STC, other buildings, such as barns and garages, will be allowed to remain in the flowage easement area. (390-504-M, 4th Ed., Apr 2014) 504.A-7 Title 390 – National Watershed Program Manual Approval for flooding buildings of this type will not be granted if the building is used for the storage of feed, regulated chemicals, perishables, supplies, equipment, or other items that would be substantially damaged by flooding. This prohibition against allowing other buildings also applies to any building used for other purposes if flooding would cause an interruption or delay of operations carried on in the building or if a death or damage to the building’s contents could occur.”*

This requirement raised the question as to whether the New Creek Site 1 dam was inducing flooding due to the residential development downstream of the dam that has occurred over time since construction was completed.

On August 15, 2021, the Real Property Rights Updated Policy became effective per Circular 390-21-1, Attachment B. This policy update addresses the dams that have experienced urbanization and require

minimum land rights that will allow the rehabilitation of a dam to meet its intended purpose. The updated real property requirements for areas downstream of dams is addressed in section 504.3.C.1.iii which states:

"For areas downstream of the dam, landrights should be acquired for the entire area where water elevations are higher for the dam in-place condition than for elevations occurring without the dam in place. See NWPM, Part 504, Subpart A, Section 504.3 C(3)(i)."

NWPM 504.3.C.3.i states:

"Induced flooding is any flooding that results due to the presence of a project measure greater than the flooding that would have occurred without the project measure. Except as stated otherwise, the STC must ensure that the real property rights work map includes all areas of induced flooding resulting from the project measure during the passage of the 100-year, 24-hour storm."

The following sections describe the Preferred Alternative auxiliary spillway and its downstream impacts, compares the Preferred Alternative to Current Condition and the No-Dam Condition, and determines if water elevations for the dam in-place condition are higher than the water elevations occurring without the dam in place (inducing flooding as defined in NWPM 504.3.C.3.i).

Preferred Alternative

The Preferred Alternative plan includes relocation of the auxiliary spillway. To minimize potential impacts to private property associated with realigning the existing exit channel, it is recommended that the existing auxiliary spillway be abandoned and a new Roller Compacted Concrete (RCC) spillway be constructed over the embankment in line with the discharge channel from the principal spillway. An RCC auxiliary spillway with a 50-foot width and maintaining the existing auxiliary spillway crest elevation would be adequate to pass the freeboard hydrograph. With activation of the auxiliary spillway occurring during a 2,025-year event, the need to reduce the potential for activation by raising the auxiliary spillway crest elevation is not warranted. Table 2 provides a comparison of key information for the Current Condition to the Preferred Alternative.

Table 2 - Comparison of Current Conditions to Preferred Alternative

	Current Conditions	Preferred Alternative
Elevation Crest Auxiliary Spillway (ft)	919.9	919.9
Auxiliary Spillway Type	Vegetated	RCC
ASW Width (ft)	78	50
Peak Discharge from Dam (cfs)	2610	2440
Recurrence Interval which Activates ASW (year)	2025	2025
Top of Dam (ft)	925.55	926.1

Figure 7 compares the freeboard hydrograph inundation area immediately downstream of the dam for the existing condition (red shaded area) and with the relocated auxiliary spillway in place (light blue line). The inundation areas are nearly identical except for the area immediately downstream of the existing auxiliary spillway. Figure 8 shows a side-by-side comparison of the estimated PMF flow depths immediately downstream of New Creek Site 1 with the spillway in its current location (Existing Conditions) and with the spillway moved onto the embankment (Proposed Conditions). Figure 12 (Appendix C) provides a side-by-side comparison of PMF extents and depths for the existing condition, proposed spillway, and no dam condition.

Figure 4 - Comparison of the Freeboard Hydrograph Inundation Area (Existing Versus Relocated Auxiliary Spillway)

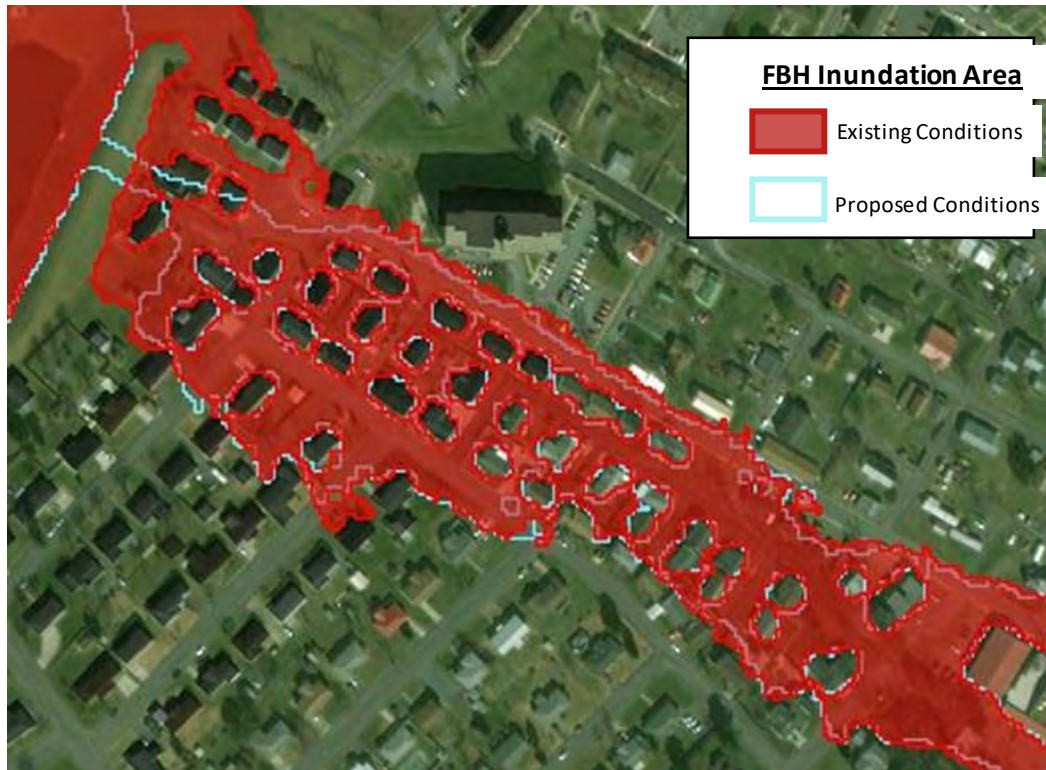
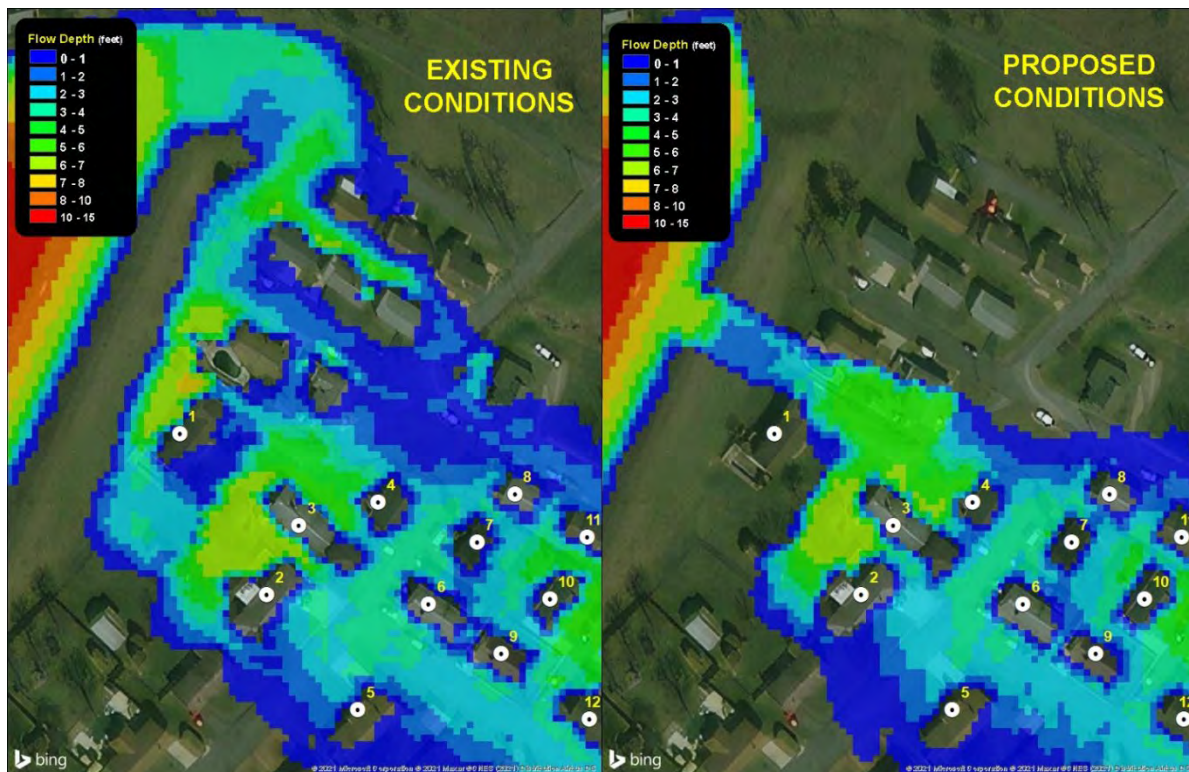


Figure 5 - Side-by-side comparison of the estimated PMF flow depths immediately downstream of the Existing vs Proposed auxiliary spillway exit channel



The current auxiliary spillway configuration impacts homes located in the path of the exit channel within an area that would not be flooded if the spillway was not there. The proposed RCC auxiliary spillway will direct flow into the area which would be flooded from activation of the existing auxiliary spillway and in the no-dam condition. Consequently, no additional properties would be impacted by flooding beyond those properties which are expected to be flooded under the current and no-dam conditions.

SITES Analysis

SITES analyses were conducted for both the short duration (6-hour) storm and the long duration (24-hour) storm in accordance with procedures outlined in the latest version of TR-60. The auxiliary spillway crest was evaluated within the SITES model for the 100-year event. Table 3 presents the calculated auxiliary spillway crest based on the 1-Day/10-Day hydrograph. This analysis indicates that the existing auxiliary spillway crest elevation is conservative, reported to be 3.45 feet above the 100-year elevation as calculated by the runoff criteria. Table 4 compares elevations and SITES outputs from analyzing the original 78-ft. ASW bottom width to the proposed 50-ft ASW bottom width for the existing condition and preferred alternative.

Table 3 - 100-Year (1-Day/10 Day) Comparison

	Point Rainfall Criteria	Runoff Criteria
ASW Crest Elevation (elev.)	912.01	916.45

Table 4 - Comparison of changing the ASW bottom width from 78ft to 50ft

	Existing Conditions 6HR	Preferred Alternative 6HR	Existing Conditions 24HR	Preferred Alternative 24HR
Elevations				
Permanent Pool	905.7	905.7	905.7	905.7
ASW Crest Elevation	919.9±	919.9±	919.9±	919.9±
Top of Dam	925.5±	926.1	925.5±	926.1
SITES Summary Table				
ASW Width (ft)	78	50	78	50
SDH Rainfall Duration (Hours)	6	6	24	24
SDH Rainfall Total (Inches)	9.9	9.9	13.3	13.3
FBH or Storm Rainfall Duration (Hours)	6	6	24	24
FBH or Storm Rainfall Total (Inches)	27.2	27.2	34.6	34.6
SDH Inflow Peak (cfs)	679.4	679.4	360.9	360.9
FBH or Storm Inflow Peak (cfs)	3142.1	3142.1	1286.9	1286.9
Initial Reservoir Elevation (ft)	906.82	906.82	906.82	906.82
Maximum WS SDH (ft)	919.72	919.72	919.24	919.24
Maximum WS FBH (ft)	924.55	925.45	922.84	923.61
Storage at Max. WS FBH (ac-ft)	124.4	132.2	110.6	116.8
Top of Dam (ft)	924.55	925.45	922.9	923.61
Pool Head (Hp) FBH (ft)	4.65	5.55	2.94	3.71
ASW Peak Discharge FBH (cfs)	2533	2341	1195	1188

Conclusion

Based on the Real Property Rights Updated Policy (section 504.3.C.1.iii) of the National Watershed Program Manual, the current alignment of the auxiliary spillway of the New Creek Site 1 dam induces flooding if activated. This is primarily due to the extensive development that has occurred downstream and in the auxiliary spillway exit channel since completion of the dam. Based on SITES analysis, the current ASW elevation is conservative at approximately 3.45 feet above the 100-year elevation as calculated by the runoff criteria and is activated by the 2025-year event.

Many alternative options were explored within section 4.2 of the Supplemental Watershed Plan – Environmental Assessment to remove, reduce, and/or decrease the recurrence interval of ASW flow to mitigate the issue, however since the current ASW elevation and recurrence interval (2025-years) are

already conservative based on SITES analysis, these are not warranted as viable options for various reasons including additional construction cost, social costs, and impacts on the environment and property.

The preferred alternative for the dam rehabilitation of New Creek Site 1 would not induce flooding of downstream properties and structures if the auxiliary spillway were activated because the water surface elevations (WSEs) are not higher than WSEs for the no-dam condition, per NWPM 504.3.C.1.iii. Current conditions of New Creek Site 1 would induce flooding during PMF flows to the 7 home located in the exit flowpath of the auxiliary spillway. The final proposed dam rehabilitation alternative and corresponding design will continue to maintain flood control which exceeds the 500-year flood event at the crest of the auxiliary spillway and remove the potential for erosion at the embankment toe resulting from activation of the auxiliary spillway.

WV SHPO Section 106 Review Information
New Creek Site 1 Dam Rehabilitation (new project)

I. General Project Information

Federal Agency: Natural Resources Conservation Agency (funding assistance)

Federal Agency Contact Person:

Louis Aspey, NRCS State Conservationist
1550 Earl L. Core Road
Morgantown, WV 26505
Phone: 304-284-7540
Email: Louis.Aspey@wv.usda.gov

State Agency: West Virginia Conservation Agency (lead agency)

State Agency Contact Person:

Brian Farkas, WVCA Executive Director
1900 Kanawha Boulevard, East
Charleston, WV 25305
Phone: 304-558-2204
Email: bfarkas@wvca.us

Project Contact Person:

Eric Neast, Gannett Fleming, Inc.
PO Box 67100
Harrisburg, PA 17106-7100
Phone: 717-763-7212 extension 2828
Email: eneast@gfnet.com

Project Address: Baker Street and Carskadon Lane, Keyser, WV 26726

Project Location: See attached mapping. Coordinates 39.434982 N, 78.994097 W

Project Description: Proposed rehabilitation of the existing dam and associated structures. Project is in the scoping phase – no alternatives or design concepts have been developed to date. Dam was completed in 1957. The normal pool surface of the associated impoundment covers approximately 2.1 acres, holding approximately 9.0 acre-feet of water. The dam structure is a 945-foot long earthfill embankment approximately 41.7 feet in height above the principal spillway. Land use in the immediate vicinity of the dam and impoundment generally consists of grass/forest cover to the north and single family residences to the south.

No substantial impact to structures (other than those associated with the dam) are anticipated, although it remains possible that structures immediately adjacent to the principal spillway outlet channel may be impacted by rehabilitation alternatives.

WV SHPO Section 106 Review Information
New Creek Site 1 Dam Rehabilitation (new project)

Project Photographs:



Looking north across New Creek Site 1 pool



Looking east across New Creek Site 1 toward Carskadon Lane

WV SHPO Section 106 Review Information
New Creek Site 1 Dam Rehabilitation (new project)



Looking northeast across New Creek Site 1 embankment



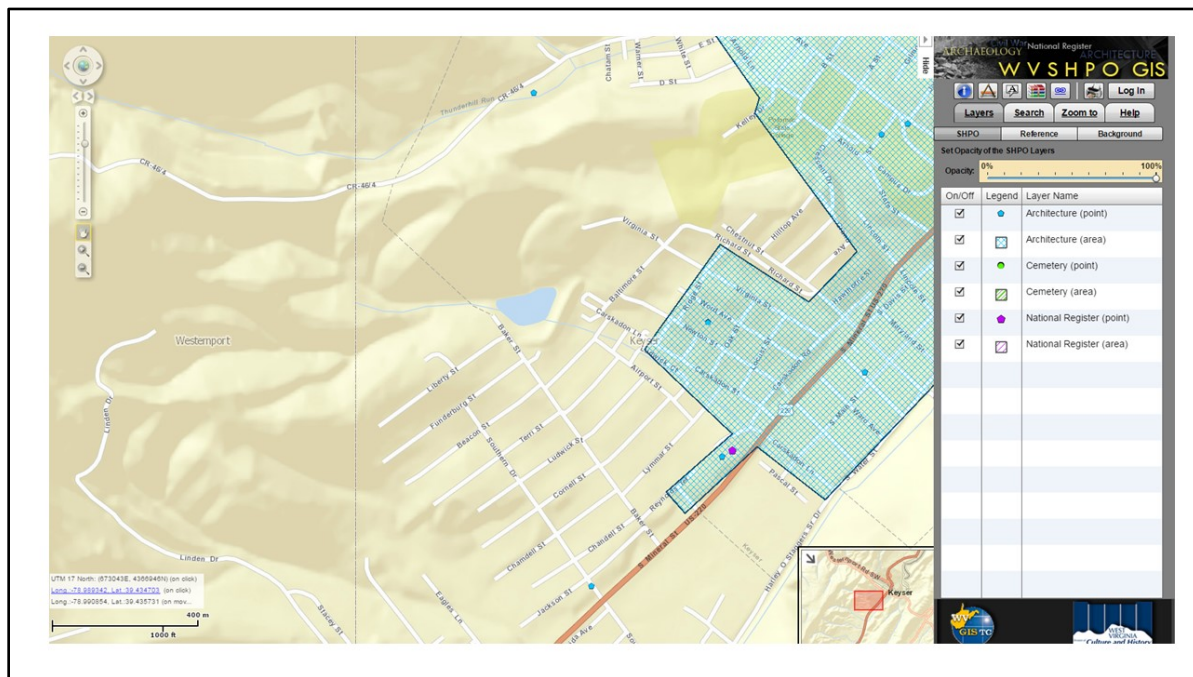
Looking southeast from top of New Creek Site 1 embankment – Carskadon Lane to left. Principal spillway outlet channel noted by arrow.

WV SHPO Section 106 Review Information

New Creek Site 1 Dam Rehabilitation (new project)

Identification of Cultural Resources

Based on review of the West Virginia State Historic Preservation Office Interactive Map Viewer, there are no potential historic resources in the vicinity of the New Creek Site 1 dam. The eligible Keyser Historic District (MI-0200) is not located within the Area of Potential Effects for the project.





Internal Rating: _____

WEST VIRGINIA HISTORIC PROPERTY INVENTORY FORM

Street Address North of Parrish Street	Common/Historic Name/Both ☐ ☒ ☐ New Creek Site 1 Watershed Dam	Field Survey # S-001	Site # (SHPO Only) MI-0249	
Town or Community Keyser	County Mineral	Negative No.	NR Listed Date	
Architect/Builder U.S. Department of Agriculture Soil Conservation Service	Date of Construction c.1957	Style Earth embankment dam for flood control		
Exterior Siding/Materials n/a	Roofing Material n/a	Foundation n/a		
Property Use or Function Residence ☐ Commercial ☐ Other ☒ UTM# NAD83/Zone 17 North 4366932 East 672711	Photo 1 			
Survey Organization & Date Cultural Resource Analysts, Inc. 12/3/19				Quadrangle Name Keyser
Part of What Survey/FR#				

Sketch Map of Property
Or Attach Copy of USGS Map



Site No.

Present Owners D&L Coal Company parcel owner Phone # WV Conservation Agency has easement for operation and maintenance of dam	Owners Mailing Address
Describe Setting _ Acres Located on an unnamed tributary of New Creek approximately 1 mile southwest of the center of Keyser, WV. It is boarded to the southeast and southwest by residential development and to the north by undeveloped land consisting of fields and forested areas. <u>No</u> Archaeological Artifacts Present	
Description of Building or Site (Original and Present) _ Stories _ Front Bays The earthfill dam is 41.7-foot-high by 945-foot-long and was constructed for the purpose of flood control. The earthfill embankment has two spillways that consist of the main two-stage spillway and an auxiliary spillway that is an open channel covered in vegetation. Both spillways are uncontrolled and the main spillway carries all the discharge until the pool level reaches the level of the auxiliary spillway. A drawdown gate was constructed to lower or drain the reservoir. The reservoir covers an approximate area of 3.35 acres. (Use Continuation Sheets)	
Alterations ☐ Yes ☒ No If yes, describe:	
Additions ☐ Yes ☒ No If yes, describe:	
Describe All Outbuildings: N/A (Use Continuation Sheets)	
Statement of Significance MI 0249 is associated with mid-twentieth century flood control measures. As stated in the 2011 report; <i>Rehabilitation Assessment Report: New Creek Watershed Site 1</i>, "The purpose of the plan for New Creek Subwatershed was to outline land treatment and structural measures necessary to achieve the maximum practical erosion control and alleviate flood damage. Installation of planned structural measures were to assist in providing floodwater protection to dwellings, roads, fields, crops, and businesses, and to permit more intensive land use by reducing damage to land in the flood regions and also make uplands more attractive and productive. A total of 9 floodwater retarding dams were constructed on tributaries within the New Creek Watershed" (Gannett Fleming 2011). Research did not reveal any significant events that would rise to the level that would make the site eligible under Criterion A. Research revealed no significant persons associated with MI 0249 and is not recommended as eligible for listing in the NRHP under Criterion B. (Use Continuation Sheets)	
Bibliographical References Gannett Fleming Inc. 2019 Rehabilitation Assessment Report New Creek Watershed Site 1 Mineral County, West Virginia. Technical Report. Harrisburg, Pennsylvania. (Use Continuation Sheets)	
Form Prepared By: Robert W. Ball, MHP Date: 12/5/19	
Name/Organization: Cultural Resource Analysts, Inc. Address: 3556 Teays Valley Road, Suite 3 Hurricane, WV 25526 Phone #: 304-562-7233	



West Virginia Division of Culture and History
State Historic Preservation Office

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WEST VIRGINIA HISTORIC PROPERTY FORM

CONTINUATION SHEET

NAME: New Creek Site 1 Watershed Dam **SITE#** MI-0249

Statement of Significance cont.

The structure is not a particularly outstanding example of mid-twentieth century flood control. The structure does not contain any unique or distinctive characteristics that would set it apart from other earthen dams. As a result, this site does not appear eligible for listing in the NRHP under Criterion C.

Consequently, CRA recommends that MI-0249 is not eligible for inclusion in the NRHP under Criterion A, B, or C.

WEST VIRGINIA HISTORIC PROPERTY FORM

CONTINUATION SHEET

NAME New Creek Site 1 Watershed Dam SITE# MI-0249



Photo 2: Reservoir, looking southwest.



Photo 3: Crest of the dam, looking northeast.

WEST VIRGINIA HISTORIC PROPERTY FORM

CONTINUATION SHEET

NAME New Creek Site 1 Watershed Dam SITE# MI-0249



Photo 4: Northeast end of the dam, looking southwest.



Photo 5: Overview of dam, looking northeast.

WEST VIRGINIA HISTORIC PROPERTY FORM

CONTINUATION SHEET

NAME New Creek Site 1 Watershed Dam SITE# MI-0249



Photo 6: Principal spillway riser structure, looking south.



Photo 7: Downstream embankment slope, looking southwest.

