Supplemental Watershed Plan-Environmental Assessment for the Pohick Creek Watershed

Supplement No. 5 to the original watershed plan for the rehabilitation of Pohick Creek Dam No. 2 (Lake Barton)

Fairfax County, Virginia

August 2009

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Abstract

Pohick Creek Dam No. 2, Lake Barton, does not presently meet NRCS or Virginia safety standards for the stability and integrity of the auxiliary spillway. The recommended plan will rehabilitate the Lake Barton dam to meet current safety and design criteria. The plan provides for building a reinforced concrete wall at the end of the level section and a concrete secant wall at the end of the outlet section. The permanent pool elevation will be raised by 0.8 feet to achieve the required sediment storage capacity. The auxiliary spillway crest will be raised by 0.5 feet to maintain the design volume of floodwater storage and to meet NRCS criteria for a vegetated auxiliary spillway. There will be no change in the current levels of flood protection downstream as a result of project activity.

Authority

The original work plan was prepared, and the works of improvement have been installed, under the authority of the Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566), as amended. The rehabilitation of Pohick Creek Dam No. 2 is authorized by the Watershed Protection and Flood Prevention Act (Public Law 83-566) as amended by the Small Watershed Rehabilitation Amendments of 2000 (Section 313 of Public Law 106-472).

Sponsors

Northern Virginia Soil and Water Conservation District
Fairfax County Board of Supervisors

Prepared By:

USDA – Natural Resources Conservation Service

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SUMMARY OF DRAFT SUPPLEMENTAL WATERSHED PLAN

Project Name: Pohick Creek Dam No. 2 (Lake Barton)

County: Fairfax **State:** Virginia

Sponsors: Fairfax County Board of Supervisors
Northern Virginia Soil and Water Conservation District

Description of Recommended Plan: The recommended plan will rehabilitate the Lake Barton dam to meet current safety and design criteria. The plan provides for building a reinforced concrete wall at the end of the level section and a concrete secant wall at the end of the outlet section. The permanent pool elevation will be raised by 0.8 feet to achieve the required sediment storage capacity. The auxiliary spillway crest will be raised by 0.5 feet to maintain the design volume of floodwater storage and to meet NRCS criteria for a vegetated auxiliary spillway. There will be no change in the current levels of flood protection downstream as a result of project activity.

Resource Information:

Size of the entire Pohick Creek Watershed = 23,595 acres
Drainage Area of Lake Barton = 539 acres

Land Use:

Residential/Business, 336 acres, 62.3%
Woodland, 109 acres, 20.2%
Transportation, 64 acres, 11.9%
Grassland, 21 acres, 3.9%
Water, 9 acres, 1.7%
Total = 539 acres
Floodpool of Lake Barton = 25.2 acres

Land Ownership:

Upstream of dam: 78% private, 22% public
Downstream of dam: 38% private, 62% public

Project Beneficiary Profile: The population for Fairfax County in 2006 was 1,010,443. The population diversity was 68% White, 15.8% Asian, 12.9% Hispanic (of any race), 9.5% Black or African American, and 4.5% others. The median age of the population of Fairfax County was projected to be 38.4 in 2006 as compared to 36.9 for the State and 36.4 for the entire nation. Residents 65 years of age or older totaled 9.2% of the total population. This compares to 11.6% for the State and 12.4% for the entire nation.

The 2006 Census estimates indicate that there were 390,761 housing units within Fairfax County with 93% occupied, 69.9% owner-occupied and 23.1% renter-occupied. The state-wide occupancy rate for Virginia as a whole in 2006 was 89.9% and the national figure was 88.4% The local and state-wide rates in 2006 for owner-occupancy, 69.9% and 62.8%, respectively, are higher than the national figure of 59.5%. Residential property values for the land and associated buildings downstream of the dam range between $238,000 and $598,000 with an average of

$377,000. The total value of residential property (structures and contents only, excluding land values) at risk below the dam is an estimated $71,221,000.

In 2006, per capita personal income for Fairfax County was $46,499. That makes the County income 56% higher than the State level and 84% higher than the national figure.

Cultural Resources: A field reconnaissance was conducted in February, 2007 of the area below the dam downstream for approximately 200 meters. The ground surface and creek bed were searched for quartz and other natural material that could be used for the manufacture of stone tools. None were found. No previously recorded archaeological sites are present within the surveyed area. A Phase I archaeological survey was completed in December 2007. No artifact patterning was evident within the area of potential effect that would allow for detailed occupation and/or cultural analyses. No further work was recommended.

Floodplains: The entire area of the 100-year floodplain has been zoned by Fairfax County to prevent development.

Land in Breach Inundation Zone by Type, Acres and Percentage

Residential/Business, 100.7 acres, 25.0%
Woodland, 276.9 acres, 68.8%
Transportation, 24.5 acres, 6.1%
Grassland, 0.6 acres, 0.1%
Water, 0 acres, 0%
Total = 402.7 acres

Highly Erodible Cropland: None exists in the watershed.

Threatened and Endangered Species: There are seven (7) State Threatened (ST) and one (1) State Endangered (SE) animal species known or likely to occur within a two mile radius of the Lake Barton dam site. There are no confirmed sightings of these species. Four (4) of these are also Federal Species of Concern (FS). The listed species are:

T&E Species	Scientific Name	Status*	Confirmed
Brook Floater	Alasmidonta varicosa	FSSE	No
Henslow's Sparrow	Ammodramus henslowii	FSST	No
Appalachian Grizzled Skipper	Pyrgus Wyandot	FSST	No
Migrant Loggerhead Shrike	Lanius ludovicianus migrans	FSST	No
Bald Eagle	Haliaeetus leucocephalus	ST	No
Loggerhead Shrike	Lanius ludovicianus	ST	No
Upland Sandpiper	Bartramia longicauda	ST	No
Wood Turtle	Glyptemys insculpta	ST	No

* Species Legal Status: FT = Federally Threatened; FE = Federally Endangered; ST = State Threatened; SE = State Endangered; FS = Federal Species of Concern

Wetlands: There are no wetlands, jurisdictional or non-jurisdictional, associated with this site.

Problem Identification: At the present time, Lake Barton does not meet current dam design and safety criteria. During the planning process, there were two primary problems identified by the NRCS Planning Team, the local Sponsors and the public. These are the primary issues addressed by the rehabilitation plan.

- The vegetated earth auxiliary spillway does not have the stability or integrity to carry the design flow without breaching.
- There is not enough sediment storage capacity to hold 50 years of sediment.

The breach inundation zone includes Roberts Parkway (13,000 vehicles per day), Guinea Road (16,000 vehicles per day), the Norfolk Southern/Virginia Railway Express and Amtrak rail lines (9,000 passengers per day), Burke Lake Road (35,000 vehicles per day), and five utilities (sewer, electric, water, gas, and telecommunications). There are 192 single family homes and townhouses, 38 business sites and three public buildings located in the breach inundation zone.

Alternative Plans Considered: Several alternatives were considered during the planning process with the following two being evaluated in detail:

1. No Federal Action – Sponsors will rehabilitate the dam to meet current dam safety and design criteria without Federal assistance.
2. Rehabilitate the Dam – Rehabilitate the dam to meet current dam safety and design criteria using Federal assistance.

Project Purpose: This project will bring Lake Barton into compliance with the current dam design and safety criteria for NRCS and the Commonwealth of Virginia. It also provides for the continuation of existing flood control for another 50 years after completion. The rehabilitation project will address all needs identified during the planning process.

Principal Project Measures: The rehabilitation of the dam involves the following actions:

- Extend the existing training dike approximately 40 feet to protect the dam embankment and contain spillway flow.
- Construct a reinforced concrete wall at the downstream edge of the level section.
- Construct a concrete secant wall at the end of the outlet section.
- Regrade the top of the dam adjacent to the auxiliary spillway to raise it to the design elevation.
- Increase the sediment storage in the lake by raising the elevation of the principal spillway orifice crest by 0.8 feet. The orifice opening will be enlarged to 22"W x 19"H.
- Raise the crest of the auxiliary spillway by 0.5 feet to maintain the design floodwater storage and to meet NRCS criteria for a vegetated spillway.

Project Costs (Dollars):	PL-106-472 Funds 65%	Other Funds 35%	Total 100%
Structural Measures:	$1,814,000	$741,000	$2,555,000

Project Benefits: Reduces potential for loss of life and maintains protection of existing infrastructure downstream of the dam and property values around the lake. Net average annual

equivalent benefits between the Future with Federal Project (FWFP) and the Future without Federal Project (FWOFP) = $0

Non-monetary Benefits:

- Minimizes the threat to loss of life to approximately 1,585 people that live and work in the 192 single family homes and townhouses, 38 business sites, and three public buildings within the breach inundation zone.
- Satisfactorily meets the dam design and safety criteria established by the Virginia Division of Dam Safety and Floodplain Management and NRCS.
- Eliminates the liability associated with continuing to operate an unsafe dam.
- Provides protection for Roberts Parkway, Premier Court, Guinea Road, and Burke Lake Road, which have a combined average daily traffic count of 73,800 vehicles.
- Provides protection for the Norfolk Southern/VRE and Amtrak railroad tracks downstream that transport approximately 9,000 passengers daily.
- Provides protection for the 545 vehicles that park daily in the VRE parking lot.
- Provides protection for five utilities located in the breach zone.
- Provides flood protection for the scores of people living in the area, as well as those working, recreating, or traversing within the downstream floodplains.
- Traps 0.68 acre feet of sediment annually, thereby improving downstream water quality.
- Maintains existing stream habitat downstream of the dam.
- Maintains the existing fish and wildlife habitat in and around the lake.
- Preserves recreational opportunities for area residents.

Environmental Values Changed or Lost:

Resource	Impact
Air Quality	Short term impacts during construction.
Land Use Changes	Cut 0.4 acres of trees. Replant 0.2 acres of trees onsite and 0.2 acres elsewhere in the watershed.
Floodplains	Current floodplain would be maintained.
Fisheries	Fish habitats would be maintained and/or protected.
Wildlife Habitat	Habitat will be maintained and protected in the watershed.
Wetlands	No effect.
Prime Farmland	N/A
Cultural Resources	No effect.
Threatened and Endangered Species	No effect.
Mitigation	Replant 0.2 acres of trees onsite. Replant 0.2 acres of trees elsewhere in the watershed.

Major Conclusions: In order to bring this dam into compliance with State safety criteria, it is necessary to rehabilitate the auxiliary spillway and training dike. The majority of the environmental impacts are short-term and existing conditions will be restored upon completion of construction.

Areas of Controversy: None

Issues to be Resolved: None

POHICK CREEK WATERSHED AGREEMENT

Supplemental Watershed Plan Agreement
(Supplement No. 5)

between the

Fairfax County Board of Supervisors
Northern Virginia Soil and Water Conservation District
(herein referred to collectively as "Sponsors")

and the

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

Whereas, the Watershed Work Plan Agreement for the Pohick Creek Watershed, Commonwealth of Virginia, authorized under the Watershed Protection and Flood Prevention Act (Public Law 83-566, 16 U.S.C. 1001 et seq.) and executed by the Sponsors named therein and the Soil Conservation Service (which is now NRCS, pursuant to section 246 of the Department of Agriculture Reorganization Act of 1994, 7 U.S.C. 6862), became effective the 1st day of April 1969; and

Whereas, Supplement No. 1, which modified the Watershed Plan Agreement, was developed through cooperative efforts of the Sponsors and the Soil Conservation Service and became effective on the 25th day of September 1970; and

Whereas, Supplement No. 2, which modified the Watershed Plan Agreement, was developed through cooperative efforts of the Sponsors and the Soil Conservation Service and became effective on the 18th day of October 1971; and

Whereas, Supplement No. 3, which modified the Watershed Plan Agreement, was developed through cooperative efforts of the Sponsors and NRCS and became effective on the 25th day of September 2006; and

Whereas, Supplement No. 4, which modified the Watershed Plan Agreement, was developed through cooperative efforts of the Sponsors and NRCS and became effective on the 30th day of June 2008; and

Whereas, application has been made to the Secretary of Agriculture by the Sponsors for assistance in preparing a plan for rehabilitation of the works of improvement for the Pohick Creek Dam No. 2 located in Fairfax County, Commonwealth of Virginia, under the authority of Section 14 of the Watershed Protection and Flood Prevention Act (16 U.S.C. 1012); and

Whereas, through the cooperative efforts of the Sponsors and NRCS, a Supplemental Watershed Plan has been developed to rehabilitate the Pohick Creek Dam No. 2, which Plan is annexed to and made a part of this Supplemental Watershed Plan Agreement; and

Whereas, in order to provide for rehabilitation of Pohick Creek Dam No. 2, it has become necessary to modify the Supplemental Watershed Plan Agreement;

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

1. Fairfax County agrees to continue to participate in and comply with applicable federal and state floodplain management and flood insurance programs before construction starts.

2. Fairfax County will acquire all necessary land rights, easements, or rights-of-way in connection with the planned works of improvement.

3. No relocations are planned with this rehabilitation project. However, should it be determined later that relocation is needed, relocation costs will be cost-shared at following rate:

Sponsors	NRCS	Total Relocation Costs
35%	65%	100%

4. The Sponsors hereby agree that they will comply with all the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. 4601 et. seq., as implemented by 7 C.F.R. Part 21 and 49 C.F.R. Part 24) when acquiring real property interests for this federally assisted project. If the Sponsors are legally unable to comply with the real property acquisition requirements of the Act, 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. In any event, the Sponsors agree that they will reimburse owners for necessary expenses as specified in 49 C.F.R. Part 24.

5. Fairfax County will obtain all necessary federal, state, and local permits required by law, ordinance, or regulation for installation of the planned works of improvement. The costs of such permitting is not eligible as part of the Sponsors' cost-share requirement.

6. Fairfax County will be responsible for the costs of water, mineral and other resource rights, and will acquire or provide assurance that landowners or resource users have acquired such rights pursuant to state law as may be needed in the installation and operation of the works of improvement. The costs associated with the subject rights are not eligible as a part of the Sponsors' cost-share requirement.

7. NRCS will assist the Sponsors with the installation of planned works of improvement. The percentages of total rehabilitation project costs to be paid by the Sponsors and by NRCS are as follows:

Project Costs
(Dollars)

Works of Improvement	NRCS PL-106-472 Funds	Other Funds - Fairfax County's Responsibility	Total Estimated Cost
Cost Sharable Items (per PL-106-472 and NRCS policy)	---	---	---
Rehabilitation of the dam (construction costs):	$1,729,000	$331,000	$2,060,000
Relocation, Replacement in-kind	$0	$0	$0
Relocation, Required Decent, Safe, Sanitary	$0	$0	$0
Sponsor's Planning Costs:	n/a	$190,000	$190,000
Sponsor's Engineering Costs:	n/a	$300,000	$300,000
Sponsor's Project Administration Costs:	n/a	$105,000	$105,000
Land Rights Acquisition Costs:	n/a	$5,000	$5,000
Subtotals: Cost-Sharable Costs: Cost-Share Percentages [a/]	**$1,729,000** (65%)	**$931,000** (35%)	**$2,660,000** (100%)
Non Cost-Sharable Items (per PL-106-472 and NRCS policy) [b/]	---	---	---
NRCS Engineering and Project Administration Costs:	$85,000	n/a	$85,000
Federal, State and Local Permits:	n/a	$0	$0
Subtotals: Non-Cost-Sharable Costs:	**$85,000**	**$0**	**$85,000**

a/ The maximum NRCS cost-share is 65% of the cost-sharable items not to exceed 100% of the construction cost. Total eligible project costs include construction, land rights, relocation, project administration, and planning services provided by the Sponsors. Not included are NRCS engineering technical assistance costs of $75,000; NRCS project administration costs of $10,000; and the local cost of permitting and ordinances.

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

8. The Sponsors will continue to ensure that the land draining into the Pohick Creek Dam No. 2 is adequately protected from excessive erosion through: 1) proper administration of the county's Erosion and Sediment Control Ordinance for any future construction; 2) continuation of land management measures on parkland and other public lands, and of stormwater management measures throughout the watershed, that reduce the erosive effect of stormwater runoff on streams; and 3) judicious application of other similar county policies and regulations that serve to protect water quality and reduce the degradation of stream channels. These measures support the goal of providing protection to the reservoir from undue sedimentation throughout the life of the structure.

9. Fairfax County will be responsible for the operation, maintenance, and replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with a new operation and maintenance agreement that will be entered into before

issuing invitations to bid for construction work. The term of the operation and maintenance agreement will be for the 52-year period of analysis (50-year evaluated life plus 2 years for design and installation). The Operation and Maintenance Agreement shall be prepared in accordance with the NRCS National Operation and Maintenance Manual.

10. An Emergency Action Plan (EAP) currently exists for the Floodwater Retarding Structure included in this plan. Fairfax County will provide leadership in developing a new EAP that is appropriate for the rehabilitated condition of this structure and will update the EAP annually with assistance from the local emergency response officials. NRCS will provide technical assistance in preparation and updating of the EAP. The purpose of the EAP is to outline appropriate actions and to designate parties responsible for those actions in the event of a potential failure of a floodwater retarding structure. The NRCS State Conservationist will ensure that a current EAP has been prepared prior to the initiation of construction.

11. The costs shown in this plan are preliminary estimates. Final costs to be borne by the parties hereto will be based on the actual costs incurred in the installation of works of improvement and the cost-share percentages stated in this agreement.

12. 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.

13. This agreement does not commit the NRCS to assistance of any kind beyond the 50-year project life.

14. A separate agreement will be entered into between NRCS and Fairfax County 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.

15. 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 it determines that the Sponsors have failed to comply with the conditions of this agreement. In this case, NRCS shall promptly notify the Sponsors in writing of the determination and the reasons for de-authorization of project funding, together with the effective date. Payments made to the Sponsors or recoveries by NRCS shall be in accord 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.

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

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

18. Certification Regarding Drug-Free Workplace Requirements (7 CFR 3021).

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

Controlled Substance means a controlled substance in Schedules I through V of the Controlled Substances Act (21 U.S.C. 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 manufacturing, distribution, dispensing, use, or possession of any controlled substance;

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

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

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

(2) Establishing an ongoing drug-free awareness program to inform employees about—
(a) The danger of drug abuse in the workplace;

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

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

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

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

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

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

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

(5) Notifying the NRCS in writing, within ten calendar days after receiving notice under paragraph (4)(b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice shall include the identification number(s) of each affected grant;

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

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

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

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

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

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

19. Certification Regarding Lobbying (7 CFR 3018).

(1) The Sponsors certify to the best of their knowledge and belief, that:

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

(b) 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.

(c) The Sponsors 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.

(2) 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.

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

(1) The Sponsors certify to the best of their knowledge and belief, that they and their principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions 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 primary Sponsors are unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this agreement.

Fairfax County Board of Supervisors

By: A H Griffin
ANTHONY H. GRIFFIN

12000 Government Center Parkway, Suite 552
Fairfax, Virginia 22035–2531

Title: County Executive

Date: 7/13/09 | 8/3/09

The signing of this supplemental watershed agreement was authorized by the governing body of the Fairfax County Board of Supervisors at a meeting held on July 13, 2009.

Nancy Vehrs
County Clerk

12000 Government Center Parkway,
Suite 533
Fairfax, Virginia 22035–0072

Date: 8/3/09

Northern Virginia Soil and Water Conservation District

By: Jean R. Packard
JEAN R. PACKARD

12055 Government Center Parkway, Suite 905
Fairfax, Virginia 22035-5512

Title: Chairperson

Date: ~~June 23, 2009~~ 8/3/09

The signing of this supplemental watershed agreement was authorized by the governing body of the Northern Virginia Soil and Water Conservation District at a meeting held on June 23, 2009.

Diane Hoffman
District Administrator

12000 Government Center Parkway,
Suite 533
Fairfax, Virginia 22035–0072

Date: 8-3-09

Natural Resources Conservation Service
United States Department of Agriculture

Approved by:

Date: Aug 3, 2009

JOHN A. BRICKER
State Conservationist

INTRODUCTION

NEED AND PURPOSE

This supplement only addresses the Pohick Creek Dam No. 2, known locally as Lake Barton. This dam was built in 1978. A supplement to the watershed plan is needed because this dam does not meet current Natural Resources Conservation Service (NRCS) or Virginia Department of Conservation and Recreation, Virginia Division of Dam Safety and Floodplain Management (referred to herein as the Virginia Division of Dam Safety) dam design, safety, and performance standards for auxiliary spillway integrity and stability. A conditional certificate for Operation and Maintenance of the structure has been issued by the Virginia Division of Dam Safety because the vegetated earthen auxiliary spillway will not pass the Probable Maximum Flood (PMF) without breaching the structure. For this reason, the dam does not meet the objectives of the Fairfax County Board of Supervisors and the Northern Virginia Soil and Water Conservation District (herein referred to as Sponsors), which are to continue to provide flood protection and to reduce the risk of loss of human life. This supplemental plan documents the planning process by which the USDA Natural Resources Conservation Service (NRCS) provided technical assistance to local Sponsors and the public in addressing resource issues and concerns within the Lake Barton Watershed.

With this need and purpose in mind, it should be noted that the local sponsors have done an outstanding job of maintaining the Pohick Creek dam sites, and Lake Barton is no exception. The Lake Barton dam site, and associated recreational lands and facilities, have been taken care of very well since the dam was constructed. Indeed, in 1993, the Pohick Creek Watershed was recognized as the "Watershed Project of the Year" by the National Watershed Coalition. An aerial photograph of Royal Lake (Pohick Creek No. 4) was featured on the cover of their national meeting brochure and the proceedings from their Jackson, Mississippi, convention.

In addition, Fairfax County should be praised for the overall high quality job that has been done to prevent development within the 100-year floodplain. Through local zoning and effective enforcement of the zoning rules, the County has effectively kept development out of the 100-year floodplain. This has allowed the floodplain to function as it should during storm events and has prevented untold amounts of damages from occurring.

PROJECT SETTING

ORIGINAL PROJECT

A plan for flood prevention and watershed protection was authorized in 1969 under the authority of Public Law 83-566, the Watershed Protection and Flood Prevention Act of 1954. The original work plan included the construction of seven single-purpose dams and one multi-purpose dam that were all high hazard dams designed for a 100-year life, an accelerated land treatment program for watershed protection, and 6.28 miles of stream channel improvement. Of the structures proposed in the plan, five of the single purpose dams and one multi-purpose dam were built from 1970 to 1985. Planned sites No. 6 and No. 10 and the channel work were deleted from the planned works of improvement. The project was closed out in January 1994.

PHYSICAL FEATURES

Project Location: The watershed for Lake Barton is located in Fairfax County, Virginia. Lake Barton drains to Pohick Creek, which empties into the Potomac River at Pohick Bay. The Lake Barton watershed is 539 acres (0.84 square miles). Appendix E shows the location map for this watershed. Three unnamed tributaries of approximately 2.1 miles total length contribute flow to Lake Barton which discharges to an unnamed tributary to Sideburn Branch. A very small impoundment lies at the head of a small tributary to the middle unnamed tributary.

Topography: Lake Barton is located in the Piedmont Physiographic Province. The topography of the Piedmont is relatively flat and topographically featureless. The elevation in the watershed ranges from about 310 feet at the dam to 450 feet at the watershed divide.

Soils: The soils present in the vicinity of Lake Barton are primarily mapped in the Manor series, and are associated with the Fairfax and Glenelg soils. The Manor series consists of shallow, highly micaceous, somewhat excessively drained soils of the uplands. These soils have formed from quartz sericite schist, and are found on narrow, rolling ridgetops and steeper ridge slopes. The surface layer is yellowish brown and is directly over micaceous residuum. Some areas of the Manor soils have a very thin, weakly developed subsoil similar to that of the Glenelg soils.

The predominant map unit in the vicinity of the dam is Manor silt loam, hilly phase, 14-25% slope. This soil has a shallower depth to bedrock than the Manor silt loam, rolling phase, 7-14% slope. It has steeper slopes and is more susceptible to erosion, and has a slightly lower water-holding capacity. The associated Fairfax silt loam, eroded rolling phase, 7-14%, has comparable slope steepness, erosion susceptibility and low water holding capacity.

The Mixed Alluvial Land type, 0-2% slope, occupies the depositional area of small intermittent streams, having been derived from a mix of colluvial and upland soils. It is subject to frequent flooding and continuous deposition.

Geology: The Piedmont Physiographic Province is underlain by metamorphic rocks of various origins that were folded during the Paleozoic era. It is located in the outer Piedmont area adjacent to the fall zone. This area is characterized by rolling upland, erosion, and deep weathering. According to the digital representation of the 1993 geologic map of Virginia, the bedrock at the dam site is Old Mill Branch Metasiltstone that is part of the Popes Head Formation formed in the Ordovician-Cambrian period. A typical characteristic of the bedrock in the area is that it is covered in a saprolitic layer of clayey or silty sands that contains relic rock structure formed by deeply weathered schist.

The boring logs performed during the original design and those performed by Gannett Fleming in 2001 indicate that this geology underlies micaceous sandy silts and clays.

Climate: The watershed has a continental, humid, temperate climate, and is characterized by warm to hot summers and rather cold winters. The average annual temperature is 58.2 degrees Fahrenheit, with an average minimum temperature in winter of 28.2 degrees Fahrenheit, and an average maximum temperature of 88.5 degrees Fahrenheit in the summer. The last frost of spring normally occurs in late April and the first frost in the fall occurs in late October. This provides a growing season of approximately 204 days.

The average annual precipitation is 39.34 inches, varying from about 33.65 inches in the driest years to about 44.5 inches in the wettest years. This precipitation is well distributed throughout the year, with the highest monthly precipitation occurring in May, July and August. Snowfall averages about 14.8 inches annually, with appreciable snow cover on the ground an average of 12 days per year.

LAND USE

The drainage area upstream of Lake Barton is 539 acres. This area was digitized using 2002 USGS Imagery and 2005 NAIP imagery for base maps. Table A lists the land use upstream of the dam. This table also lists the land use in the breach inundation zone below the dam. Appendix E contains the aerial photograph of the watershed.

Table A - Land Use In Acres

Land Cover Type	Drainage Area of Lake Barton (ac.)	Percent Of Total	Breach Inundation Zone (ac.)	Percent of Total
Residential/ Business	336	62.3%	100.7	25.0%
Woodland	109	20.2%	276.9	68.8%
Transportation	64	11.9%	24.5	6.1%
Grassland	21	3.9%	0.6	0.1%
Water	9	1.7%	0	0
Totals	**539**	100.0%	**402.7**	100.0%

THREATENED AND ENDANGERED SPECIES

According to the Virginia Fish and Wildlife Information Service, there are no federal listed threatened or endangered animal species that are likely to occur within a two mile radius of the project dam site.

There is one federal species of concern (FS), state endangered (SE) animal species, the Brook Floater, Alasmidonta varicosa, a freshwater mussel likely to occur within a two mile radius of the project dam, although there have been no confirmed sightings of this species. Seven state threatened (ST) animal species, the Bald Eagle, Haliaeetus leucocephalus; the Henslow's Sparrow, Ammodramus henslowii; the Appalachian Grizzled Skipper, Pyrgus wyandot, a butterfly; the migrant Loggerhead Shrike, Lanius ludovicianus migrans; the Loggerhead Shrike, Lanius ludovicianus; the Wood Turtle, Glyptemys insculpta; and the Upland Sandpiper, Bartramia longicauda, are likely to occur within two miles of the dam. Of these, three are Federal Species of Concern (FS). However, there are no confirmed sightings of these species. There are no state listed threatened or endangered plant species in the project area.

Confirmed occurrence of a listed species in a project area requires consultation with the appropriate State or Federal agency. Since there are no confirmed occurrences of Federal or State listed threatened or endangered species, consultation with these agencies is not required. The

U.S. Fish & Wildlife Service (USFWS), Virginia Department of Game and Inland Fisheries (VDGIF), and the Natural Heritage Division of the Virginia Department of Conservation and Recreation were invited to the preliminary scoping meeting on March 8, 2007. None of the three agencies attended, but two agencies submitted comments by letter and email.

The DCR Natural Heritage Division responded in a February 27, 2007 letter that their "Biotics Data System does not document the presence of natural heritage resources in the project area. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species… The current activity will not affect any documented state-listed plants or insects."

The VDGIF responded by email on March 1, 2007. They stated "According to our current records, there have been no documented occurrences of threatened or endangered wildlife resources under our jurisdiction within the project area. Therefore, we currently do not anticipate a significant adverse impact upon those resources."

NRCS did not find any federally listed species based on review of the VDGIF and VDCR data bases. NRCS concluded that this project is "not likely to affect" any federally listed species or its habitat. The USFWS was consulted and provided concurrence to NRCS regarding this determination during the interagency and public review process.

Table B summarizes the potential occurrence of threatened and endangered species in the project area. Lack of confirmed occurrence of a species within a 2 mile radius of the project dam does not necessarily indicate the species absence since definitive surveys may not have been conducted. There is the assumption of potential occurrence due to existing habitat factors. The letters of comment received on this topic are located in Appendix A.

Table B - Threatened and Endangered Species
Likely to Occur Within 2 Miles of the Project Dam

Animal Species	Scientific Name	Status*	Confirmed
Brook Floater	Alasmidonta varicosa	FSSE	No
Henslow's Sparrow	Ammodramus henslowii	FSST	No
Appalachian Grizzled Skipper	Pyrgus Wyandot	FSST	No
Migrant Loggerhead Shrike	Lanius ludovicianus migrans	FSST	No
Bald Eagle	Haliaeetus leucocephalus	ST	No
Loggerhead Shrike	Lanius ludovicianus	ST	No
Upland Sandpiper	Bartramia longicauda	ST	No
Wood Turtle	Glyptemys insculpta	ST	No

* Species Legal Status: FT = Federally Threatened; FE = Federally Endangered; ST = State Threatened; SE = State Endangered; FS = Federal Species of Concern

CULTURAL RESOURCES, NATURAL AND SCENIC AREAS, AND VISUAL RESOURCES

The National Register of Historic Places lists fifty-three sites in Fairfax County. Fifteen archaeological sites within one mile of the project area are listed in the State archaeological files; none will be affected by the proposed work. There are no architectural sites listed in the State architectural files within one mile of the project area.

The National Historic Landmarks Program lists 118 sites, buildings or structures in Virginia, eight of which are found in Fairfax County. None of the eight buildings, objects or districts are within one mile of the project area, or will be affected by the project activities.

There are no designated State Natural and Scenic Area Preserves or visual resources in the project vicinity that will be affected by the proposed changes to the dam.

The Virginia Department of Historic Resources (VADHR) was notified of the March 8, 2007 Scoping Meeting, but did not attend. The VADHR provided comments indicating their concurrence with the finding of *no historic properties affected*.

In February 2007, NRCS Cultural Resources Staff surveyed the dam area and downstream of the dam for indicators of archaeological and/or historical resources. A field view was conducted for the areas immediately adjacent to the dam, and for a distance of approximately 200 meters downstream. The ground cover is wooded, with very little surface visibility. The topography is mostly level with a 0-3% slope. The ground surface and creek bed was searched for quartz and other natural material that could have been used for the manufacture of stone tools. None were noted. No previously recorded archaeological sites are present within the area to be rehabilitated.

The area below the dam where any disturbance will likely occur is low floodplain with mixed deciduous trees. On the north side of the creek downstream from the dam, there is a decanting basin that has a fence and berm around the perimeter. The area immediately adjacent to this area appears disturbed.

Phase I investigations were conducted on December 6, 2007, in the projected spillway area that will be disturbed. A small number of low quality quartz artifacts, e.g. shatter, flakes, were recovered from 11 out of 24 shovel test pits. The site is not considered to have the potential to contribute important information on prehistory or history and is not considered eligible for the National Register of Historic Places. No further work on this site is recommended.

WATER QUALITY

Lake Barton Dam is located on an unnamed tributary to Sideburn Branch which confluences with Rabbit Branch to form Pohick Creek, which then flows into the Potomac River at Pohick Bay. Pohick Creek has a total stream length of 35.61 miles from the headwaters of Rabbit Branch to Pohick Bay.

The 2006 305(b)/303(d) Integrated Water Quality Assessment and Impaired Waters Report does not list any waters in the project area as “impaired”. Citizen monitoring has been conducted on

Rabbit Branch between the Royal Lake dam and the confluence with Sideburn Branch. A bioassessment of benthic macroinvertebrates was performed in three surveys from 2002 to 2004. All revealed poor stream conditions for stream biota. Sideburn Branch is expected to have similar conditions.

The Pohick Creek watershed is not considered a Public Drinking Water Source or Supply, and is ranked low for nonpoint source impaired lakes. The watershed is, however, rated high for urban nitrogen, phosphorus, and sediment contribution.

WETLANDS

The Lake Barton shoreline, inlet and outlet were visually surveyed in November 2006, February 2007, and December 2007 for wetlands. No jurisdictional or non-jurisdictional wetlands are associated with this site. Documentation regarding the method used to make this determination can be found in Appendix B.

FOREST RESOURCES

The surrounding watershed is part of the Piedmont Physiographic Province. An approximation of climax forest stands in this vicinity is indicated by remnant mature stands of American beech, Fagus grandifolia; several oak (Quercus) species; and American holly, Ilex opaca var. opaca. Chestnut oak, Quercus montana, and Mountain laurel, Kalmia latifolia, dominate parts of the dissected inner Coastal Plain.

WILDLIFE RESOURCES

The Pohick Creek Watershed is considered to be part of the Mid-Atlantic Coastal Plain Ecoregion according to Virginia's Comprehensive Wildlife Conservation Strategy, 2005 (VDGIF). This Strategy lists 235 Species of Greatest Conservation Need in the Mid-Atlantic Coastal Plain. Twenty three species are considered to be Tier I species, (species with a critical conservation need having an extremely high risk of extinction); 35 species are considered to be Tier II species, (species with a very high conservation need and a high risk of extinction); 39 species are considered to be Tier III species, (species with a high conservation need and face possible extinction); and 138 species are considered to be Tier IV species, (species with a moderate conservation need and have demonstrated a declining trend in population). In the watershed, the Tier I species include a single mammal, the Eastern Big-eared Bat, Corynorhinus rafinesquii macrotis; and four fishes, the Shortnose sturgeon, Acipenser brevirostrum; the Blackbanded Sunfish, Enneacanthus chaetodon; the Bridle Shiner, Notropis bifrenatus; and the Roanoke Logperch, Percina rex. The Wood Turtle, Glyptemys insculpta, and the Chicken Turtle, Deirochelys reticularia, are the included reptiles. Ten bird species are listed, including the Peregrine Falcon, Falco peregrinus. The potential exists for several of the Tier I fish species and turtle species to occur within the project watershed.

The Tier II species that may occur in the project area include two aquatic mollusks, the Green Floater, Lasmigona subviridis, and the Dwarf Wedgemussel, Alasmidonta heterodon; several amphibians including Mabee's Salamander, Ambystoma mabeei; the Tiger Salamander,

Ambystoma tigrinum; the Oak toad, Bufo quercicus; and the Barking Treefrog, Hyla gratiosa; a reptile, the Northern Diamond-backed terrapin, Malaclemys terrapin; and 13 bird species, including the Little Blue Heron, Egretta caerulea; the Bald Eagle, Haliaeetus leucocephalus; and the Cerulean Warbler, Dendroica cerulea.

The Steelcolor shiner, Cyprinella whipplei, is the only Tier III fish species. Three aquatic mollusks, the Yellow Lance, Elliptio lanceolata; the Yellow Lampmussel, Lampsilis cariosa; and the Chesapeake Ambersnail, Oxyloma subeffusum, are listed as Tier III species. Tier III amphibian species include the Dwarf Waterdog, Necturus punctatus; the Carpenter Frog, Rana virgatipes; and the Lesser Siren, Siren intermedia. Reptilian species that may occur on the project area are the Spotted Turtle, Clemmys guttata; the Glossy Crayfish Snake, Regina rigida rigida; and the Eastern Box Turtle, Terrapene Carolina. Eleven Tier III bird species are listed including the Least Bittern, Ixobrychus exilis; and the Black-crowned Night Heron, Nycticorax nycticorax.

Some of the many Tier IV species that may occur within the project boundaries are the Lined Topminnow, Fundulus lineolatus; the Ironcolor Shiner, Notropis chalybaeus; the Logperch, Percina caproides; the Eastern Mud Salamander, Pseudotriton montanus; and the Yellowbellied slider, Stereochilus marginatus, a turtle.

Wildlife species inhabiting these forests also include ruffed grouse, woodcock, various thrushes and vireos, the scarlet tanager, several species of woodpeckers, gray and red squirrels, rabbits, gray fox, white-tailed deer, and raccoon. Ducks, geese, herons, birds, mink, otter, muskrat, and beaver may be found along the shoreline of the reservoir.

CHESAPEAKE BAY AND COASTAL ZONE MANAGEMENT AREAS

The Pohick Creek Watershed drains into the Potomac River, a major tributary to the Chesapeake Bay. As such, the dam rehabilitation efforts must consider impacts as required by the Chesapeake Bay Preservation Act. The Bay Act is an element of Virginia's multifaceted response to the Chesapeake Bay Agreement. The Bay Act established a cooperative relationship between the Commonwealth and local governments aimed at reducing and preventing nonpoint source pollution. The Bay Act Program is designed to improve water quality in the Chesapeake Bay and its tributaries by requiring the use of effective conservation planning and pollution prevention practices when using and developing environmentally sensitive lands.

Fairfax County has adopted local land use plans and ordinances which incorporate water quality protection measures consistent with the Chesapeake Bay Act Regulations. The regulations address non-point source pollution by identifying and protecting certain lands called Chesapeake Bay Preservation Areas. These lands are those that have the potential to impact water quality most directly. Generally, there are two types of land features: those that protect and benefit water quality (Resource Protection Areas) and those that, without proper management, have the potential to damage water quality (Resource Management Areas). By carefully managing land uses within these areas, local governments help reduce the water quality impacts of nonpoint source pollution and improve the health of the Chesapeake Bay.

Fairfax County is also included in Virginia’s Coastal Zone Management Program, and is one of eight Planning District Commissions in the Coastal Zone Area. The Northern Virginia Regional

Commission is responsible for review of federal, state and local activities in its geographic area for consistency with the provisions of the Coastal Zone Management Act. Any dam rehabilitation efforts must consider these regulations and comply with them during the planning, design, and construction phases of the project.

SOCIAL AND ECONOMIC CONDITIONS

Lake Barton has a watershed of 539 acres, all of which lie within Fairfax County. Thus, the entire population within the watershed resides within Fairfax County.

Population and Race: According to the 2006 Census Bureau projections for the population of the U.S., Fairfax County had a total population of a little over 1 million (1,010,443). Of the total population, about 68% (686,661) are white, 15.8% are Asian (159,544), and 9.5% (95,635) are Black or African American. Together these three groups make up 93.2% of the county's entire population. Hispanics of any race are the third largest minority group with 12.9%, or 130,753. "Other races" constitute 4.3% of the Fairfax County population with 43,481. Native Americans have a very small presence with only 0.2% of the population (1,620, having declined significantly from 2,561 counted in the 2000 Census).

Language Spoken at Home: The 2006 population projections of the Census Bureau indicate that a little over sixty-six percent of the Fairfax County population, 5 years of age and over, speak only English at home. Almost 34% of this same age group speak languages other than only English at home. The single largest group that speaks a language other than English at home, at 11.6%, speak Spanish at home (109,121). The next largest group, at 11.4%, speaks Asian and Pacific Island languages at home and 7.1% (66,846) speak Indo-European languages other than Spanish at home. Over 15% (141,769) speak English "less than very well."

Age: The 2006 Census projections of the U.S. population indicate that the median age (middle point with ½ above and ½ below) of the population of Fairfax County was 38.4 (up from 35.9 in 2000). The median age for the state of Virginia was somewhat lower at 36.9 years while it was 36.4 for the entire nation. Residents in Fairfax County that were 65 years old or older totaled 9.2% (92,662 as compared to 76,818 and 7.9% in 2000). These compare to 11.6% for the State and 12.4% of the nation. About 75% of the County population was over the age of 18. The same statistic for the state as a whole projected for 2006 was 76.4%. Both the local and the state numbers are close to the national average estimated for 2006 at 75.4%.

Education: Almost 93% of the residents in the County had a high school education or higher while the state-wide and national percentages for this were 85.4% and 84.1% respectively. Approximately 14% of the residents in the county, 25 years of age or older, have only a high school diploma or have passed an equivalency test. Over 78% of the County residents have some education beyond high school, including 30.6% with a bachelor's degree and 28.1% with graduate or professional degrees. Thus 58.7% of County residents have a bachelor's degree or higher. An additional 14.2% in the County have completed at least some college level work with 5.5% having obtained an associate degree. All of these numbers are well above the state-wide and national averages.

Employment/Unemployment, Class of Worker and Commuter Status: There are 785,314 Fairfax County residents who are 16 years of age or older according to the 2006 Census Bureau

projections. Approximately seventy-three percent (573,279) of these people are considered in the labor force pool. About 96.5% of the civilian labor force in the County was employed according to the 2006 Census projections. About 3.5% of the civilian labor force in the County, was unemployed according to the 2006 estimates. The unemployment figure is lower than the unemployment rate projected in 2006 for the state of Virginia as a whole which was 4.7%, and for the nation, which was estimated to be 4.1%.

Fairfax County has a diverse and productive economy. According to the 2006 Census projections, three sub-sectors of the local economy employ about 90% of the workforce: management and related professional occupations (57.3%); sales and office occupations (20.8%); and service occupations (11.8%). Occupations in the construction, extraction and maintenance make up 5.8% and production, transportation and related occupations make up only 4.2% of area jobs.

According to the 2006 American Community Survey of the U.S. Census Bureau, private employment constitutes 77.7% of all employment in Fairfax County with 58.3% working in private for-profit businesses, 10.3% being self-employed and 9.1% working for private nonprofit organizations. Government workers constitute 22.3% of the Fairfax County workforce with 13.9% employed by the federal government, 1.5% employed by state government and 6.8% employed by local government.

Of all Fairfax County residents employed in 2006, 51.6% worked within Fairfax County, 25.3% commuted to another locale within Virginia and 23.1% commuted outside of the county and state (presumably to Washington, D.C. and Maryland).

Housing: The 2006 Census estimates indicate that there were 390,761 housing units within Fairfax County with 93% occupied, with 69.9% owner-occupied and 23.1% renter-occupied. The state-wide occupancy rate for Virginia as a whole in 2006 was 89.9% and the national figure was 88.4%. The local and state-wide rates for owner-occupancy, 69.9% and 62.8% respectively, are higher than the national figure of 59.5% in 2006.

There are 11 town-home buildings with approximately 85 single family units that adjoin the frontage around the reservoir. In addition, six apartment buildings are located near the Lake Barton dam. The values of these properties are directly affected by the presence of the dam and impounded water. Immediately upstream, there are 30 lots that adjoin the upper watershed reaches along the wooded drainage-ways that feed water into the reservoir. An additional 192 homes, 40 business sites and two public buildings are located in the projected breach inundation zone below the dam. Residential property values downstream of the dam range between $238,000 and $598,000 with an average of $377,000. The total value of residential property (structures and contents only, excluding land values) at risk below the dam is an estimated $71,221,000. An added $86,170,000 of commercial property and $16,365,000 worth of infrastructure (roads, bridges, rail lines, etc.) are below the dam within the breach inundation zone.

Income: Median household income (householder and all others, related or not) estimated for the county in 2006 was $100,318. This compares to $56,277 per year for the median household income calculated for the state of Virginia. The national figure for median household income per year estimated for 2006 was $48,451. The median estimated household income in 2006 for

Fairfax County was 178% of the state median and 207% of the national median household income.

Median family income (householder and all others that are related) in Fairfax County for 2006 was $119,812 compared to $92,146 per year for 1999[1]. The current figure is significantly more, approximately 79% higher, than the $66,886 in median family income for Virginia as a whole and almost 104% higher than the $58,526 reported for the entire United States in 2006.

With respect to per capita incomes, Fairfax County residents are estimated to have had per capita incomes of $46,499 in 2006 as compared to $36,888 reported in 1999. Virginians reported per capita income of $23,975 in 1999, and the estimated number for 2006 is $29,899, while the same figure for the entire United States was $21,587 in 1999 and $25,267 in 2006. That makes the county figure in 2006 55.5% higher than the State level and 84% above the national figure.

From a gender-specific perspective, males earn far more than females in the workplace at all levels. Full-time, year-round male workers in Fairfax County had a median income projected for 2006 of $79,678, up from $60,503 in 1999, while the same category of female workers in the county were estimated to earn $56,192 in 2006, up from $41,802 earned per year in 1999. Full-time, year-round male workers in Virginia had an estimated median income in 2006 of $47,063, up from $37,764, while the same category of females in Virginia earned an estimated $36,062, up from $28,035/year in 1999. The Virginia figures are very close to the national statistics of $42,210 and $32,649 for male and female full-time, year-round workers, respectively, up from $37,057 and $27,194.

Poverty: According to the 2006 Census projections, Fairfax County had 8,956 families living below the poverty level (3.6%), up from 7,507 families (2.9%) living below the poverty level in 1999. State-wide, 6.8% of Virginia's families had incomes below the poverty level in 2006, down slightly from 7% in 2000. At the national level, 9.8% of our families were estimated to live below the poverty level in 2006, up from 9.2% in 2000.

Recreation: Lake Barton provides recreation to homeowners and landowners in the area and is highly valued by the local community. Lake-based recreation and other activities associated with the lake include boating, fishing, cycling, walking and jogging, skate-boarding and roller-blading, a "tot-lot" (play structures for small children), and some bird watching. The trail that goes completely around the normal pool of the reservoir is highly valued for the exercise and enjoyment of nature that it affords the community.

[1] Median family income is consistently higher than median household income. This is because the household universe includes people who live alone. Their income would typically be lower than family income because by definition, a family must have two or more people.

PLANNING ACTIVITIES

As part of the planning process, several engineering surveys were conducted. Valley cross-sections were developed using HEC-GeoRAS and supplemented with field survey data for the Roberts Parkway Bridge. The hydraulic modeling program HEC-RAS (Hydrologic Engineering Center – River Analysis System) was used to determine the breach inundation zone and the water surface elevations at each cross-section. Information on impacted structures in the dam breach zone was obtained from GIS layers generated from post-processing HEC-RAS results using HEC-GeoRAS. These layers included a polygon defining the inundation extent and a grid containing information on the depth of water throughout the inundation polygon. The inundation extent polygon was used to extract appropriate cadastral (parcels) and planimetric (building footprints) data from Fairfax County GIS datasets. All parcels in the inundation zone with buildings were identified and data on assessed value and type of structure in these parcels compiled. The water depth grid was used to determine the mean inundation depth for each building footprint. A summary of parcels with multiple buildings was also compiled to avoid counting assessed values more than once, since assessment values are maintained by parcel and there may be several parcels with multiple buildings. The SITES (Water Resources Site Analysis) computer program was used with information from the geologic investigations to model the stability and integrity of the vegetated earthen auxiliary spillway.

A. Morton Thomas & Associates, Inc. (AMT) conducted the sediment survey, the hydrologic and hydraulic analysis for the Dam No. 2 existing condition, and the proposed repair alternatives under contract to Fairfax County. The basic data and technical support and review were provided by NRCS. The analysis was presented in two reports: Pohick Creek Watershed Dam No. 2 Lake Barton (Inventory Number: VA 05923) Hydrologic and Hydraulic Analysis, August 2007 and Pohick Creek Watershed Dam No. 2 Lake Barton (Inventory Number: VA 05923): Additional Analysis of Auxiliary Spillway Alternatives, September 2008. Portions of these documents were used in the development of this report.

Other planning activities included a land use inventory, natural resources inventories, wetland assessments, and the identification of threatened and endangered species and fish and wildlife resources. Cultural and historic resources were investigated and a Phase I survey completed. Social and economic effects of the potential alternatives were evaluated for cost-effectiveness and for local acceptability. Both the benefits and the costs of the alternatives were computed and analyzed.

WATERSHED PROBLEMS AND OPPORTUNITIES

WATERSHED PROBLEMS

The Division of Dam Safety has issued a conditional certificate for Lake Barton because the vegetated earthen auxiliary spillway cannot pass the Probable Maximum Flood (PMF) storm flows without breaching the structure.

Sponsor Concerns: The first conditional certificate was issued to Fairfax County for Lake Barton in March 2004. It was issued because the existing vegetated auxiliary spillway would experience probable erosion during a storm event that exceeds 70% of the PMF. The most recent conditional certificate was issued in September 2008. The conditional permit requires the Sponsors to address the potential for severe head-cutting and erosion in the auxiliary spillway. The local Sponsors are very interested in resolving the issues raised by the Virginia Division of Dam Safety and complying with the Dam Safety regulations.

A conditional certificate serves as notification to the Sponsors that the dam no longer meets State requirements and must be modified as soon as possible to meet State law. The presence of an unresolved conditional certificate leaves the Sponsors vulnerable to liability suits should the dam breach and downstream damages result. In order to address these concerns, the Sponsors requested the assistance of NRCS to do the watershed planning and to identify the improvements necessary to obtain full dam safety certification.

Soil Erodibility: According to Gannett Fleming's May 2001 report entitled "Pohick Creek Dam Site No. 2 Emergency Spillway Investigation, *Project PC0102*," five borings were drilled in Lake Barton's auxiliary spillway in February 2001. For each boring, 1.5 foot samples were taken at 5 foot intervals until bedrock was reached. Continuous cores were taken from that point. Three borings were advanced through the soil and rock substrate and two were advanced only into the soil substrate. The purpose of the borings was to evaluate the subsurface conditions within the auxiliary spillway. From the surface of the spillway, Boring 1A was advanced to a depth of 40.0 feet, Boring 1B was advanced to a depth of 11.4 feet, Boring 2 was advanced to a depth of 40.0 feet, Boring 3A was advanced to a depth of 55.3 feet, and Boring 3B was advanced to a depth of 25.8 feet. The boring logs in the report identified the soil encountered in borings 1A, 1B and 2 as sandy silt (ML) to a depth of 5.0 feet. At a depth of 5.0 feet, the soil encountered was classified as silty sand (SM). Borings 1A and 2 were advanced into weathered rock underlying the SM horizon. In Boring 1A, weathered rock began at 20.8 feet. In Boring 2, weathered rock began at 31.3 feet. The boring logs in the report identified the soil encountered in borings 3A and 3B as sandy silt (ML) to a depth of 10.0 feet. At 10.0 feet, the soil encountered was classified as silty sand (SM). Boring 3A was advanced into the weathered rock underlying the SM horizon. In Boring 3A, the weathered rock began at 45.3 feet. Based on the data from the borings and information from a previous subsurface investigation performed by SCS prior to the construction of Pohick Dam No. 2, the substrate of the auxiliary spillway was divided into four layers, top soil, residual soil, saprolite, and weathered schist.

The subsurface profiles as well as the engineering properties of the soil/rock were utilized as input parameters for the SITES model. Gannett Fleming performed SITES analyses utilizing an estimate of the erosion resistance properties of all four layers indicated above for the 100-, 200-, 500-, 1,000-, 2,000-, 5,000-year, and both the PMF and ½ PMF spillway outflow events. The

100-year event was modeled by assuming there was no reservoir storage capacity available prior to the start of the precipitation event. This was necessary because normally the auxiliary spillway does not flow during that event. Gannett Fleming's report on their SITES analysis states, "For the 2,000-year flood event through the PMF, the analyses indicate that the emergency spillway would be breached."

Floodplain Management: The Sponsors have identified flooding in the floodplain downstream as a primary concern. Fairfax County has participated in the National Flood Insurance Program since 1972, and realizes the value that Lake Barton provides in flood protection benefits, particularly for the roads. Lake Barton controls 0.84 square miles (539 acres) of the watershed above the affected properties.

Fairfax County has been very proactive in the protection of the Pohick Creek floodplain. In the early 1970s, USGS identified the 100-year floodplain within the watershed. The entire area was then zoned to prevent development. The six NRCS flood control dams were installed after the zoning was complete. The post-construction 100-year floodplain is substantially smaller than the zoned area.

Erosion and Sedimentation: As of 2007, Lake Barton had reached about 29% of its planned service life. According to the 2007 sediment survey conducted of the lake, the volume of sediment (both submerged and aerated) in the Lake Barton reservoir and its tributaries was about 37.8% of the original as-built sediment storage volume. Approximately 10.3 acre-feet of sediment were removed by dredging from 1985 to 1990. As expected, most of the sediment observed is present in the inlet channel areas of the structure. This material is primarily deposited sediments plus leaf and other organic debris. Figures 1 and 2 show the sediment accumulations in the lake.

In the original design, 463 acres of the watershed were classified as "subject to construction." Currently, 398.6 acres of the watershed are either classified as having a land use of 'Residential/Business' or 'Transportation', with the majority being Residential/Business. The watershed area is predominantly "built-out." The increase in impervious surface area has increased the volume of runoff into the streams feeding the lake. As a result, the stream banks have eroded, contributing sediment to the lake. Stormwater management, stream bank erosion control, and general watershed erosion control in the watershed are the responsibility of the sponsors and will not be addressed in this plan. Streambank erosion in the watershed is shown in Figures 3 and 4.

Local Concerns: Lake Barton and the walking trails are used extensively by the local residents. The potential for the lake to be drained for rehabilitation work, the impacts to the walking trails and other facilities during construction, and the potential location of the site access road have sparked a number of concerns among local residents. Sediment accumulation in the lake is an issue of major concern. An additional issue centers on the possible loss of trees near the outlet of the auxiliary spillway. The aesthetic appearance of the proposed solution is a critical concern.

Figure 1. Sediment deposited in southern arm of Lake Barton.

Figure 2. Sediment deposited in northern arm of Lake Barton.

Figure 3. Streambank erosion upstream of Lake Barton.

Figure 4. Streambank instability caused by streambank erosion upstream of Lake Barton.

WATERSHED OPPORTUNITIES

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

- Comply with dam design and safety criteria established by NRCS and the Virginia Division of Dam Safety.
- Minimize the potential for loss of life associated with a failure of this dam.
- Reduce the sponsor liability associated with operation of an unsafe dam.
- Maintain the existing level of flood protection for downstream houses, businesses, and infrastructure.
- Protect real estate values around the lakes and downstream from the dam.
- Maintain existing fish and wildlife habitats around the lake.
- Preserve existing recreation opportunities.
- Protect water quality (the lake has trapped 27.8 acre-feet of sediment and attached nutrients in 29 years).

SCOPE OF THE ENVIRONMENTAL ASSESSMENT

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

Specific concerns and their degree of significance to the decision making process were identified. On March 8, 2007, a Scoping Meeting was held at Braddock Hall in Burke, Virginia. Input was provided by Fairfax County, the Northern Virginia SWCD, the Virginia Department of Game and Inland Fisheries, the Virginia Department of Forestry, the Virginia Department of Emergency Management, the Virginia Marine Resources Commission, and the Virginia Department of Conservation and Recreation Division of Natural Heritage, and Virginia Division of Dam Safety and Floodplain Management. These concerns are listed in Table C.

Table C - Scoping Meeting Results For Rehabilitation of Lake Barton Dam
March 8, 2007

Resource Concern	Degree of Concern	Significance to Decision making	Remarks
Aesthetics	High	High	Must look pleasing after rehab Supplemental landscaping
Air Quality	Low	Low	No open burning Emissions control on equipment Dust control during construction Loss of trees may affect air quality Stopped traffic impacts
Coastal Zone Management	High	High	RPA-100 yr floodplain buffer RMA-All the rest of county
Economic and Social Effects	High	High	Positive
Erosion & Sedimentation	High	High	Aesthetics a concern Sediment to be tested Possible forebay
Fish & Wildlife Habitat; Fisheries	Low	Low	
Floodplain Management; Flooding	High	High	
Forestry and Parks	High	High	Harvest notification to DOF if offsite tree removal is required; onsite processing okay
Highly Erodible Cropland	High	Low	None present
Historic Resources	Med	Med	
Invasive Species	Low	Low	
Land Use and Management	High	Med	Protect trees if possible
Noise pollution	High	High	During construction (check zoning ordinance)
Prime & Unique Farmlands	Low	Low	None present
Property Values around lake	High	High	Positive
Public Recreation	High	High	Impacts to trails
Public Safety	High	High	Transportation - Passenger rail - Freight rail - Public roads Homes/Businesses
Sewer Utilities	High	High	Sewer lines near lake
Stormwater Management	High	High	
Threatened & Endangered Species	Low	Low	
Transportation	High	High	Staging area – existing decanting basin
Water Quality	High	Low	Benefits to environment Follow E&S ordinances/laws during construction
Wetlands, Streams and Lakes	Med	Med	
Wild & Scenic Rivers	Low	Low	

DESCRIPTION OF EXISTING DAM

Current Condition of the Dam: A visual inspection of the dam was conducted on March 5, 2007. The dam and auxiliary spillway have been well maintained with a good stand of grass and no woody vegetation on the embankment and auxiliary spillway. No erosion was observed on either the embankment or the auxiliary spillway. The exterior concrete of the principal spillway appears to be in good condition; however, the interior of the riser was not inspected. In 2006, Fairfax County had a video camera photograph the interior of the principal spillway conduit. A review of the video showed the conduit to be in good condition. According to Fairfax County, the dewatering gate at the bottom of the riser was last activated on November 10, 2008.

No wet areas along the downstream groins were noted. The embankment drains were located below the water level, so no flow was observed. Piezometer readings, taken by Fairfax County on a 3-month interval, indicate that the phreatic line is well below the embankment surface.

Potential Dam Safety Deficiencies: The Virginia Division of Dam Safety issued a conditional use certificate for Pohick Creek Watershed Dam No. 2 because the vegetated earthen auxiliary spillway would not pass the Probable Maximum Flood (PMF) storm flow without breaching the structure. A minor deficiency noted in the AMT analysis is that the existing top of dam is about 0.4 feet low for the last 50 feet adjacent to the auxiliary spillway. This means that the training dike is also slightly low.

As-Built Dam Specifications: According to the As-Built drawings, the dam was constructed from April 1978 to November 1978. The earthfill used to construct the embankment was obtained from the surrounding floodplain and auxiliary spillway. This borrow area includes alluvium, some colluvium, and residual soils. The alluvium varies in certain locations between silty sand to sandy silt and silty sand to silty gravel. Colluvial soils overlay the alluvium and contain red-brown clayey silt with sand to orange-brown clayey silt. The residual, which borders the alluvium, consists of clayey and sandy silt. The embankment is comprised of clayey silt from the colluvium. The top of the embankment is 14 feet wide with 2.5 horizontal to 1 vertical side slopes. There is a 12-foot wide wave berm on the upstream slope that is located slightly higher than the principal spillway crest. In 1988, rock riprap was added to the berm of the upstream embankment by the owners of the dam.

According to the As-Built drawings, the top of dam was constructed 40.25 feet above the downstream toe of the embankment with an allowance of 1.0 foot of settlement for a settled top of dam 39.25 feet high. The 2007 field survey shows a dam height of 40.1 feet above the downstream toe. The crest of the dam extends approximately 698 feet from the left abutment to the auxiliary spillway.

Principal Spillway: The principal spillway is a 204-foot long, 30-inch-diameter, reinforced concrete pipe with a covered reinforced concrete riser and an impact basin outlet. The two-stage riser is 32’-5” high with interior dimensions of 2.5’x 7.5’. The riser controls the normal pool with a 22”x 13” orifice located in the upstream endwall and a second stage weir, 15 feet long, at the top of the riser. A 24-inch-diameter circular gate at the base of the riser, operated by crank, is provided for dewatering. The conduit discharges into an impact basin and flows into a riprap-lined stilling basin. The outlet works are in good condition including the downstream riprapped channel.

Auxiliary Spillway: A 70-foot-wide vegetated earthen channel auxiliary spillway was constructed in the right abutment. The As-Built drawings show a 50-foot-long level section approximately 8 feet below the top of dam with a 200-foot-long, 0.2% inlet slope. The outlet has a grade of 3% for 50 feet and is level for an additional 50 feet. The field survey shows no well-defined level section; however, it shows a 50-foot-long section that is within 0.1 foot of the highest surveyed elevation. The surveyed length of 50 feet is used for all calculations. The vegetation lining the spillway is well maintained. The spillway outlets into a wooded slope leading to a defined channel. No flow has been observed in the auxiliary spillway.

Internal Drain System: The As-Built drawings indicated that the trench drain is composed of a two-stage graded filter surrounding a perforated corrugated metal pipe. Two 6-inch-diameter CMP pipes exit the embankment into the side walls of the impact basin. The condition of the entire length of the pipe is unknown because the video camera could not negotiate the second bend in the pipe.

Appurtenant Structures: There are two 5-foot wide asphalt footpaths on and near the dam. One is on the upstream end of the inlet slope and extends across the top of the dam. The second footpath is near the downstream end of the outlet slope and extends across the top of the training dike to the top of dam. There is a sewer line under the embankment.

Baseline Survey: A field survey, conducted by AMT, referenced to NGVD 29 vertical datum (feet), indicates that the vertical datum used for design and construction is consistent with NGVD 29. The differences are shown in Table D. Elevations used in this report are referenced to NGVD 29, the vertical datum used by Fairfax County.

Table D – Comparison of Dam Elevations

	Elevations (feet)		
	As Built	2007 Survey (NGVD 29)	Difference
Principal Spillway Crest	319.0	318.5	0.5
High Stage Weir	331.75	331.44	0.31
Top of Dam (Settled)	341.0	341.0	0
Auxiliary Spillway Crest	333.0	333.0	0

The field survey data were used to develop the area of the normal pool. LIDAR data developed by the Joint Programs Sustainment and Development (JPSD) Project Office at the Topographic Engineering Center (TEC), Fort Belvoir, Virginia, were used to develop elevation-area data for the flood pool. Using the storage volume shown in the design report, the floodwater retarding storage (water storage between the auxiliary spillway crest and sediment pool elevations) would be 260 acre feet, while using the LIDAR data, the floodwater retarding storage would be only 209.3 acre feet. The areas are less than those shown in the design report in part because some of the borrow area in the pool was not used. The result is that there is less flood storage in the reservoir than was used for the original design. However, there is still sufficient floodwater retarding capacity to hold more than the 100-year, 24-hour evaluation storm runoff volume, which is the basis for the economic evaluation.

Precipitation Data: NRCS high hazard dams are designed to store the 100-year, 10-day storm before water can flow through the auxiliary spillway. Precipitation data collected by the National Oceanic and Atmospheric Administration (NOAA) was revised in 2004. The precipitation frequency estimates for Fairfax County released as part of NOAA Atlas 14, Volume 2, decreased the 100-year, 10-day design precipitation from 14.0 inches to 12.14 inches. The rainfall in the 100-year, 24-hour storm event increased from 8.0 inches (as estimated when the design for the dam was completed in 1972) to 8.27 inches.

Sedimentation: In the original design for Lake Barton, 100 years of sediment storage was planned. Part of this storage volume was to be gained by removing borrow material from the pool area. When the dam was built, the borrow material was not taken from the pool area as expected. The sediment storage area is only big enough for 72 years of storage at the design sedimentation rate of 0.64 acre-feet per year. Lake Barton has a sediment storage capacity of 46.2 acre-feet (44.4 acre-feet submerged).

Based upon the sediment survey, the volume of sediment in the pool in 2007 was 17.5 acre-feet. Approximately 10.3 acre-feet of sediment were removed by dredging from 1985 to 1990. This means that the Lake Barton dam trapped a total of 27.8 feet of sediment in its first 29 years. The sedimentation rate for this time period was 0.96 acre-feet per year. Since the vast majority of the construction in the watershed occurred during this same time, it would be appropriate to anticipate a reduced sedimentation rate for the remainder of the dam life. The future sedimentation rate is projected to be 0.68 acre-feet per year. There are 28.7 acre-feet of storage remaining in the reservoir. Based upon the future sedimentation rate, there are 42 years of sediment life remaining as of 2007.

STATUS OF OPERATION AND MAINTENANCE

Operation and maintenance of the structure is the responsibility of Fairfax County. Recent records indicate that the operation and maintenance of the structure has been kept current for the site. This has been verified through site assessments. Fairfax County has done an excellent job of operating and maintaining this structure. The most recent inspection was conducted May 5, 2008.

STRUCTURAL DATA

The as-built structural data for the dam and watershed is described in Table E.

Table E - Existing Structural Data for Lake Barton

Local Name	Lake Barton
Site Number	2
Year Completed	1978
Cost	$244,980
Purpose	Flood control
Drainage Area, mi^2	0.84
Dam Height, feet	40.1
Dam Type	Earthen
Dam Volume, yds^3	62,887
Dam Crest Length, ft	698
Storage Capacity, ac-ft	255.5
Submerged Sediment, ac-ft	44.4
Aerated Sediment, ac-ft	1.8
Flood Storage, ac-ft	209.3
Principal Spillway	
Type	Concrete
Riser Height, ft	32.42
Conduit Size, inches	30
Stages, no.	2
Capacity, cfs	114
Energy Dissipater	Impact Basin
Auxiliary Spillway	
Type	Earthen
Width, ft	70
Capacity, % of PMF	70*
Normal Pool Elev.	318.5
Flood Pool Elev.	333.0
Top of Dam Elev.	341.0

*Gannett Fleming Report, 2001.

BREACH ANALYSIS AND HAZARD CLASSIFICATION

Breach Analysis: To determine the downstream inundation zones due to a dam breach, a breach analysis was performed using a sunny day breach with the water level at the top of the dam and with the existing principal spillway riser and earthen auxiliary spillway blocked.

The maximum breach discharge of 60,052 cfs was computed using the criteria in Technical Release No. 60, Earth Dams and Reservoirs. The As-Built drawings, dated November 1978, and the field surveyed data obtained for Lake Barton were used to determine the maximum height used in the breach discharge. The depth of water at failure is 40.1 feet.

An analyses using HEC-RAS (unsteady/steady flow) was used to determine the inundation zone due to the breach of the dam. The river cross sections were developed using HEC-GeoRAS and

supplemented with As-Built drawings and field survey data. Manning's roughness coefficient "n" values ranging from 0.16 in the overbank to 0.08 in the channel were used. These values were selected to account for mud/trees/brush that would be disturbed and washed downstream due to a breach of the dam. Contraction and expansion values of 0.1 and 0.3 respectively were used in the modeling. The extent of model limits were taken to a point where the depth of the inundation area was within 1 foot of the 100-year FEMA floodplain as determined from delineated Fairfax County DFIRM GIS data. Results of the breach analyses are shown in Table C2 and on the Breach Inundation Map in Appendix C.

The breach inundation zone analysis will be used by the Sponsors to update the Emergency Action Plan (EAP) that currently exists for the dam. The purpose of an EAP is to outline appropriate actions and to designate parties responsible for those actions in the event of a potential failure of the dam. The Sponsors will update the EAP annually with assistance from local emergency response officials. As resources allow, NRCS will provide technical assistance with updating the EAP. The NRCS State Conservationist will ensure that a current EAP is prepared prior to initiation of construction.

Hazard Classification: Lake Barton was originally constructed in 1978 for the purpose of protecting downstream lands from flooding. It was designed as a SCS class (c) (high hazard) structure with a 100-year design life. The hazard class of the structure remains high because failure may cause loss of life and serious infrastructure damage.

In Virginia, State dam safety regulations require that a high hazard dam must be able to safely pass the volume of water associated with the Probable Maximum Flood (PMF) without overtopping. The Virginia Division of Dam Safety definition of the PMF is "the flood that might be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region. NRCS is required to use the criteria established in NRCS Technical Release 60 (TR-60) to prepare rehabilitation designs. Under these criteria, the Probable Maximum Precipitation (PMP) is used to define the design requirements rather than the Probable Maximum Flood used by the State of Virginia. Since the Probable Maximum Flood is the result of the Probable Maximum Precipitation, the NRCS criteria meet the State criteria.

Current NRCS policy in TR-60 requires an evaluation of both the short duration (6-hour) and the long duration (24-hour) PMP storms to assess the capacity and integrity of the earthen auxiliary spillway. Only the short duration storm is used to check the stability of the spillway. Based on the results of these analyses, NRCS designs for the storm that has the potential to cause the most damage.

According to the most recent Virginia Division of Dam Safety conditional operation and maintenance certificate issued in November 2008, the auxiliary spillway of Lake Barton can only safely pass 70% of the runoff associated with the 6-hour PMP without breaching. The 6-hour PMP storm is 28.0 inches of water.

EVALUATION OF POTENTIAL FAILURE MODES

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

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

As the detention pool loses storage due to sediment deposition, the auxiliary spillway operates, or has flowage, more often. For a vegetated earthen auxiliary spillway, repeated flows could erode the soil material and eventually cause the spillway to breach. For a structural auxiliary spillway, only the soil material would erode, leaving the underlying structure intact but exposed. There would be no potential for a breach. The repair and revegetation of the spillway would be conducted under the Operation and Maintenance agreement.

The land use in the watershed above the dam is 62.3% Residential/Business, 20.2% Woodland, 11.9% Transportation (roads), 3.9% Grassland, and 1.7% Water. These uses are not expected to change significantly. Since the majority of the watershed is built out, the future sediment accumulation rate in Lake Barton is expected to be lower than the historic rate. Based upon the future sediment deposition rate of 0.68 acre-feet (1,100 cubic yards) per year, the remaining sediment storage life of Lake Barton is 42 years. After the sediment storage capacity is reached, the potential for failure due to inadequate capacity is high.

Hydrologic Capacity: Hydrologic failure of a dam can occur by breaching the auxiliary spillway or by overtopping and breaching the dam. The integrity and stability of the auxiliary spillway and dam embankment are dependent on the depth, velocity, and duration of the flow, the vegetative cover, and the resistance of the soil in the auxiliary spillway and dam embankment to erosion. Under the present Virginia criteria for high hazard dams, the auxiliary spillway must have sufficient capacity to pass the full PMF event without breaching the spillway or overtopping the dam. At the present time, Lake Barton can pass about 70% of the 6-hour PMF before the auxiliary spillway breach would occur. The overall potential for hydrologic failure of Lake Barton is considered to be high because it cannot pass the PMF without breaching the auxiliary spillway.

Seepage: Embankment and foundation seepage can contribute to failure of an embankment by removing (piping) soil material through the embankment or foundation. As the soil material is removed, the voids created allow even more water flow through the embankment or foundation,

until the dam collapses due to the internal erosion. Seepage that increases with a rise in pool elevation is an indication of a potential problem, as is stained or muddy water or "sand boils" (the up-welling of sediment transported by water through voided areas). Foundation and embankment drainage systems can alleviate the seepage problem by removing the water without allowing soil particles to be transported away from the dam.

The principal spillway pipe for Lake Barton does not exhibit signs of seepage. Seepage from the principal spillway pipe provides a low potential for failure. However, it should be noted that the location of the embankment drains at Lake Barton has not been identified. They will have to be evaluated by Fairfax County before the design process is started. The camera survey of the sewer pipe under the embankment showed no problems. The potential for a seepage failure of Lake Barton is considered to be low.

Seismic: The integrity and stability of an earthen embankment are dependent upon the presence of a stable foundation. Foundation movement through consolidation, compression, or lateral movement can cause the creation of voids within an embankment, separation of the principal spillway conduit joints, or in extreme cases, complete collapse of the embankment. The Pohick Creek watershed is not located within an area of significant seismic risk; therefore, there is low potential for seismic activity to cause failure of the dam.

Material Deterioration: The materials used in the principal spillway system, the embankment drains, and the pool drainage system are subject to weathering and chemical reactions due to natural elements within the soil, water, and atmosphere. Concrete risers and conduits can deteriorate and crack, metal components can rust and corrode, and leaks can develop. Embankment failure can occur from internal erosion caused by these leaks. The camera survey of the principal spillway pipe show no material deterioration. Failure of the dam is not likely to occur through material failure.

Conclusion: At the present time, the Lake Barton dam has the potential to fail due to a lack of hydrologic capacity since the soils in the auxiliary spillway do not have the structural integrity necessary to pass the required storm event. This type of failure could occur at any time during the remaining life of the structure. The Lake Barton dam also has the potential to fail due to the lack of sediment storage capacity. However, this type of failure would not occur until after the sediment pool was completely filled, in approximately 42 years. There are no signs of seepage, the site is not in a seismic activity area, and the material components are in satisfactory condition.

CONSEQUENCES OF DAM FAILURE FOR THE EXISTING AUXILIARY SPILLWAY CONDITION

NRCS and the State of Virginia consider this dam to be an "unsafe" structure because it does not meet the criteria established for a high hazard dam and is at risk for catastrophic failure under extreme rainfall event conditions. This dam is "unsafe," not because of imminent danger, but because the soil materials in the auxiliary spillway do not have the structural integrity necessary to resist the flows of the PMF. Fairfax County has installed instrumentation on this dam to provide near real-time data on precipitation and lake water levels in order to implement the Emergency Action Plan in a timely manner.

Storage in the reservoir will be about 400 acre-feet with a depth in the auxiliary spillway of approximately 5 feet when the breach is modeled to occur. The Norfolk Southern/VRE Railroad line, Roberts Parkway, Premier Court, Guinea Road and Burke Lake Road will be affected along with their associated utilities. Some businesses and residences downstream could experience some flood damages due to their proximity to the creek. Some residents may have loss of access to emergency services due to flooding on residential roads.

When the flow in the auxiliary spillway reaches 1.8 feet deep or higher, the floodpool will back water onto Burke Centre Parkway. In a non-breach situation where the road was inundated, there would be little or no velocity over the road for most of the time. Some damage would occur but would be more related to the saturated road embankment than to water movement. During a breach event, significant damage to Burke Centre Parkway could occur if the water velocity increased rapidly during a water release.

CONSEQUENCES OF DAM FAILURE BY OVERTOPPING

For the purposes of preparing the Emergency Action Plan, a worst-case scenario is assumed in the analysis of a possible dam failure. This scenario assumes a sunny day breach, with no advanced warning. Dam failure is assumed to occur when water begins to overtop the embankment due to the unresolved blockage of the principal and auxiliary spillways. It is assumed that structural collapse would occur quickly and result in a release of 482 acre-feet of water and sediment, beginning with a wall of water that is 40.1 feet high.

The breach analysis indicates that the inundation zone due to the breach of the Lake Barton Dam would jeopardize 192 homes and place approximately 535 residents and 1,050 workers and clients at a fatal risk. Additionally, commuters on three major roads (Roberts Parkway, Guinea Road and Burke Lake Road) and one railroad (Norfolk Southern/VRE Railroad) and people at 15 industrial sites, three public sites, 14 commercial sites and nine office sites would also be at a fatal risk. At least five important utilities (sewer, water, electric, gas, and telecommunications) would also be at risk. Vehicles on Premier Court would also be affected. Access to emergency services would be limited.

Traffic counts from the Virginia Department of Transportation (VDOT) indicate that an additional exposure to loss of life could occur as a result of the 13,000 vehicles that cross Pohick Creek at Roberts Parkway daily, and also the vehicles on Premier Court (9,800 Average Daily Traffic), Guinea Road (16,000 ADT), and Burke Lake Road (35,000 ADT). About 9,000 passengers use the rail system each day and their commute would be disrupted for an estimated 9-10 months. Freight traffic would also be disrupted. The utilities associated with the transportation routes could also be destroyed.

The economic damages would include the damages to the homes, businesses, roads, rail lines, and utilities, the loss of business activity, and the loss of the lake and corresponding decreases in property values and recreational opportunities. The residences and business properties at risk in the area of the floodplain subject to a breach of Lake Barton Dam have structure and content values estimated at $157,390,000. In addition, potentially impacted infrastructure is valued at $16,365,000. Infrastructure damage caused by a catastrophic breach would include the damages to the Norfolk Southern/VRE Railroad, Roberts Parkway, Guinea Road and Burke Lake Road, and the five utilities. Economic damages resulting from these losses would be approximately

$15,817,000. Long-term costs of the loss of these infrastructure components would also be incurred due to the need for alternate routes during the replacement period.

Other economic damages from a catastrophic breach would be: a) lost recreation opportunities with the lake gone; b) changes in real property values and the tax base associated with increased flooding in the future; and c) increased flood damages in the future for remaining properties due to the absence of the dam and its flood protection effects. A catastrophic breach of the Lake Barton Dam would result in a total estimated $65,590,000 in damages.

The environmental damages from a dam failure would be significant. In addition to the damage caused by the water, a significant volume of sediment would initially be flushed downstream in the event of a catastrophic breach. At its full capacity, Lake Barton has a sediment storage volume of 46.2 acre-feet. Highly erodible sediment remaining in the sediment pool would continue to cause persistent sediment deposition problems for the downstream channel and floodplain. Approximately three miles of stream channel downstream of the dam would be damaged by scouring or deposition. Sediment would be deposited in the floodplain. This would constrict the floodplain and cause additional flooding in subsequent storm events. Deposition of sediment in the floodplain would also restrict normal use of the land which may cause water quality problems in the future. It is unlikely that a catastrophic breach would remove all of the fill material used to build the dam. The embankment material remaining after a breach would also eventually erode into the stream, contributing to the downstream sediment deposition. The nutrients in the sediment could also cause water quality problems in the future. Over time, the sediment and attached nutrients would migrate downstream into the Potomac River, and eventually to the Chesapeake Bay.

There is also a potential for stream degradation upstream from the dam site. The abrupt removal of the water and sediment would cause instability in the streams and stormwater drains feeding the reservoir. These channels would develop headcuts that would migrate upstream to the first culvert. The culverts will stop the headcutting from proceeding upstream. Downcutting and widening will continue to occur in the lake bed.

FORMULATION AND COMPARISON OF ALTERNATIVES

The stated objectives of the Lake Barton Rehabilitation Plan for the Sponsors are: 1) to bring the Lake Barton dam into compliance with current dam safety and design criteria; 2) to maintain the current level of flood protection provided by Lake Barton; and 3) to address the local residents' concerns. The first two objectives and most of the third objective can be met by installing measures which will bring the dam into compliance with State and Federal regulations. Under the Watershed Rehabilitation Provisions of the Watershed Protection and Flood Prevention Act, NRCS is required to consider the technical, social, and economic feasibility of both the locally preferred solution and other alternatives identified through the planning process.

FORMULATION PROCESS

Formulation of alternative rehabilitation plans for Lake Barton followed procedures outlined in the NRCS *National Watershed Manual, Part 504.38*. Other guidance incorporated into the formulation process included the NRCS *National Planning Procedures Handbook, Economic and Environmental Principles and Guidelines for Water and Related Land Resources*

Implementation Studies, and other NRCS watershed planning policies. Each alternative evaluated in detail used a 52-year period of analysis, which includes a two year design and installation period and 50 years of expected useful life. This period of analysis was chosen because it is the life associated with the most limiting factor, the sediment storage capacity of the reservoir. It is anticipated that the dam will continue to be in service after that time with proper maintenance.

The formulation process began with formal discussions between the Sponsors, the Virginia Division of Dam Safety, and NRCS. The Virginia Division of Dam Safety conveyed state law and policy associated with a high hazard dam. NRCS explained agency policy associated with the Small Watershed Dam Rehabilitation Program and related alternative plans of action. As a result, alternative plans of action were developed based on NRCS planning requirements and the ability of the alternatives to address the initial objective of bringing the Lake Barton into compliance with current dam safety and design criteria. See Table F.

Table F - Alternative Plans of Action

1. No Federal Action
2. Decommission the Dam
3. Non-Structural – Relocate or Floodproof Structures in the Breach Zone
4. Rehabilitate the Dam

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

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

Decommission Dam: Decommissioning is an alternative which includes a plan to remove the flood detention capacity of the dam by removing a portion (or all) of the existing embankment down to the valley floor and restoring the function and stability of the stream channel and the 100-year floodplain. Decommissioning may require grading of the sediment pool to stabilize or remove accumulated sediment. The removal of the principal spillway riser and pipe is also necessary. These unneeded materials may be buried or hauled to an appropriate disposal site.

Decommissioning is a mandatory rehabilitation alternative under NRCS policy. However, since this alternative did not meet the identified purpose and need of the plan which was to provide continued flood protection, it was not considered as a viable option for detailed development. In addition, the costs for decommissioning would be more expensive than other alternatives studied in detail. Overall costs would include the necessary upgrades to downstream bridges affected by the increased volume of water. Table G lists some of the components of decommissioning.

Table G – Individual Components of Dam Decommissioning

Items of Work	Quantities
Fill Removed	63,000 cubic yards
Channel Restoration	0.52 miles
Accumulated Sediment to be removed	28,300 cubic yards
Forested Riparian Buffer to be created	8.0 acres
Critical Area Treatment	4.6 acres
Offsite Disposal	260 tons
Cost of structure removal only*	$3,187,430

* Other costs would include mitigation for induced damages, loss of recreation, and reduced property values.

This alternative would induce flooding downstream once the structure was removed. Federal policy requires that induced damages be mitigated. Since the floodplain boundaries were delineated prior to construction of the Pohick Creek dams, the present 100-year floodplain enforced by the county is larger than the actual post-construction 100-year floodplain. However, there would still be the need to mitigate for damage to the roads, bridges, and utilities in the watershed. None of the roads, railroads, or utilities are currently damaged in the 100-year event because the presence of the dam regulates the release of the water.

Non-Structural - Relocation or Floodproof Structures in 100-year Floodplain: There are no homes located in the 100-year floodplain of Lake Barton. However, the VRE railroad station building and parking lot are located within the floodplain. It is not feasible to relocate or floodproof the roads, bridges, and utilities that are at risk in the 100-year floodplain. Since the homes, businesses, and public buildings located in the breach inundation zone are only around the perimeter of the zone, it is not economically practical to relocate or floodproof these structures given the unlikely event of a dam breach. Although the existing condition breach was not calculated, it would occur at an elevation significantly lower than the sunny-day breach and is not likely to affect the properties around the edges of the breach zone.

Rehabilitate Dam - Armor with Roller-compacted concrete (RCC): This option calls for armoring the auxiliary spillway from the upstream end of the level section to the valley floor with RCC and covering the RCC with a foot of topsoil and vegetation. The chute would be 400 feet long with a 37 foot long stilling basin. Training dikes would be installed from the auxiliary spillway outlet to the valley floor on both sides. These would be armored on the inside edge with RCC and covered with topsoil and vegetation. A slight curve in the spillway outlet at a point downstream of the dam embankment would be needed in order to accommodate the topography of the site. A small diversion channel would be constructed along the outside of the right (looking downstream) training dike to carry flows from a small channel that drains the adjacent property.

Roller-compacted concrete is a non-reinforced concrete that is durable and easy to install. However, it is not practical for use at Lake Barton for several reasons. The primary reason is that RCC has a very limited window of installation time. Each batch of concrete must be mixed and installed within a time window of less than one hour. Since the available working space on

site is limited, the assumption was made that the RCC would be mixed at a ready-mix plant that is approximately two miles away. In the high traffic conditions common to this northern Virginia community, it may be difficult to meet the time criteria. This option is not feasible due to these constraints.

Rehabilitate Dam - Realign the Spillway and Armor with RCC: In this option, the armored auxiliary spillway described in the previous option would be relocated closer to the dam in order to reduce the impact of construction activities on the adjacent townhomes. This option is not feasible due to the constraints on the use of RCC.

Rehabilitate Dam - Steep Armored Slope: In this option, the outlet of the auxiliary spillway would be excavated at a 3:1 slope from the end of the level section to the valley floor. The RCC armor would be installed in the auxiliary spillway from the upstream edge of the level section to the valley floor. Earthfill would be placed over the outlet slope up to the elevation of the original slope and vegetated. A foot of topsoil would be placed over the RCC in the level section also. This would effectively provide the same breach protection as a cutoff wall. Once the earthfill material was scoured off, the stable armored slope would be exposed. The construction limits for this option would be about 14 feet from the adjacent residences. As with the other rehabilitation options considered in this section, the limitations on the use of RCC would prevent use.

DESCRIPTION OF ALTERNATIVE PLANS CONSIDERED

No Federal Action: With this alternative, no federal funds would be expended. Since the Lake Barton Dam does not meet current safety and performance standards, it is considered to be "unsafe." The Virginia Division of Dam Safety has issued a conditional certificate of operation for the dam. It is reasonable and prudent to expect that the Virginia Division of Dam Safety will soon issue an Administrative Order requiring the Sponsors to bring the dam up to State standards by rehabilitation of the dam or remove the hazard by removing the storage function of the reservoir. The Sponsors would be totally responsible for the cost of rehabilitation of the dam. NRCS would still have the technical responsibility of approving the Sponsors' solution.

At the present time, the potential for an uncontrolled breach and resulting damages is present and will continue until the existing dam safety issues are addressed and resolved.

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

- Hire a consultant, prepare plans to meet the State of Virginia and NRCS standards, and rehabilitate the dam using their own resources.

- Do nothing. In this case, the Virginia Division of Dam Safety may choose to breach the dam and send the Sponsors the bill. This option is likely to be more expensive than if the Sponsors performed the breach. The end results would be the same as those for the next option. This option would not meet the Sponsors' goal of maintaining the existing level of flood protection.

- The Sponsors could remove the flood storage capacity of the dam by breaching the dam using a least cost method. This breach would be a minimum size hole in the dam from the

top of the dam to the valley floor, which would eliminate the structure's ability to store water. Downstream flooding conditions would be similar to those that existed prior to the construction of the dam. The sediment would not be stabilized and would migrate downstream. This course of action would minimize the Sponsors' dam safety liability but would not eliminate all liability as it would induce flooding downstream. This option would not meet the Sponsors' goal of maintaining existing levels of flood control.

The Sponsors have indicated that they will rehabilitate the dam to meet the required dam safety and design criteria at their own expense in the absence of federal assistance. For the purposes of this evaluation, the Sponsors' Rehabilitation will be used as the No Federal Action alternative.

Rehabilitate dam: There were several solutions considered under the Rehabilitation alternative. The options had to address the following issues:

1) Prevent a breach of the auxiliary spillway.
2) Achieve 50 years of sediment storage.

Issue 1. Prevent a Breach of the Auxiliary Spillway: There are four main parts of an auxiliary spillway. The inlet section is on the side closest to the lake. It has a gentle upward slope toward the middle of the auxiliary spillway. The water that reaches the inlet section has little or no velocity and, therefore, does not cause erosion to occur. The center section is called the level section. At Lake Barton, the level section is located where the auxiliary spillway crosses the centerline of the top of the dam. It is 50 feet long and 70 feet wide. The purpose of the level section is to make the water in the auxiliary spillway spread out evenly rather than concentrate into little channels. The third section is called the outlet channel. Its purpose to keep the water flowing out of the auxiliary spillway in a controlled manner until the water gets far enough away that it will not cause erosion on the dam itself. Once this point is reached, the water is free to go on downstream. At Lake Barton, the outlet channel has a 3% grade for 50 feet and then is level for another 50 feet. Most dams do not have a level section in the outlet channel. However, at Lake Barton, there is a drainageway immediately downstream of the auxiliary spillway. The outlet section was built level in order to spread the water evenly across the spillway and avoid concentrating the water in the drainageway. The fourth component of an auxiliary spillway is the training dikes. Training dikes are used in conjunction with the outlet section to direct the flow of the water away from the back side of the dam embankment.

A breach in a vegetated earthen auxiliary spillway typically begins when the vegetation in the area downstream of the outlet section of the auxiliary spillway is eroded away by the force of the water flowing through it. The soil is exposed and also begins to erode away. A gully forms in each location where water is concentrated. The gully will erode downward first and then begin to widen as the water goes downstream. Gully formation doesn't just occur in the downstream direction. The little drop-off in the soil surface that was created at the upstream edge of the gully when it started is called a headcut. As more soil is eroded from the edge of the headcut, the upstream edge of the gully will migrate toward the source of the water. This widening and deepening process continues until it reaches the inlet section of the auxiliary spillway. The dam is considered to be breached at this point. Erosion will continue to occur until all of the water stored behind the dam has been released downstream or until a hard rock layer is reached.

There are two main techniques for preventing an auxiliary spillway from breaching. Armoring the spillway surface will limit the extent of the soil erosion and prevent gullies from occurring.

A cutoff wall buried in the auxiliary spillway will keep headcuts from migrating upstream but will not prevent soil erosion or gully formation downstream of the cutoff wall.

Initially, only the option of armoring the auxiliary spillway with RCC or ACBs was evaluated for cost and engineering feasibility. The use of ACBs was seen as the most viable option due to the difficulty in obtaining RCC. This information was presented to the Sponsors at a meeting on November 14, 2007 and to the public at a meeting on December 10, 2007. At that time, the selected alternative for Lake Barton was to install earthen training dikes to control the flow direction of the water, armor the spillway and interior slopes of the training dikes with ACBs, and raise the crest of the principal spillway orifice by 0.8 feet. However, the required permanent removal of 2.0 acres of trees and the proximity of the construction area to the adjacent homes were of great concern to the residents of the affected townhome community. To address these concerns, Fairfax County had AMT identify and evaluate other possible alternatives. Seven new options were identified. Of these, three were eliminated from consideration because of the difficulties associated with RCC construction. This information was presented to the Sponsors at a meeting on June 25, 2008, and to the public at a meeting on February 18, 2009.

There are three viable alternatives for rehabilitating the auxiliary spillway on Lake Barton. These represent different combinations of either armoring or cutoff walls or both. There are also different combinations of materials that could be used. These are shown as subsets of the primary options. Realignment of the armored auxiliary spillway is shown as a fourth option. Table H compares these different solutions.

Subsidiary Concerns. At the present time, the elevation of the existing training dike is slightly lower than needed to contain the maximum flow through the auxiliary spillway. The training dike also needs to be extended approximately 40 feet to get water past the downstream toe of the embankment. In addition, the top of the dam is about 0.4 feet low for the 50 feet closest to the auxiliary spillway. Fill material will be added in each place to raise the height regardless of the option chosen.

The existing orifice in the riser will be enlarged to have a minimum opening size of 22”W x 19”H. This will allow the floodwater stored above the normal pool level to drain from the lake within the required 10-day drawdown period.

The auxiliary crest elevation is determined using a combination of the 100-year, 24-hour and the 100-year, 10-day storm events. The existing auxiliary spillway crest is 0.5 feet lower than required for a vegetated spillway. Fill material will be added to the level section of the auxiliary spillway to achieve the required elevation regardless of the rehabilitation option chosen. The floodwater detention storage will be 222.7 acre-feet (an increase of 13.4 acre-feet).

For all options, the footpath to the top of the dam will need to be relocated in the inlet section or sufficiently downstream of the auxiliary spillway to avoid causing a discontinuity in the auxiliary spillway surface.

Issues to be considered: practicality, cost, operation and maintenance, access, number of trees removed, aesthetic appearance, and proximity to homes adjacent to dam. Appendix D: Alternatives shows the plan and profile views of these options.

Option 1 – Armor with Articulated Concrete Blocks (ACBs): Keep the auxiliary spillway in its present location and armor it with ACBs from the upstream edge of the level section to the valley floor. The ACBs would be covered with a foot of topsoil and vegetation. The outlet section would be a chute 400 feet long with a 37-foot long stilling basin. Training dikes would be installed from the auxiliary spillway outlet to the valley floor on both sides. These would be armored on the inside slopes with ACBs and covered with topsoil and vegetation. A slight curve in the spillway outlet at a point downstream of the dam embankment would be needed in order to accommodate the topography of the site. A small diversion channel would be constructed along the outside of the right (looking downstream) training dike to carry flows from a small channel that drains the adjacent property.

Articulated Concrete Blocks (ACBs) are individually constructed concrete blocks that are cabled together to form a continuous erosion-resistant mattress. The proposed blocks are "open cell" which provides about 20% open space within and around the block. Geotextile fabric and six inches of gravel would be placed on the prepared subgrade to provide permeability and filtration while providing soil retention. The ACB mattress would then be set over the geotextile fabric. A foot of topsoil placed in the cells of the blocks and around the blocks would allow more extensive vegetation of the site and would conceal the armoring. According to the AMT report, damage to the auxiliary spillway and downstream areas will not begin to occur until the 1,000-year storm event. Any necessary repairs would be addressed as part of the routine operation and maintenance of the site. Damage to the auxiliary spillway would be limited to just the topsoil and grass removal since the ACBs underneath the soil would provide the structural integrity necessary to prevent a breach. Little, if any, erosion damage would occur for storm events smaller than the 1,000-year storm event. In the PMF storm event, an estimated 3,710 CY of topsoil would be eroded from the site. It would cost about $270,000 and take about a month to restore the site. There would be some environmental damages from the deposition of the eroded soil.

The ACBs can be manufactured offsite and trucked in for installation which reduces the amount of space needed for a staging area.

The estimated construction cost for Option 1 is $2,470,000. The construction limits for this work would be about 30 feet from the nearest townhome. The total project footprint is calculated to be 2.5 acres, including the removal of 2.2 acres of trees. Installation of the access road from Premier Court will require the removal and restoration of 0.2 acres of trees. Trees would also be replanted in the disturbed areas outside of the training dikes. This acreage is included in the total footprint of the project. Approximately two acres of trees would be planted elsewhere in the watershed to mitigate for the trees permanently removed by the project.

Option 2 – Two Cutoff Walls: Place a reinforced concrete wall at the end of the level section in the auxiliary spillway. Place a second wall just above the treeline at the end of the outlet section. This would provide erosion protection for the spillway material upstream of the walls and would not require construction of a berm near the residential area or extensive clearing of the wooded area downstream. The level portion of the existing training dike would be extended downstream, ending below the downstream cutoff wall. Although the walls will extend across the auxiliary spillway and up the side slopes to an elevation even with the top of the dam, they will be covered with soil and will not be seen. The construction limits would be about 55 feet from the nearest residence. The total project footprint is calculated to be 0.7 acres, including 0.4 acres of trees. Installation of the access road from Premier Court will require the removal and

restoration of 0.2 acres of trees. This acreage is included in the total footprint of the project. The 0.2 acres of trees removed from the auxiliary spillway outlet will be replanted elsewhere in the watershed after construction is complete.

According to the AMT report, the vegetated auxiliary spillway between the two cutoff walls would meet NRCS stability criteria. The allowable effective stress is 0.098 lb/sq. ft. The calculated maximum effective stress during the 6-hour Spillway Design Hydrograph for the vegetated portion of the spillway is 0.032 lb/sq. ft. Therefore, the TR-60 stability criteria are met.

Different types of cutoff walls were evaluated based on ease of construction and site-specific feasibility. For the upstream wall, a reinforced concrete wall about nine feet deep would be feasible. For the downstream wall, the two viable alternatives would be a concrete slurry wall and a concrete secant wall. The wall would be about 54 feet deep in order to prevent undermining or overturning. According to the SITES analysis, a storm larger than the 1,000-year storm would need to occur before vegetation or sediment damages from erosion of the auxiliary spillway would occur. In the PMF event, approximately 0.5 acres of grass and 2.3 acres of trees would be destroyed. In addition, 22,400 CY of earthfill would be eroded from the site. There would be significant amounts of environmental damage to the downstream floodplain. The downstream infrastructure could also have damage. These damages/costs have not been estimated. Repair of the site would cost about $1,850,000 and take about four months.

Option 2A – Reinforced Concrete Wall upstream and Concrete Slurry Wall downstream. The slurry wall is built using a trench that is first filled by a bentonite slurry for excavation support. The bentonite is then displaced by structural reinforced concrete. The estimated construction cost of this option is $2,730,000.

Option 2B – Reinforced Concrete Wall upstream and Concrete Secant Wall downstream. A secant wall is created by drilling a series of overlapping shafts that are filled with concrete and reinforced with H-piles. The estimated construction cost of this option is 2,040,000.

Due to the method of construction and the mobilization/demobilization costs, Option 2B with the secant wall would be more cost effective than Option 2A with the slurry wall.

Option 3 - One Cutoff Wall with ACB Armoring: This option would be similar to Option 2 in that it would provide erosion protection for the existing auxiliary spillway with reduced disturbance of the wooded area and the residential properties. The cutoff wall would be installed at the lower end of the outlet section as in Option 2. It would be 175 feet long and would extend upward on both ends to the same elevation as the top of the dam. The existing training dike would have to be extended to meet the wall. The ACB armor would be placed from the upstream edge of the level section to the wall. This armoring would provide erosion resistance to this area. A foot of topsoil would be placed over the ACBs and vegetated. There would be no visible difference in the appearance of the site after construction was complete. The construction limits would be about 55 feet from the nearest residence. The total project footprint is calculated to be 0.7 acres, including 0.4 acres of trees. Installation of the access road from Premier Court will require the removal and restoration of 0.2 acres of trees. This acreage is included in the total footprint of the project. The other trees removed by the construction will be replanted elsewhere in the watershed.

As with the other options, a storm larger than the 1,000-year storm would need to occur before significant vegetation or sediment damages from erosion of the auxiliary spillway would occur. In the PMF event, approximately 0.5 acres of grass and 2.3 acres of trees would be destroyed. In addition, 17,700 CY of earthfill would be eroded from the site. There would be significant amounts of environmental damage to the downstream floodplain. Downstream infrastructure damages may also occur. These damages/costs have not been estimated. Repair of the site would cost an estimated $1,710,000 and take about four months.

Option 3A – Concrete Slurry Wall and ACB Armor. The estimated construction cost of this option is $3,300,000.

Option 3B – Concrete Secant Wall and ACB Armor. The estimated construction cost of this option is 2,600,000.

As with Option 2, the secant wall in Option 3B is more cost effective than the slurry wall in Option 3A.

Option 4 – Realign the Auxiliary Spillway and Armor with ACBs: In order to provide erosion resistance similar to that of Option 1 without construction immediately adjacent to the residential properties, the auxiliary spillway would be shifted closer to the dam embankment. Since the new orientation would cut into the embankment, this alternative would require 2,540 CY of excavation and the construction of a berm along both sides of the spillway chute. This changed alignment would not affect the drainageway from the adjacent residential area. The total project footprint would be about 2.5 acres of which 2.2 acres would be woods. Two acres of tree planting elsewhere in the watershed would be required to mitigate for the loss of trees on site. The 0.2 acres of trees removed for installation of the access road would be replanted at the conclusion of the project. This option would have an estimated construction cost of $2,590,000.

As with the other options, significant damage to the soil and vegetation on the site is not likely to occur at events smaller than the 1,000-year storm event. In the PMF event, 3,700 CY of topsoil would have to be replaced on top of the armor. The estimated cost for the repairs would be $270,000 and take about a month. Only minor damages would occur downstream as a result of the deposition of the eroded soil material.

Issue 2. Achieve 50 years of sediment storage: Under the federal rehabilitation requirements, a minimum of 50 years of sediment storage must be available upon completion of the rehabilitation project. In 2007, Lake Barton had 42 years of remaining sediment capacity. Since the average project has two years of design and construction before completion, and the anticipated project completion date is in 2010, the needed additional capacity of Lake Barton is eleven years of storage. This is about 7.5 acre-feet (12,100 cubic yards). Two options were evaluated for gaining the necessary capacity.

Option 1: Remove 7.5 acre-feet of sediment by dredging. This is about 43% of the sediment currently in the lake. This solution would be considered to be incomplete by most, if not all, of the people that are concerned about the lake because the majority of the sediment would still be present. It would cost about $760,000 to dredge 7.5 acre-feet of sediment.

Option 2: Increase the capacity of the sediment pool 7.5 acre-feet by raising the water level by 0.8 feet. This would entail enlarging the existing principal spillway orifice at the top to a total

size of 22”W x 29”H and placing a steel plate across the bottom 0.8 feet of the orifice. The finished opening size will be 22”W x 19”H. The estimated cost for this option is $20,000. Raising the permanent water level by 0.8 feet would increase the surface area of the lake from 9.23 acres to 9.67 acres. The trails around the lake are located above the proposed elevation of the water but would be affected by slightly more frequent flooding. It is possible that raising the water surface elevation could cause water to stand in the two culverts that are under Burke Centre Parkway. This impact is minor. Fairfax County would need to acquire the landrights to approximately 0.44 acres around the perimeter of the lake in the area impacted by the elevated water level. Use of this option does not preclude dredging of the lake by the Sponsors at some later time.

The sediment pool volume and the floodwater detention volume together make up the total amount of water and sediment stored below the crest of the auxiliary spillway. Increasing the sediment storage capacity by raising the permanent pool 0.8 feet will cause a decrease of 7.5 acre-feet in floodwater detention volume. However, the loss of floodwater detention volume due to the increase in sediment storage volume will be offset by the increase in floodwater detention volume gained when the auxiliary spillway crest elevation is raised 0.5 feet (net gain of 13.4 acre-feet).

Table H. Comparison of options for rehabilitation of the auxiliary spillway.

Option	Construction Cost	Acres of Trees Removed for Construction*	Acres of Trees to be Planted Offsite**	Footprint of Construction Site	Proximity to Homes	Amount of Erosion in PMP event and acres of damages	Repair cost after PMP event and time required for repair
1 – ACB Armor	$2,470,000	2.2 acres	2.0 acres	2.5 acres	~30 feet	3,700 CY	$270,000 1 month
2 – Two Cutoff Walls 2A – Reinforced Concrete upstream, Concrete Slurry Wall downstream	$2,730,000	0.4 acres	0.2 acres	0.7 acres	55 feet	22,400 CY 0.5 acres of grass 2.3 acres of trees	$1,850,000 4 months
2B – Reinforced Concrete upstream, Concrete Secant Wall downstream	$2,040,000						
3 – Cutoff Wall with Armoring 3A – ACB Armor and Concrete Slurry Wall	$3,300,000	0.4 acres	0.2 acres	0.7 acres	55 feet	17,700 CY 0.5 acres of grass 2.3 acres of trees	$1,710,000 4 months
3B – ACB Armor and Concrete Secant Wall	$2,600,000						
4 – Realign Auxiliary Spillway and ACB Armor	$2,590,000	2.2 acres	2.0 acres	2.5 acres	100 feet	3,700 CY	$270,000 1 month

* Includes 0.2 acres for access road that will be replanted upon completion of construction.
** Cost of offsite tree planting not included in construction costs.

Table I. Comparison of options for achieving sediment storage.

Option	**Construction Cost**	**Effects**
1 – Dredge 7.5 acre-feet of sediment from lake	$760,000	Majority of sediment would still be present.
2 – Raise water level by 0.8 feet	$20,000	Surface area of water would increase from 9.23 to 9.67 acres, 0.44 acres of landrights needed. No impacts to trails or recreation.

SELECTED REHABILITATION OPTION

The selected option for the rehabilitation of the auxiliary spillway is to install two cutoff walls in the auxiliary spillway using reinforced concrete for the upstream wall and a concrete secant wall for the downstream cutoff (Option 2B). This is the least cost alternative. With this option, only 0.4 acres of trees would be removed. About half of this area will be replanted after construction is complete. The remaining mitigation of 0.2 acres of trees will be done offsite. The construction limits would be approximately 55 feet from the nearest residence. Figure 5 shows the existing auxiliary spillway. The appearance will be similar after completion of construction.

The selected option for achieving the required sediment storage is to raise the crest of the principal spillway orifice by 0.8 feet. This is the least cost alternative. At the present time, Fairfax County is actively pursuing the option of dredging 7.5 acre-feet of sediment from the lake, at their own expense, to achieve the required sediment storage. If the dredging occurs prior to or during rehabilitation of the auxiliary spillway, it will not be necessary to raise the water level of the lake. If the dredging occurs after rehabilitation of dam is complete, the water level can be restored to its original level by removing the orifice plate. Responsibility for removal of the orifice plate and the associated cost would lie with the local sponsors. The NRCS would provide input into planning for this action as well as an inspection once completed. For either action, the orifice will be enlarged to a minimum opening size of 22”W x 19”H. The auxiliary spillway crest will be raised by 0.5 feet to meet NRCS criteria for a vegetated auxiliary spillway.

The estimated construction cost is $2,040,000 for the spillway rehabilitation and $20,000 to raise the elevation of the inlet to the principal spillway to achieve the required sediment storage.

Figure 5. Existing auxiliary spillway.

EFFECTS OF ALTERNATIVE PLANS

Alternative plans of action can result in a multitude of effects on resources upstream and downstream of Lake Barton. This section describes anticipated effects on resource concerns identified by the Sponsors, the public, and agency personnel. Effects of alternative plans of action on resource concerns of national importance are also included.

There are two plans that will be considered and evaluated in detail: 1) No Federal Action (Sponsors' Rehabilitation) and 2) Rehabilitate Dam with the selected alternative. The Sponsors have indicated that they will use the plan developed by NRCS to complete the rehabilitation of the dam in the event that Federal funding is not available. Therefore, the Sponsors' Rehabilitation is the same as the Federal rehabilitation and the effects of the rehabilitation will be the same.

Aesthetics

Existing Condition: At the present time, the auxiliary spillway and training dike are grassed with trees located in the exit area and in the area immediately upstream of the dam. Sediment is visibly present in the lake.

No Federal Action (Sponsors' Rehabilitation): When the rehabilitation of the auxiliary spillway is complete, the part of the auxiliary spillway that is presently in grass will still be in grass. There will be no visible concrete. The 0.2 acres of trees that will be removed from the access road during construction will be replanted onsite. The remaining 0.2 acres of trees will be replanted elsewhere in the watershed. Raising the water level by 0.8 feet will put the water closer to the path but not over it. At the higher water level, the existing sediment in the pool will be covered for a few years.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Air Quality

Existing Condition: Air quality in the project area is satisfactory and below the Ambient Air Quality Standard for PM2.5 as measured at several monitoring stations in Fairfax County.

No Federal Action (Sponsors' Rehabilitation): During the rehabilitation of the auxiliary spillway, particulate matter (dust) from construction activities will increase. Air pollution abatement actions will minimize any potential temporary dust problems during construction, and the proposed work is not expected to violate any federal, state, or local air quality standards. Changing the elevation of the water will have no effect on the air quality.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Coastal Zone Management and Chesapeake Bay Act

Existing Conditions: Lake Barton is located in the Chesapeake Bay drainage area. As such, it is subject to the requirements of the Chesapeake Bay Preservation Act and the Virginia Coastal Zone Management Program.

No Federal Action (Sponsors' Rehabilitation): Rehabilitation of the auxiliary spillway of Lake Barton will be done in accordance with all of the requirements and restrictions that are necessary. Fairfax County is responsible for assuring compliance and for obtaining any necessary permits

and certificates. Approximately 0.4 acres of trees will be replanted onsite and/or in the watershed after construction. Raising the water level of the lake will have no impact on the Chesapeake Bay Act.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Economic and Social Effects

Existing Conditions: Lake Barton has provided flood protection since 1978. Under the existing conditions, there is the potential for loss of life because the dam does not meet current dam safety and design criteria. According to the SITES model, an uncontrolled breach of the Lake Barton auxiliary spillway would occur with approximately five feet of water flowing through it. This could release 400 acre-feet of water and sediment in a wall up to 35 feet high. This would cause substantial damages to the downstream properties and infrastructure. Guinea Road, the Norfolk Southern/VRE railroad, Burke Lake Road, and the associated utilities would all be at risk.

No Federal Action (Sponsors' Rehabilitation): Structural rehabilitation of the Lake Barton dam would provide flood protection to the residents of the watershed for 50 years after completion. Property values around the lakes and downstream of the dam would be maintained. The existing opportunities for recreation would remain for the evaluated lives of the dam. Protection of the roads, bridges, and public utilities would be maintained at the present levels, as would the access to emergency services. In addition to the long-term economic benefits provided by the dam, there would also be short-term economic benefits from the construction activities. An estimate of the flood damage reduction benefits for this alternative as compared to the existing conditions was not made since this alternative is compared with the alternative that involves federal assistance and they are equal in scope, cost, and effects.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Erosion and Sedimentation

Existing Conditions: About 38% of the lake's available sediment storage capacity has been filled. The historic sediment accumulation rate is 0.96 acre-feet per year. Because of the nearly total build-out in the watershed, the future sediment accumulation rate is expected to be 0.68 acre-feet per year. At this rate of sediment accumulation, there is enough storage available for an additional 39 years as of 2010.

No Federal Action (Sponsors' Rehabilitation): The dam will provide sediment storage for 50 years after rehabilitation. The anticipated accumulated sediment volume of 34 acre-feet is material that would not be deposited in Pohick Creek, the Potomac River, or the Chesapeake Bay. The Sponsors can also take measures to reduce the sediment loading to the reservoir. Additional erosion and sediment controls and sediment forebays are examples of steps that could be taken. The water level would be raised by 0.8 feet to achieve 7.5 acre-feet

Instead of raising the permanent pool level to increase sediment storage, Fairfax County may choose to dredge the lake to improve the aesthetic appearance and increase the sediment storage capacity to the required amount. This would be the sole responsibility of the County and be funded and permitted as such.

Rehabilitate Dam: Raise the sediment pool elevation by 0.8 feet to achieve an additional 7.5 acre-feet of sediment storage.

Fish and Wildlife Habitat/Fisheries

Existing Conditions: Lake Barton was managed by the Virginia Department of Game and Inland Fisheries as a recreational fishery in the past, but is no longer maintained due to periodic dredging of the lake. Some limited fishing opportunity exists. The lake continues to provide habitat for a number of cool and warm water fish species such as large and smallmouth bass, bluegills, sunfish, bullheads and a number of species of forage fish including shiners, minnows, dace and killifish. The terrestrial species, wading birds and shore birds in the watershed are well-adapted to the fragmented environment around the dam.

No Federal Action (Sponsors' Rehabilitation): Rehabilitation of the dam would result in no major changes in fish and wildlife habitat around the lake. Terrestrial habitats below the dam will be altered temporarily by the removal of 0.4 acres of trees and the temporary removal of grasses on the embankment and auxiliary spillway areas of the dam. The grass and about 0.2 acres of trees will be replanted on site. The remaining trees will be planted on site if possible. Otherwise, they will be replanted elsewhere in the watershed. The surface area of the pool would be increased by 0.44 acres due to the 0.8 foot increase in the water depth.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Floodplain Management and Flooding

Existing Conditions: In the early 1970s, Fairfax County zoned the floodplain of Pohick Creek to restrict development in the 100-year floodplain. Since this work was done prior to construction of the six flood control dams built by NRCS, the zoned floodplain is more extensive than the post-construction floodplain. There will be little or no damage to the homes, businesses, or infrastructure from the 100-year storm event.

No Federal Action (Sponsors' Rehabilitation): The flood reduction benefits provided by Lake Barton would be extended for a projected 50 years after construction. The rehabilitation of Lake Barton would result in a higher level of safety/reduced risk for catastrophic breach. There will be a loss of 7.5 acre-feet of floodwater detention storage in the pool area when the water level is raised 0.8 feet. However, this loss will be offset by the floodwater detention capacity gained by when the auxiliary spillway is raised 0.5 feet. Additional flood easements may be needed to accommodate the increase in the auxiliary spillway crest elevation.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Forestry and Parks

Existing Conditions: Most of the land around the lake is forested. Other than the reservoir and the dam embankment, which are owned by Fairfax County, all of the parcels adjacent to the lake are owned by the Burke Centre Conservancy. These areas are managed and maintained by the Conservancy. There is a walking trail completely around Lake Barton's shoreline which is used heavily by the public. The downstream floodplain is protected from future development through floodplain easements.

No Federal Action (Sponsors' Rehabilitation): The footprint of the disturbed area is estimated to cover 0.7 acres, of which 0.4 acres are wooded and 0.3 acres are in grass. The grass and 0.2

acres of the trees removed during construction will be replanted upon completion. An additional 0.2 acres of trees will be planted offsite to mitigate for areas onsite that cannot be replanted to trees. Any trees that are presently located within 25 feet of the dam will be removed in accordance with Virginia Division of Dam Safety Regulations and the area will be planted to grass. No trees will be replanted within 25 feet of the cutoff walls.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Highly Erodible Cropland
There is no highly erodible cropland within the watershed.

Historic Resources
Existing Conditions: A field reconnaissance was conducted in February 2007 of the area below the dam downstream for approximately 200 meters. The ground surface and creek bed were searched for quartz and other natural material that could be used for the manufacture of stone tools. None was found. No previously recorded archaeological sites are present within the surveyed area. A Phase I archeological investigation was completed in December 2007 with the recommendations that the area of potential effect is not eligible for the NRHP and no further work is required.

No Federal Action (Sponsors' Rehabilitation): Same as Existing Conditions.

Rehabilitate Dam: Same as Existing Conditions.

Invasive Species
Existing Conditions: At the present time, there no known invasive species on the site.

No Federal Action (Sponsors' Rehabilitation): Rehabilitation of the Lake Barton dam would not change the existing conditions for invasive species. Care will be taken during construction to avoid the introduction of invasive species and comply with Executive Order 13112.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Land Use and Management
Existing Conditions: At the present time, the land use in the watershed above the dam is highly urbanized with mostly residential properties and scattered businesses throughout. The 100-year floodplain has been protected from development. Some "fill-in" development is occurring.

No Federal Action (Sponsors' Rehabilitation): Rehabilitation of the Lake Barton dam would not change the existing land use above or below the dam. Future development in the watershed above the dam could affect the service life of the dam if the erosion and sediment from any development is not adequately controlled. Approximately 0.4 acres of trees will be cut to facilitate construction. About 0.2 acres will be replanted on site and the remaining 0.2 acres will be planted elsewhere in the watershed. Approximately 0.44 acres of land will be inundated by permanent water due to raising the principal spillway inlet by 0.8 feet.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Noise Pollution
Existing Condition: There is no noise pollution currently associated with the presence of the lake.

No Federal Action (Sponsors' Rehabilitation): During the rehabilitation of the auxiliary spillway, there will be some noise from the construction activities. Since this will be temporary in nature, practical remedies might consist of things like setting daily starting and stopping time requirements. There may be some additional costs associated with this noise reduction practice.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Prime and Unique Farmlands
There are no prime or unique farmlands within the watershed.

Property Values Around the Lake
Existing Conditions: There are 85 townhomes located around the normal pool. They have an estimated average market value of $527,000.

No Federal Action (Sponsors' Rehabilitation): There are no anticipated changes to the existing property values as a result of the planned rehabilitation activities.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Public Recreation
Existing Condition: There are multiple opportunities for recreation associated with Lake Barton. In addition to the lake-based activities such as boating and fishing, there are opportunities for cycling, rollerblading, jogging, walking, and environmental education. Bird watching is a popular activity.

No Federal Action (Sponsors' Rehabilitation): There are no anticipated changes to the existing recreational opportunities as a result of the planned rehabilitation activities.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Public Safety
Existing Conditions: The soil material in the existing earth auxiliary spillway does not have the strength necessary to withstand the Probable Maximum Precipitation event. It is projected that the auxiliary spillway would breach at a 6-hour precipitation event of approximately 13 inches. In addition to the amount of water flowing through the auxiliary spillway, this event has the potential to release the entire amount of water and sediment stored upstream of the dam. This is a volume of approximately 400 acre-feet. Roberts Parkway, Premier Court, the Norfolk Southern/VRE railroad tracks, Guinea Road and Burke Lake Road and all the associated utilities will be damaged. There is the potential for loss of life in the event of a dam breach.

No Federal Action (Sponsors' Rehabilitation): Under this alternative, the dam would be structurally rehabilitated using current design and safety criteria in order to provide continued flood protection for 50 years after the rehabilitation period is complete. The downstream flooding levels would be the same as they are presently. The threat to loss of life from failure of the dam would be greatly reduced.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Sewer Utilities

Existing Condition: There is a 16 inch ductile iron sewer pipe that passes through the right embankment of the dam. This pipe was installed before the dam was constructed. Six anti-seep collars were used along the pipe, spaced at equal distances under the embankment.

No Federal Action (Sponsors' Rehabilitation): There are no anticipated changes to the existing sewer pipe as a result of the planned rehabilitation activities. Any needed repairs would be the responsibility of Fairfax County and would be independent of the rehabilitation effort.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Stormwater Management

Existing Condition: Lake Barton contributes to the management of stormwater in Fairfax County by providing detention of floodwater and its controlled release. It was designed to detain the volume of water that would run off the land in a 100-year frequency (1% chance of occurrence) storm event.

No Federal Action (Sponsors' Rehabilitation): Rehabilitation of Lake Barton will continue to provide stormwater management control within the watershed at the existing level of floodwater detention. Damages from flows in the auxiliary spillway are not projected to occur for events smaller than the 1,000-year storm. The floodwater detention volume will increase by 13.4 acre-feet when the crest of the auxiliary spillway is raised 0.5 feet.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Threatened and Endangered Species

Existing Conditions: There are seven State Threatened (ST) and one State Endangered (SE) animal species likely to occur within a two mile radius of the Lake Barton dam site. There are no confirmed sightings of these species. There are no federally listed threatened or endangered species within this project.

No Federal Action (Sponsors' Rehabilitation): It is unlikely that rehabilitation of the dam would affect any of the state-listed threatened or endangered species or their habitat. There are no federally listed threatened or endangered species within this project.

Rehabilitate Dam: Same as No Federal Action (Sponsors' Rehabilitation). NRCS has determined that this project will have no effect on any state listed threatened or endangered species or their habitat. Four of these are also Federal Species of Concern (FS). The U.S. Fish & Wildlife Service (USFWS) did not provide comments during the scoping process. Based on this lack of response and the inclusion of federally listed species in the VDGIF and VDCR data bases, NRCS has concluded that federally listed threatened and endangered plant and animal species are not present on this project.

Transportation

Existing Conditions: There are two main roads which cross Pohick Creek below the dam, Roberts Parkway and Burke Lake Road. Guinea Road is parallel to Sideburn Branch. There are

also several streets in residential areas and one railroad bridge in the breach inundation zone. All of this infrastructure would be negatively affected by flood damages during a breach.

No Federal Action (Sponsors' Rehabilitation): The continuation of flood control for another 50 years after rehabilitation would provide continued access to transportation routes in the watershed that currently exist. Access to towns, shopping, schools, work places, medical services, and emergency services would be the same as under present conditions.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Water Quality

Existing Conditions: Lake Barton and the tributary to the Sideburn Branch on which it is located are not listed as impaired in the 2006 305(b)/303(d) Virginia Water Quality Assessment Report although there are significant inputs of nitrogen, phosphorus, and sediment from urban runoff.

No Federal Action (Sponsors' Rehabilitation): Rehabilitation of the dam will not significantly alter the present water quality in the watershed. With the required erosion and sediment control measures, there should be minimal impacts on water quality associated with construction. No long-term impacts on water quality from rehabilitation activities are anticipated.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Wetlands, Streams and Lakes

Existing Conditions: The tributaries of Lake Barton have stable outlets but are transporting some sediment into the lake. Despite the visible sediment deposition, there are no developed wetlands associated with these depositional areas or downstream of the dam, possibly because of the history of dredging at the lake. Consequently, there are no wetlands, jurisdictional or non-jurisdictional, associated with Lake Barton. Three unnamed tributaries of approximately 2.1 miles total length contribute flow to Lake Barton which discharges to Sideburn Creek. A very small impoundment lies at the head of a small tributary to the middle unnamed tributary.

No Federal Action (Sponsors' Rehabilitation): Rehabilitation of the dam would have no permanent adverse effect on streams and the lake.

Rehabilitate Dam: Same as the No Federal Action (Sponsors' Rehabilitation).

Wild and Scenic Rivers

There are no wild and scenic rivers associated with Lake Barton.

Cumulative Effects

Lake Braddock was rehabilitated by Fairfax County prior to requesting federal assistance for dam rehabilitation. Two other dams within the watershed were evaluated by NRCS staff for rehabilitation. The Royal Lake dam has been rehabilitated. The Woodglen Lake design for rehabilitation is currently being developed and construction is expected later this year. The No Federal Action alternative for Lake Barton calls for the Sponsors to rehabilitate the dam. The cumulative effects of the other projects on the principal resources of concern, along with the social and economic effects, are to maintain the existing social, economic, and environmental conditions of the community. The cumulative effects of the rehabilitating Lake Barton would be

the same, i.e., to maintain the existing social, economic and environmental conditions of the community. In both the recommended plan and the rehabilitation by the local sponsors, all of the existing dams in the watershed stay in place, essentially the same level of flood protection is provided, and the existing emergency action plan remains in force. The only difference of significance is that the rehabilitation of each site will assure that the dams will fulfill their intended function and the threat to loss of life for area residents will be reduced.

The rehabilitation of this dam would result in a significant reduction in the threat to loss of life for area residents.

COMPARISON OF ALTERNATIVE PLANS

Table J summarizes the effects of each alternative considered. Refer to the Effects of Alternative Plans section for additional information.

Table J - Summary and Comparison of Candidate Plans

Effects	Future Without Federal Project No Federal Action - Sponsors' Rehabilitation	Future With Federal Project Structural Rehabilitation with Federal Assistance, the Recommended Plan (NED Plan)
Sponsor Goals	Continue to provide flood protection, reduces liability	Continue to provide flood protection, reduces liability
Structural	Upgrade dam to meet dam safety criteria	Upgrade dam to meet dam safety criteria
Total Project Investment - Lake Barton	$2,555,000	$2,555,000
National Economic Development Account		
Total Beneficial Annualized (AAEs*)	---	$122,400
Total Adverse Annualized (AAEs*)	---	$122,400
Net Beneficial	---	$0
Benefit/Cost Ratios	---	1.0 to 1.0
Estimated OM&R**	---	$2,500
Environmental Quality Account		
Coastal Zone Management	No effect	No effect
Erosion & Sedimentation	Trap 0.68 ac-ft of sediment annually	Trap 0.68 ac-ft of sediment annually
Forestry and Parks	0.7 acre footprint of disturbed area to be replanted	0.7 acre footprint of disturbed area to be replanted
Historic Resources	No effect	No effect
Threatened and Endangered Species	No effect on state listed T&E species; federal T&E species not present	No effect on state listed T&E species; federal T&E species not present
Wetlands, Streams and Lakes	N/A; no wetlands associated with this site	N/A; no wetlands associated with this site
Fish & Wildlife Resources	No long-term effect; short term effects may include water level fluctuations, increased sediment-ation	No long-term effect, short term effects may include water level fluctuations, increased sediment-ation
Water Quality	Some turbidity increase	Some turbidity increase
Other Social Effects Account		
Public Safety	Decrease potential for loss of life from dam breach	Decrease potential for loss of life from dam breach
Floodplain Management and Flooding	Maintain 100-year flood protection; no induced damages downstream	Maintain 100-year flood protection; no induced damages downstream
Property Values	Values protected	Values protected

Effects	Future Without Federal Project No Federal Action - Sponsors' Rehabilitation	Future With Federal Project Structural Rehabilitation with Federal Assistance, the Recommended Plan (NED Plan)
Recreation	Opportunities maintained	Opportunities maintained
Sewer Utilities	No effect	No effect
Stormwater Management	No effect	No effect
Transportation	Access to emergency services maintained at present level; road maintenance continues at present level	Access to emergency services maintained at present level; road maintenance continues at present level
Land Use and Management	Cut 0.4 acres of trees. Replant 0.2 acres onsite and 0.2 acres offsite. About 0.44 acres inundated with permanent water.	Cut 0.4 acres of trees. Replant 0.2 acres onsite and 0.2 acres offsite. About 0.44 acres inundated with permanent water.
Noise Pollution	Construction methods will be chosen to minimize noise.	Construction methods will be chosen to minimize noise.
Aesthetics	Removal of 0.4 acres of trees (to be replanted) and water located closer to path.	Removal of 0.4 acres of trees (to be replanted) and water located closer to path.
Enhanced protection from future flood events	No added protection beyond that provided under the existing conditions	No added protection beyond that provided under the existing conditions
Exposure/Risk of a catastrophic breach as proxy for associated mental duress	Very low	Very low
Civil Rights Impacts:	Positive across all groups	Positive across all groups
Environmental Justice Impacts:	No disparate treatment	No disparate treatment
Anxiety, frustration and mental duress:	Decreased across all groups with flood storage retained	Decreased across all groups with flood storage retained

* Per 1.7.2 (a) (4) (ii) of the "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies" (P&G), U.S. Water Resources Council, March, 1983, allowing for abbreviated procedures, damage reduction and recreation benefits have not been displayed because they are the same for both alternatives and no net change in benefits occurs when comparing the two candidate plans to each other. The federally assisted alternative is displayed within a zero-based accounting context that credits local costs avoided (Total Adverse Annualized for the Future Without Federal Project scenario) as adverse beneficial effects (Total Beneficial Annualized) consistent with P&G 1.7.2(b)(3). Although the average annual benefits of rehabilitation are $122,400, net benefits are zero because the total project cost is equal to the claimed benefits and the resulting B/C ratio is 1:1. "AAEs" stands for Average Annual Equivalents which are based on a 4.625% discount rate and a 52 year period of analysis.

** OM&R – Operation, Maintenance and Replacement Costs include replacement of some topsoil and vegetation over the control section of the auxiliary spillway in between the two cutoff walls, and below the second cutoff wall, once in the anticipated useful life of the structure.

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

IDENTIFICATION OF NATIONAL ECONOMIC DEVELOPMENT (NED) PLAN

Detailed evaluation of the candidate plans to rehabilitate Lake Barton indicate that they have identical scope, substantially equivalent costs and equal effects. The rehabilitation with federal assistance is the most locally acceptable alternative and best serves the local sponsors in achieving the needs and purpose of this rehabilitation. Therefore, the federal assistance alternative is selected as the recommended plan or NED plan. Per the Federal Principles and Guidelines document and NRCS National policy, when the Future Without Federal Project is the same as the Future With Federal Project, the local costs avoided are credited as benefits. This renders the federally assisted alternative as having zero net benefits. Net benefits are zero because, by policy, the total project cost is equal to the claimed benefits and the resulting B/C ratio is 1:1. The results displayed in Table J are presented within a zero-based accounting context to highlight the costs and benefits associated with the recommended alternative alone. Within a zero-based accounting framework, the "Total Adverse Annualized" value associated with the Future Without Federal Project is displayed as the "Total Beneficial Annualized" in the Future With Federal Project column.

RISK AND UNCERTAINTY

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

Property rights were procured to the crest of the auxiliary spillway prior to the original construction. This meets NRCS policy. No additional development is anticipated in the upstream watershed. However, since the crest elevation of the auxiliary spillway will be raised by 0.5 feet, it may be necessary to obtain some additional landrights for the spillway rehabilitation part of this project. If additional landrights are needed, they will be secured by the Sponsor prior to construction of the project.

In order to raise the water level in the lake, it will be necessary to obtain an easement from Burke Centre Conservancy on the 0.44 acres around the perimeter of the lake that will be inundated. The Burke Centre Conservancy and the Burke Cove Condominium Association own the property affected by the proposed spillway rehabilitation and site access. Legal easements to construct the project will need to be obtained by Fairfax County.

No changes in wetlands or water quality are anticipated due to this project.

The sediment rate projected for the life of the project is based on the current "built-out" conditions in the watershed. An increase in construction activity could increase the amount of

erosion in the watershed and sediment delivered to the lake. Also, further development in the watershed could increase runoff rates which would increase streambank erosion.

The objective of this project is to meet applicable NRCS and Virginia public health and safety standards associated with this watershed dam. From a financing and administrative standpoint, the Sponsors have committed to NRCS that they are able to fund 35 percent of the total project costs to complete installation of the selected alternative and to perform the required maintenance on the upgraded structure for 50 years after construction. Statistically, there is a 1.0% chance in any given year that the auxiliary spillway would flow during the anticipated life of the rehabilitated structure. However, it is possible for several events to occur during this time period. If the PMF occurs and flows through the auxiliary spillway remove the soil from the auxiliary spillway between the cutoff walls and below the downstream cutoff wall to the valley floor, the estimated repair cost would be $1,850,000 and would take approximately four months. This would include 22,400 CY of earthfill. Damage would occur to 0.5 acres of grass and 2.3 acres of trees. The estimates do not include any costs for offsite damages incurred during this catastrophic event. Lesser events will have smaller costs. Routine maintenance is not included in these amounts.

RATIONALE FOR PLAN SELECTION

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

- Minimizes the threat to loss of life to approximately 535 people that live in the 192 single family homes and townhouses within the breach inundation zone.
- Minimizes the threat to loss of life to the estimated 1,050 people work and or shop at 14 commercial buildings, 15 industrial facilities, nine office buildings and three public buildings.
- Provides protection for 73,800 vehicles on a daily basis that utilize Burke Lake Road (35,000 vehicles), Roberts Parkway (13,000 vehicles), Premier Court (9,800 vehicles), and Guinea Road (16,000 vehicles).
- Provides protection for the Norfolk Southern/VRE and AMTRAK railroads downstream. They have an average daily count of more than 9,000 persons.
- Provide protection for five utilities (sewer, water, electricity, gas, and telecommunications).
- Minimizes the threat of property damage to the 545 vehicles parked daily at the railroad parking lot.
- Provides downstream flood protection for the scores of people living in the area, as well as those working, recreating, or traversing within the downstream floodplains for an additional 50 years.
- Eliminates the liability associated with continuing to operate an unsafe dam.
- Traps 0.68 acre feet of sediment annually, thereby improving downstream water quality.
- Maintains existing stream habitat downstream of the dam.
- Retains the existing fish and wildlife habitat around the lake.
- Leverages federal resources to install the planned works of improvement.

The selected alternative meets the Sponsors' objectives of bringing this dam into compliance with current dam design and safety criteria, maintaining the current 100-year floodplain, and addressing resource concerns identified by the public. The selected plan is the NED Alternative. The plan reasonably meets the following four criteria: completeness, effectiveness, efficiency, and acceptability. NRCS and the Sponsors are in agreement on the recommended plan.

CONSULTATION AND PUBLIC PARTICIPATION

Original sponsoring organizations include the Northern Virginia Soil and Water Conservation District and the Fairfax County Board of Supervisors. Fairfax County has been responsible for the operation and maintenance of the Lake Barton Dam since it was built. Interest and support for rehabilitating the dam began in the late 1990s when a study completed by a private engineering firm identified some potential problems with the soils in the auxiliary spillway. This was followed in March 2004 with the first issuance of a Conditional Certificate by the Virginia Division of Dam Safety. Following the passage of Public Law 106-472 in November of 2000, federal funds became available to eligible applicants. NRCS received an application for dam rehabilitation assistance on May 20, 2002.

Local, State and Federal support for the rehabilitation of the Lake Barton Dam has been strong. Input and involvement of the public has been solicited throughout the planning of the project. At the initiation of the planning process, many meetings were held with representatives of the Northern Virginia SWCD and Fairfax County to ascertain their interest and concerns regarding the dam. The Sponsors have worked closely with the local landowners and residents to provide information on the planning activities and solicit their input on the pertinent issues being considered during planning. The Sponsors worked to provide all residents, including minorities, with information on the planning effort and intended works of improvement.

The NRCS National Water Management Center Staff from Little Rock, Arkansas, toured the Pohick Creek Watershed on October 18, 2005 and provided input and support to the ongoing planning efforts. A follow-up teleconference was held with NRCS and Sponsors the next day. Feedback was provided regarding the federal dam rehabilitation program and the completion of a supplemental plan and environmental assessment for the rehabilitation of the dam.

The first public meeting was held at Bonnie Brae Elementary School on December 11, 2006. Local, state and federal perspectives on the rehabilitation needs of the Lake Barton dam were provided to the 32 meeting attendees. The attending members of public were informed of the dam rehabilitation program and potential alternative solutions to bring the dam into compliance with current dam safety and design criteria. Meeting participants provided input on their issues and concerns to be considered during the planning process. A fact sheet was developed and distributed which addressed frequently asked questions regarding rehabilitation of the dam. This fact sheet was also posted on the Fairfax County website to provide the public greater access to this information.

A scoping meeting was held on March 8, 2007 at Braddock Hall to identify issues of economic, environmental, cultural, and social concerns in the watershed. Input was provided by local, regional, state and federal agencies at the meeting or through letters and emails to NRCS. The SHPO and USFWS were informed of the scoping meeting but did not attend or supply comments. Use of the Virginia Fish & Wildlife Information Service program and the VADCR Natural Heritage database did not indicate the presence of any federally listed threatened and endangered species in the project area. The U.S. Fish & Wildlife Service provided a letter stating that no impacts to Federally listed species or designated critical habitat will occur. The Virginia Department of Historic Resources (SHPO) reviewed a Phase I survey of the Lake Barton project area, and in an April 2008 letter concurred with the findings of the survey that the light scatter of non-diagnostic quartz artifacts did not constitute an archaeological site, lacked research potential and was not eligible for the National Register.

All residents within the watershed were invited, and an onsite visit of the Lake Barton dam was conducted for interested residents by NRCS and the Sponsors on March 28, 2007. The group walked over the dam and spillway and discussed how the potential alternatives could affect the various resources of the area. The concerns of the local residents were also solicited during the site visit.

A Lake Barton Task Force meeting was held on November 14, 2007. The planning information gathered and analyzed to date was shared with the community leaders and Sponsors. The recommended alternative was presented and accepted by the Task Force.

A second public meeting was held on December 10, 2007, at the Bonnie Brae Elementary School. Information provided to meeting attendees included a summary of the current situation of the dam, planning efforts to date, the various alternatives considered during planning, and a detailed explanation of the recommended alternative for dam rehabilitation. Attendees understood the need for the rehabilitation but recommended that the potential use of a cutoff wall be considered during the design process as an alternative. The use of a single cutoff wall was not discussed in the initial alternatives evaluation because it is not a structural solution, typically has high O&M costs, and would cause significant environmental damage should the auxiliary spillway flow at the design storm. The meeting attendance totaled about 50 people and included elected officials, representatives from county and federal agencies, and watershed residents.

Another Lake Barton Task Force meeting was held on June 25, 2008. The four new alternatives were discussed and the recommendation was made that two cutoff walls be used (Option 2). The analysis by AMT showed that this solution would meet the stability, integrity, and capacity requirements of TR-60. The least cost alternative, the steep armored spillway, was not selected by the group because of its proximity to the residences and difficulty in obtaining RCC.

A third public meeting was held on February 18, 2009, at the Bonnie Brae Elementary School. Attendees were informed of the four new options and the recommended alternative. There were approximately 25 people present which included representatives from the community, elected officials, and federal and NRCS staff.

A Draft Plan was distributed for interagency and public review on May 8, 2009. Copies of the document were placed in local libraries and news articles placed in local newspapers which solicited comments from the public during the comment period. After a 45-day review period, comments received on the draft were incorporated into the Final Plan. Letters of comment received on the draft plan and NRCS responses to the comments are included in Appendix A.

RECOMMENDED PLAN

SUMMARY AND PURPOSE

This supplemental plan documents the planning process by which the NRCS provided technical assistance to local Sponsors and the public in addressing resource issues and concerns relative to the rehabilitation of Lake Barton.

The recommended plan is to rehabilitate the dam. By doing this, the present level of flood protection is maintained, property values are protected, and the threat to loss of life is reduced. The recommended plan of action for the dam is outlined below:

- Construct a reinforced concrete cutoff wall across the auxiliary spillway at the downstream edge of the level section and construct a concrete secant wall near the end of the outlet section.
- Extend the existing training dike approximately 40 feet to protect the dam embankment.
- Regrade the top of the dam for approximately 50 feet adjacent to the auxiliary spillway to raise it to the design elevation.
- Increase the sediment storage in the lake 7.5 acre-feet by raising the elevation of the principal spillway orifice crest by 0.8 feet.
- Enlarge the principal spillway orifice opening to 22”W x 19”W to meet the requirement that floodwater is drained from the reservoir within 10 days.
- Raise the crest of the auxiliary spillway by 0.5 feet to meet the design storage criteria for a vegetated auxiliary spillway.

After the implementation of these planned works of improvement, Lake Barton will meet all current NRCS and State of Virginia dam safety and performance standards.

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

EASEMENTS AND LANDRIGHTS

Fairfax County is responsible for obtaining any needed landrights and/or easements associated with the rehabilitation project. Additional permanent easements will be needed for raising the sediment pool and extending the auxiliary spillway and training dikes. Additional landrights in the floodpool may also be required because the flood storage of the structure will increase when the auxiliary spillway crest is raised 0.5 feet. There are no relocations planned as a result of the installation of the project measures.

MITIGATION

About 0.2 acres of trees will be replanted onsite following completion of construction activities. This is included as a component of the recommended alternative. An additional 0.2 acres of trees will be planted offsite.

PERMITS AND COMPLIANCE

Installation of the recommended plan will bring the dam into compliance with current NRCS and Virginia dam safety and design criteria. Prior to construction, the Sponsors will be responsible for obtaining an alteration permit from the Virginia Soil and Water Conservation Board, a 404 permit from the Army Corps of Engineers, any needed subaqueous lands permits from the Virginia Marine Resources Commission, and any other required permits. During construction, the successful contractor is required to develop a Stormwater Pollution Prevention Plan which includes applicable erosion and sediment control measures.

If cultural resources are discovered during installation, the work will be halted and the SHPO will be notified. Appropriate investigation procedures will be initiated.

Lake Barton lies entirely within the Resource Protection Area of Pohick Creek, and thus falls under the Coastal Zone Management Act regulations. Therefore, prior to beginning any construction activities, Fairfax County must determine the extent of construction activities affecting Virginia's coastal resources or coastal uses with the Virginia Coastal Resources Management Program. Fairfax County must submit a consistency certification to the Virginia Department of Environmental Quality regarding their coordinated review and compliance with these regulations. The Sponsors will be responsible for obtaining the certification of compliance from the Virginia Division of Dam Safety upon completion of the project.

COSTS

As indicated in Table 1, the total project cost of the recommended plan is $2,555,000. Of this amount, PL-106-472 funds will bear $1,814,000 and nonfederal funds will bear $741,000. Given that certain costs are excluded from calculation of the Sponsors' contribution, the actual cash cost to the local Sponsors required for construction costs is an estimated $331,000. Table 2 shows details of the costs and cost-share amounts by category. Total annualized costs are shown in Table 4 along with the estimated costs for operation and maintenance. Table 5 displays the average annual flood damage reduction benefits by flood damage categories, and Table 6 displays a comparison of annual costs and benefits. A 2008 price base was used and amortized at 4.625 percent interest for the 52 year period of analysis (including a design and installation period of two years and an expected useful life of 50 years). The cost of acquiring the landrights associated with raising the crest of the auxiliary spillway are expected to be minimal and are not included in the Sponsor cost.

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

INSTALLATION AND FINANCING

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

The NRCS will provide assistance to the Sponsors with the Lake Barton Dam rehabilitation project. NRCS will be responsible for the following:

- Execute a project agreement with the Sponsors before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.
- Execute a Memorandum of Understanding with the Sponsors to provide a framework within which cost-share funds are accredited.
- Execute an updated Operation and Maintenance Agreement with Fairfax County for the dam. This agreement will be based on the NRCS National Operation and Maintenance Manual.
- Provide financial assistance equal to 65% of total eligible project costs, not to exceed 100% of actual construction costs.
- Verify that a current Emergency Action Plan is developed before construction is initiated.
- Provide consultative engineering support, technical assistance, and approval during the design and construction of the project.
- Certify completion of all installed measures.

Fairfax County will be responsible for the following:

- Secure all needed environmental permits, easements, and rights for installation, operation and maintenance of the rehabilitated structure.
- Prepare an updated Emergency Action Plan for the dam prior to the initiation of construction.
- Execute an updated Operation and Maintenance Agreement with NRCS for the dam. This agreement will be based on the NRCS National Operation and Maintenance Manual.
- Execute a Memorandum of Understanding with NRCS to provide a framework within which cost-share funds are accredited.
- Execute a project agreement with NRCS 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.
- Provide nonfederal funds for cost-sharing of the project at a rate equal to, or greater than, 35% of the total eligible project costs.
- Provide engineering services for the design, construction, and certification of the project.
- Provide local administrative and contract services necessary for installation of the project.
- Acquire a Safe Dam Permit from the State of Virginia upon completion of the planned measures.
- Participate in and comply with applicable Federal floodplain management and flood insurance programs.
- Enforce all associated project easements and rights-of-way.

OPERATION, MAINTENANCE, AND REPLACEMENT

Measures installed as part of this plan, and previously installed measures, will be operated and maintained by Fairfax County with technical assistance from federal, state, and local agencies in accordance with their delegated authority. A new Operation and Maintenance agreement will be developed for Lake Barton and will be executed prior to signing a project agreement for the construction of the project. The term of the new O&M agreement will be for the projected life of the rehabilitated structure, plus two years of project design and installation, for a total of 52 years. The agreement will 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 will be made for free access of district, state, and federal representatives to inspect all structural measures and their appurtenances at any time.

CIVIL RIGHTS AND ENVIRONMENTAL JUSTICE IMPACT ANALYSIS

Rehabilitation of the dam will have positive economic and social effects across all residents within the floodplain and above the dam. Since vehicle operators also are significant beneficiaries of the proposed rehabilitation, it is reasonable to conclude that protection of the roads and bridges will benefit all racial, ethnic, and socio-economic groups within the watershed. Avoiding a dam breach will directly benefit all residents within the watershed and taxpayers in general within Fairfax County and the Commonwealth of Virginia.

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

EFFECTS OF RECOMMENDED PLAN ON RESOURCES

Table K lists the effects of the recommended plan on Resources of Principal National Recognition.

Table K - Effects of the Recommended Plan on Resources of Principal National Recognition

Types of Resources	Principal Sources of National Recognition	Measurement of Effects
Air Quality	Clean Air Act, as amended (42 U.S.C. 1857h-7 et seq.)	No change except during the construction period.
Areas of particular concern within the coastal zone	Coastal Zone Management Act of 1972, as amended, (16 U.S.C. 1451, et seq.)	The project area is located in a coastal zone. Erosion and sediment control practices will minimize project impacts.
Threatened and Endangered Species Critical Habitat	Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)	None present in the project area.
Fish and Wildlife Habitat	Fish and Wildlife Coordination Act (16 U.S.C. Sec. 661 et seq.)	No long-term effect.
Floodplains	Executive Order 11988, Floodplain Management	Maintain flood protection for 50 more years.
Historic and Cultural Properties	National Historic Preservation Act of 1966, as amended, (16 U.S.C. Sec. 470, et seq.)	No known archaeological resources or historic properties affected.
Prime and Unique Farmland	CEQ Memorandum of August 1, 1980: Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act. Farmland Protection Policy Act of 1981, (7 U.S.C. 4201 et seq.)	None present in the project area.
Water Quality	Clean Water Act of 1977 (33 U.S.C. 1251 et seq.)	Improve downstream water quality by continuing to trap 0.68 acre feet of sediment each year.

Table K - Effects of the Recommended Plan on Resources of Principal National Recognition (Con't)

Types of Resources	Principal Sources of National Recognition	Measurement of Effects
Wetlands	Executive Order 11990, Protection of Wetlands; Clean Water Act of 1977 (42 U.S.C. 1857H-7, et seq.)	None present in the project area.
Wild and Scenic Rivers	Wild and Scenic Rivers Act, as amended, (16 U.S.C. U.S.C. 1271 et seq.)	None present in the project area.
Economic	NA	Maintain existing level of flood protection for downstream residents for another 50 years. Maintain existing recreation and property values.
Fisheries	Fish and Wildlife Coordination Act (16 U.S.C. Sec. 661 et seq.)	No adverse effects anticipated.
Forestry	NA	Approximately 0.4 acres of trees will be removed during construction. These will be replanted onsite (0.2 acres) and in the watershed (0.2 acres).
Recreation	NA	Existing benefits will be maintained.
Riparian Zone	NA	Riparian vegetation impacts will be minimal below existing dam. Adverse environmental impacts could occur below the cutoff walls if the design flows passes through the auxiliary spillway.

Table 1 - Estimated Installation Cost
Pohick Creek Dam No. 2, Virginia
(Dollars)[1]

Installation Cost Items	Estimated Costs		
Structural measures to rehabilitate floodwater retarding dam: Pohick Creek Dam No. 2:	PL-106-472 Funds[2] $1,814,000	Other Funds $741,000	Total $2,555,000
Total Project:	$1,814,000	$741,000	$2,555,000

Price base: September, 2008

Note: $190,000 in local sponsor planning costs have been excluded from Table 1 and Table 2 per NRCS policy to exclude non-federal technical assistance for planning from the estimated installation cost. These costs are included in the watershed agreement for calculating cost-share between the NRCS and the local sponsors.

[1] All tables have a price base of 2008.
[2] Paid by the USDA/NRCS – the Federal agency responsible for assisting in installation of improvements.

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

Installation Cost Items	Installation Cost: PL-106-472 Funds[1]				Installation Cost: Other Funds[2]					Total Project Cost[3]
	Construction Costs	Engi-neering Technical Assistance Costs	Project Admin-istration Costs	Total PL-106-472 Cost	Construction Costs	Engineering Costs	Real Property Land Rights	Project Admin-istration Costs	Total Other Funds	
Pohick Creek Dam No. 2	$1,729,000	$75,000	$10,000	$1,814,000	$331,000	$300,000	$5,000	$105,000	$741,000	$2,555,000
Totals:	$1,729,000	$75,000	$10,000	$1,814,000	$331,000	$300,000	$5,000	$105,000	$741,000	$2,555,000

Price base: September, 2008.

[1] 65% of total project cost (the actual federal cost/share excludes technical assistance and permit costs and cannot exceed 100% of the estimated construction cost).
[2] 35% of total project cost.
[3] Note: As per the NRCS National Watershed Manual,508.44, the actual federal cost/share amount will be calculated based on a total project cost that excludes federal technical assistance costs, water, mineral and other resource rights, and all federal, state and local permits, i.e., only the design and construction costs are included. However, for the purposes of planning all of these costs are included in the benefit/cost analysis and are displayed as part of the public record of this analysis.

Table 3 – Structural Data for Rehabilitated Dam

Pohick Creek Dam No. 2, Virginia

ITEM	UNIT	AMOUNT
Hazard Class of Structure	-	High
Seismic Zone	-	1
Total Drainage Area	Sq. Mi.	0.84
Time of Concentration	Hours	0.50
Antecedent Moisture Condition II Runoff Curve Number	-	77
Elevation, Top of Dam	Feet, MSL	341.0
Elevation, Auxiliary Spillway Crest	Feet, MSL	333.5
Elevation, Principal Spillway Orifice Crest	Feet, MSL	319.3
Auxiliary Spillway Type	-	Vegetated[1]
Auxiliary Spillway Bottom Width	Feet	70
Auxiliary Spillway Exit Slope	%	Varies between 3 and 7
Maximum Height of Dam	Feet	40.1
Volume of Fill (Rehabilitation)	Cu. Yd.	4,279 [2]
Total Capacity	Ac.-Ft.	276.4
Sediment Submerged	Ac.-Ft	51.9
Sediment Aerated	Ac.-Ft	1.8
Floodwater Retarding Pool	Ac.-Ft.	222.7
Surface Area		
Sediment Pool	Acres	9.67
Floodwater Retarding Pool	Acres	25.2
Principal Spillway Design		
Rainfall Volume (1 day)	Inches	8.27
Rainfall Volume (10 day)	Inches	12.14
Runoff Volume (10 day)	Inches	6.84
Capacity at Crest of Auxiliary Spillway	CFS	114
Conduit Size	Inches	30
Conduit Type	-	Concrete
Frequency of Operation, Auxiliary Spillway	Annual % chance	Less than 1
Auxiliary Spillway Hydrograph		
Rainfall Volume	Inches	11.21
Runoff Volume	Inches	8.28
Storm Duration	Hours	6
Velocity of flow (V_e)	Ft/s	9.4
Maximum Surface Elevation	Feet, MSL	335.0
Freeboard Hydrograph (6-hr PMP)		
Rainfall Volume	Inches	28.0
Runoff Volume	Inches	24.71
Storm Duration	Hours	6
Maximum Surface Elevation	Feet, MSL	340.7
Capacity Equivalents		
Sediment	Inches	0.80
Floodwater Retarding	Inches	4.47
[1]Vegetated auxiliary spillway with concrete and secant cutoff walls		
[2] No fill associated with raising the dam, only with lengthening and raising the training dike		

Table 4 - Average Annual National Economic Development (NED) Costs
Pohick Creek Dam No. 2, Virginia
(Dollars)

	Average Annual Equivalent Cost	Annual Operation and Maintenance Costs	Total Average Annual Equivalent Cost
Rehabilitation of Pohick Creek Dam No. 2	$120,000	$2,400	$122,400
Totals:	$120,000	$2,400	$122,400

Price base: September, 2008

Note: The average annual equivalents are based on a 4.625% discount rate and a 52 year period of analysis (2 years for project design/installation and 50 years of expected useful life).

Table 5 - Estimated Average Annual Flood Damage Reduction Benefits
Pohick Creek Dam No. 2, Virginia
(Dollars)

Flood Damage Category	Estimated Average Annual Equivalent Damages		Damage Reduction Benefits
	Without Federal Project	With Federal Project	Average Annual Equivalents
Structure Damages:	$11,890	$11,890	$0
Content Damages:	$5,300	$5,300	$0
Private Clean-up Costs:	$70	$70	$0
Public Clean-up Costs:	$50	$50	$0
Private Business Income Losses:	$50	$50	$0
Traffic and Emergency Services Disruption Costs:	$4,010	$4,010	$0
Infrastructure Damages:	$6,190	$6,190	$0
Public Admin. Costs:	$90	$90	$0
Lost Recreation Value:	$0	$0	$0
Lost Property Value:	$0	$0	$0
Totals (rounded):	$27,650	$27,650	$0

Price base: September, 2008

Note: Damage reduction benefits resulting from the recommended plan equal zero as compared to the no federal action alternative because they are the same in scope, cost and effects, and therefore yield equivalent benefits. Average annual benefits associated with the NED plan are estimated to be $122,400.

Table 6 - Comparison of NED Benefits and Costs
Pohick Creek Dam No. 2, Virginia
(Dollars)

Evaluation Unit	Benefits			Costs	Net Change	Benefit/ Cost Ratios
	Average Annual Equivalent Benefits		Total Average Annual Equivalent Benefits	Average Annual Equivalent Costs	Net Average Annual Equivalent Benefits	
	Damage Reduction Benefits	Other Benefits[1]				
Pohick Creek Dam No. 2	$0	$122,400	$122,400	$122,400	$0	1.0 to 1.0
Totals:	$0	$122,400	$122,400	$122,400	$0	1.0 to 1.0

Price base: September, 2008

Note: The average annual equivalents are based on a 4.625% discount rate and a 52 year period of analysis (2 year for project design/installation and 50 years of expected minimum useful life).

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

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A. Morton Thomas & Associates, Inc. Pohick Creek Watershed Dam No. 2 Lake Barton (Inventory Number: VA 05923) Hydrologic and Hydraulic Analysis, August 2007.

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NRCS National Engineering Manual.

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NRCS Soil Survey of Fairfax County, Virginia.

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NRCS National Watershed Manual.

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Sources for T&E species information were the Virginia Department of Game and Inland Fisheries, the Virginia Fish and Wildlife Information Service and the Virginia Department of Conservation and Recreation, Division of Natural Heritage.

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REFERENCES (Cont.)

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Virginia Department of Mines, Minerals, and Energy. The Geologic Map of Virginia. 1993.

Water Resources Site Analysis Computer Program (SITES).

INDEX OF KEY WORDS AND PHRASES

REPORT PREPARERS

The Pohick Creek Watershed Supplemental Plan and Environmental Assessment was prepared primarily by the NRCS Planning Team located in Richmond, Virginia. The document was reviewed and concurred in by state staff specialists having responsibility for engineering, resource conservation, soils, agronomy, biology, economics, geology, and contract administration. The in-house review was followed by a review by the NRCS National Water Management Center and then an interagency and public review.

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

NRCS NATURAL RESOURCES PLANNING TEAM

Name	Present Title and Years in Current Position	Education	Previous Experience	Other
R. Wade Biddix	Assistant State Conservationist – 6	M.S. Public Administration B.S. Agriculture	Supervisory District Cons. – 2 yrs. Planning Coordinator – 11 yrs. Area Resource Cons. - 2 yrs. District Conservationist - 4 yrs. Soil Conservationist - 4 yrs.	
Edward J. Fanning	Environmental Specialist – 5	B.S. Wildlife & Fisheries Management B.S. Range Management Graduate Course Work in Range Management	District Conservationist – 1.25 yrs. Soil Conservationist - 5 yrs. Sr. Environmental Analyst – 13 yrs.	
David L. Faulkner	Natural Resource Economist – 19	M.S. Ag. Economics B.S. Ag. Education	Ag. Economist (SCS) - 2.5 yrs. Ag. Economist (U.S.A.I.D.) - 4.5 yrs.	
Fred M. Garst	GIS Specialist – 10	B.S. Geology	GIS/Soil Scientist - 7 yrs. Soil Cons. Tech. - 7 yrs. Geologist (Private) – 4 yrs.	

Name	Present Title and Years in Current Position	Education	Previous Experience	Other
Alica J. Ketchem	Plng./Environmental Engineer – 15	M.S. Ag. Engineering B.S. Civil Engineering	Civil Engineer – 10 yrs.	PE
Bryan Lee	Cultural Resource Specialist – 3	M.A. Anthropology B.A. Anthropology	Archaeologist (Private) 10 years	
Mathew J. Lyons	State Conservation Engineer-5	B.S. Civil Engineering	Civil Engineer – 12 yrs.	PE
Jeffrey D. McClure	Geologist – 4	B.A. Geology B.A. Biology B.S. Geology	NRCS Geologist – total 4 yrs. Geologist (WV Dept. of Env. Prot.) - 11 yrs. Geologist (Private) – 8.5 yrs.	CPG in KY, VA, DE and PA
Timothy Ridley	Hydraulic Engineer – 20	B.S. Civil Engineering	Civil Engineer (Private 8 yrs.)	PE, PS

EMPLOYEES FROM ARCHITECTURAL AND ENGINEERING FIRMS UNDER CONTRACT TO FAIRFAX COUNTY

Company	Name	Degree	Years of Experience
A. Morton Thomas & Associates, Inc.	Jerry Kavadias, P.E.	B.S. Civil Engineering	Civil Engineer – 14 years
A. Morton Thomas & Associates, Inc.	Stuart Robinson, P.E.	B.S. Civil Engineering	Civil Engineer – 27 years
A. Morton Thomas & Associates, Inc.	Peter Zitta	B.S. Civil Engineering	Civil Engineer – 8 years
Schnabel Engineering North, LLC	Donald L. Basinger, P.E.	B.S. Civil Engineering	NRCS Civil Engineer – 30 years Civil Engineer – 17 years
Schnabel Engineering North, LLC	Anthony W. Grubbs, EIT	B.S. Agricultural and Biosystems Engineering	Civil Engineer – 4 years

EMPLOYEES FROM ARCHITECTURAL AND ENGINEERING FIRMS UNDER CONTRACT TO FAIRFAX COUNTY (cont.)

Company	Name	Degree	Years of Experience
Schnabel Engineering North, LLC	Jay T. Halligan .	B.A. Geographical Analysis	GIS Specialist - 2 years
Schnabel Engineering North, LLC	John P. Harrison, P.E.	B.S. Civil Engineering M.S. Civil Engineering	Civil Engineer – 16 years
Schnabel Engineering North, LLC	Matthew L. Marchisello, EIT	B.S. Civil Engineering M.S. Civil Engineering	Senior Staff Engineer – 2 years
Schnabel Engineering North, LLC	Paul I. Welle, P.E.	B.S. Agricultural Engineering	NRCS Civil Engineer – 4 years NRCS Hydraulic Engineer – 26 years Hydraulic Engineer – 8 years

Special acknowledgment goes to the following people who spent many hours in the Pohick Creek Watershed surveying, collecting data, meeting with landowners, and attending public meetings, or providing technical support.

- Fairfax County Staff: Christina Fullmer, Don Demetrius, and Dipmani Kumar.
- Northern Virginia Soil and Water Conservation District: Diane Hoffman, Robert Kohnke, and John Peterson.

APPENDIX A

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

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

Federal Agencies	Response Received on Draft Supplemental Plan/EA
Environmental Protection Agency Region III, Philadelphia	Yes
U.S. Army Corps of Engineers	
Norfolk District	No
Baltimore District	No
U.S. Department of the Interior	
Fish and Wildlife Service	
Annapolis, Maryland Office	No
Gloucester, Virginia Office	Yes
Federal Emergency Management Agency Philadelphia	No
U.S. Department of Agriculture	
Forest Service	No
Farm Service Agency	No
Rural Development	No
Virginia State Agencies	
Virginia Department of Environmental Quality Office of Environmental Impact Review (State Clearinghouse)	Yes
Division of Waste	Yes
Division of Air	Yes
Northern Regional Office	Yes
Virginia Department of Emergency Management	No
Virginia Department of Conservation and Recreation	
Division of Soil and Water Conservation	Yes
Division of Dam Safety and Floodplain Management	Yes
Division of Natural Heritage	Yes
Division of Planning and Recreation Resources	Yes
Division of Chesapeake Bay Local Assistance	Yes

	Response Received on Draft Supplemental Plan/EA
Virginia State Agencies	
Virginia Soil and Water Conservation Board (Governor's Designated Agency)	No
Virginia Department of Agriculture and Consumer Services	No
Virginia Department of Game and Inland Fisheries	Yes
Virginia Marine Resources Commission	Yes
Virginia Department of Historic Resources	Yes
Virginia Department of Transportation	Yes
Virginia Department of Mines, Minerals and Energy	Yes
Virginia Department of Health	Yes
Other	
Virginia Association of Soil and Water Conservation Districts	No
Northern Virginia Soil and Water Conservation District	Yes
Fairfax County	
Stormwater Planning Division	Yes
Park Authority	No
Department of Planning and Zoning	Yes
Department of Public Works and Environmental Services	Yes
Burke Centre Conservancy	Yes
Northern Virginia Regional Commission	Yes
Norfolk Southern Railroad	No

Phone: 703-324-1460
Fax: 703-324-1421
E-mail: conservationdistrict@fairfaxcounty.gov
Website: www.fairfaxcounty.gov/nvswcd

COMMONWEALTH of VIRGINIA

Northern Virginia Soil and Water Conservation District

12055 Government Center Parkway • Suite 905 • Fairfax, VA 22035-5512

June 17, 2009

John A. Bricker
State Conservationist
Natural Resources Conservation Service, USDA
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014

Dear Mr. Bricker:

The Northern Virginia Soil and Water Conservation District is pleased to review and comment on the Draft *Supplemental Watershed Plan - Environmental Assessment for the Pohick Creek Watershed* – Supplement No. 5 to the original watershed plan for the rehabilitation of Dam No. 2 in Fairfax County, Virginia. The Northern Virginia Soil and Water Conservation District is proud to be a sponsor of the Pohick Creek Watershed Project, along with the Fairfax County Board of Supervisors. The Project has proven to be extremely beneficial to the environment and to the residents of the County.

As a general comment, the Draft *Supplemental Watershed Plan-Environmental Assessment* for rehabilitating Dam No. 2, locally known as Lake Barton, is exceptionally well done. It is complete and well-written. It accurately describes the existing conditions, the assessment, the alternatives, and the recommended plan. It takes into consideration the wishes of the sponsors and the citizens. We commend NRCS for producing an excellent Plan, which we support and approve.

We have two specific comments:

1) Since the sewer pipe under the embankment is mentioned on page 24 (paragraph 2) and is shown on Figures D-2, D-3 and D-4, we suggest that it be mentioned on page 19 under Appurtenant Structures.
2) On page 23 in the second paragraph under *Sedimentation,* the second sentence states, "For a vegetated earthen spillway, repeated flows would erode the soil material and eventually cause the spillway to breach." While this may be true as a general statement, it could be misleading in this context. Considering Fairfax County's outstanding maintenance record for the Pohick structures, this is not the type of failure driving the need for the rehabilitation. The major concern is about a single catastrophic storm in which the spillway fails because the soils are not adequate for such high velocities, volumes and durations. The wording of the sentence could suggest incorrectly that with adequate maintenance, the redesign and rehabilitation of Dam No. 2 may not be necessary.

Again, we appreciate being given the opportunity to review and comment on the *Draft Supplemental Watershed Plan-Environmental Assessment* for the rehabilitation of Lake Barton.

Sincerely,

Jean Packard

Jean Packard
Chairman, Board of Directors

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014

Telephone: 804-287-1691
Fax: 804-287-1737

July 6, 2009

Ms. Jean Packard
Chairman, Board of Directors
Northern Virginia Soil and Water Conservation District
12055 Government Center Parkway, Suite 905
Fairfax, VA 22035-5512

RE: Draft Supplemental Watershed Plan-Environmental Assessment (EA) for the Rehabilitation of Pohick Creek Watershed Dam No. 2 (Lake Barton), Fairfax County, Virginia

Dear Ms. Packard:

Thank you for your review of the referenced EA. We appreciate your support of the project and will include your comments in the final document, as deemed appropriate.

We would also like to respond to the specific issues you raised. As suggested, we have included the sewer pipe in the Appurtenant Structures Section. In the section on Sedimentation in the Evaluation of Potential Failure Modes, the sentence referenced in your comment letter is describing the general process for a failure of this type. Although the potential for dam failure due to lack of sediment storage capacity is not the failure mechanism that is driving the need for rehabilitation, it is a valid concern and must be considered. Even the superb maintenance of the Pohick Dams would not be adequate to address the frequent flows through the auxiliary spillway that could occur if the sediment storage capacity of the structure is exceeded.

If questions or concerns arise as the project proceeds, please contact Wade Biddix, Assistant State Conservationist for Technology, at wade.biddix@va.usda.gov or by telephone at (804) 287-1675.

Sincerely,

W. Ray Dorsett

Acting For JOHN A. BRICKER
State Conservationist

County of Fairfax, Virginia

To protect and enrich the quality of life for the people, neighborhoods and diverse communities of Fairfax County

June 19, 2009

John A. Bricker
State Conservationist
USDA-NRCS
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229

Reference: Lake Barton Recommended Rehabilitation Plan

Dear Mr. Bricker:

We have reviewed the Draft Supplemental Watershed Plan-Environmental Assessment (EA) for the rehabilitation of Pohick Creek Watershed Dam No. 2 (Lake Barton)

As one of the project sponsors, we concur with and support the recommended rehabilitation plan in the draft EA. Fairfax County, as the owner and operator of the Lake Barton Dam, is committed to rehabilitating the dam auxiliary spillway. We look forward to working with NRCS and the Northern Virginia Soil and Water Conservation District to complete the design and construction of this project, so that the Lake Barton Dam meets current NRCS and Virginia Dam Safety performance standards for the stability and integrity of the auxiliary spillway.

We have enclosed for your consideration a number of comments on the draft EA. Also enclosed are comments on the draft EA we received from the Environmental and Development Review Branch of the Department of Planning and Zoning.

Sincerely,

Don Demetrius, Chief
Watershed Projects Evaluation Branch

Enclosures: As Stated

cc: Ryan Kelly, Chief of Staff, Braddock District

Department of Public Works and Environmental Services
Stormwater Planning Division
12000 Government Center Parkway, Suite 449
Fairfax, VA 22035-0052
Phone: 703-324-5500, TTY: 711, FAX: 703-802-5955
www.fairfaxcounty.gov/dpwes

Watershed Plan-Environmental Assessment for the rehabilitation of Pohick Creek Watershed Dam No. 2 (Lake Barton)
Fairfax County Department of Public Works and Environmental Services
Comments
June 19, 2009

1. Page 1, first paragraph, last sentence: This sentence refers to local sponsors, technical advisors, and the public. We suggest deleting technical advisors from this sentence as well as the first sentence on Page 53.

2. Page 2, Project Location: Please change this to indicate that Lake Barton discharges into an unnamed tributary to Sideburn *Branch.*

3. Page 5, sixth paragraph, second sentence: Suggest changing "staging area/soil storage area" to decanting basin.

4. Page 6, under Forest Resources: It is stated that the surrounding watershed is part of what is considered to be the inner Coastal Plain. This is not correct, as the Lake Barton drainage area is contained entirely within the Piedmont physiographic province as stated elsewhere in the document.

5. Page 18, under Current Condition of Dam: Please note that the principal spillway riser sluice gate was last operated on November 10, 2008.

6. Page 19, Internal Drain System: It should be noted that previous attempts by Fairfax County to complete an inspection of the embankment drains at the Woodglen Lake Dam using a 1" push cable camera were unsuccessful as it was not possible to negotiate the second bend in the embankment pipes. In addition, the as-built plans for the Lake Barton Dam (Sheet 8) indicate that the majority of the drainage system does not contain a corrugated metal pipe, unlike the other PL-566 dams in the County.

7. Page 19, last paragraph: The generally used and accepted Light Detection and Ranging abbreviation is LIDAR (all upper case).

8. Page 20, Status of Operation and Maintenance: It may be useful to note here that the last P.E. inspection for the Lake Barton Dam was conducted on May 5, 2008, and that the most recent state Dam Safety O&M conditional certificate for the Lake Barton Dam was issued in September, 2008 for a 1-year period.

9. Page 22, last paragraph: This paragraph is confusing. The 1000-year event has a 0.1% probability of occurring in any given year and has *less* than 0.1% probability of being exceeded in any given year. This paragraph also appears to imply that the 6-hour, 1000-year rainfall amount is 19.6 inches, while it is in fact 7.97 inches. It is also not clear why reference is being made to the 24-hour, 1000-year event which is 13.63 inches.

10. Page 24, Consequences of Dam Failure for the Existing Auxiliary Spillway Condition: In this section it is suggested that precipitation amounts greater than 10 inches should be monitored closely in order to be implement the EAP in a timely manner. Please note we have relatively conservative rainfall amounts that trigger a Stage II or III condition at the

Lake Barton Dam. Currently, a Stage II condition is triggered by 3.0 inches in 6 hours, 3.5 inches in 12 hours, and 4.0 inches in 24 hours. A Stage III condition is triggered by 6.2 inches in 6 hours, 7.8 inches in 12 hours, and 9.4 inches in 24 hours. It should also be noted that Fairfax County has completed the installation of instrumentation at all the PL-566 dams to provide near real-time data on precipitation and lake water levels.

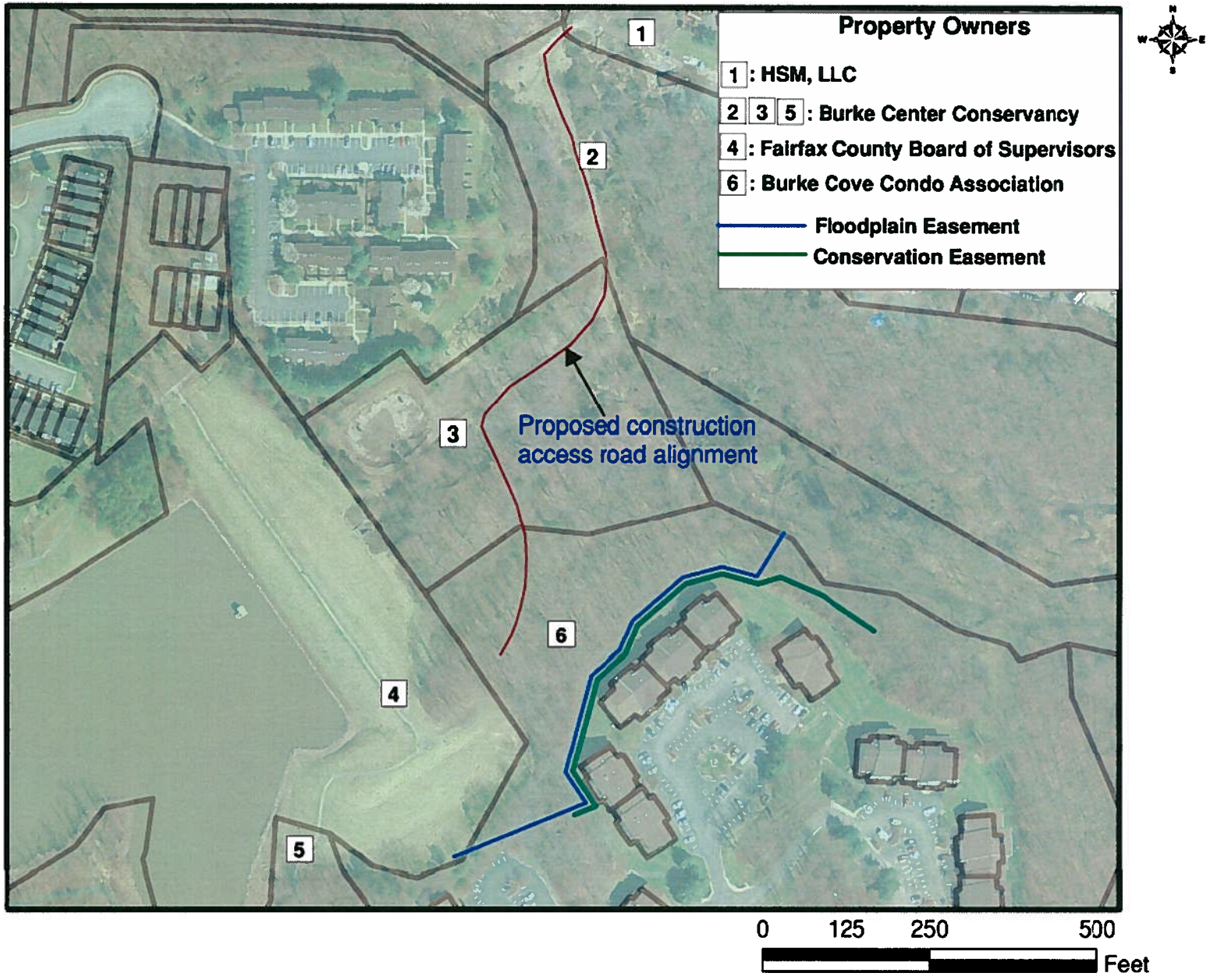
11. Page 31, Subsidiary Concerns: According to this section and additional clarification provided by NRCS, the auxiliary spillway crest should be raised by 0.5 feet to meet the requirements for a vegetated spillway, and the lowest ungated principal spillway riser opening enlarged to 22" X 19" to meet the 10-day drawdown requirement. However according to the AMT/Schnabel Hydrologic and Hydraulic Analysis (H&H) report, the principal spillway hydrograph routing results (see Appendix D2, results summary for SITES input file P2-PSH indicate that the auxiliary spillway crest should be set at elevation 333.60 for vegetated spillway (i.e. 0.6 feet above current elevation), and additionally, the TR-60 criteria for drawdown (15% or less of the maximum volume of retarding storage remains after 10 days) is met after 4.12 days. Please indicate if the requirement to raise the auxiliary spillway crest by 0.5 feet (rather than 0.6 feet) and the necessity of enlarging the principal spillway riser opening was determined by an analysis completed subsequent to the H&H report. We would appreciate receiving a copy of this analysis so that it can be appended to the H&H report. The first paragraph on page B-3 should also be modified appropriately.

12. Page 35, Issue 2, Option 2: It should be noted that while raising the normal pool level by 0.8 feet will not *directly* impact the trails around the lake, it will result in *more frequent* flooding of the trails. While this may also be considered a relatively minor impact, it will be an issue of concern to residents who use the lake and should be noted.

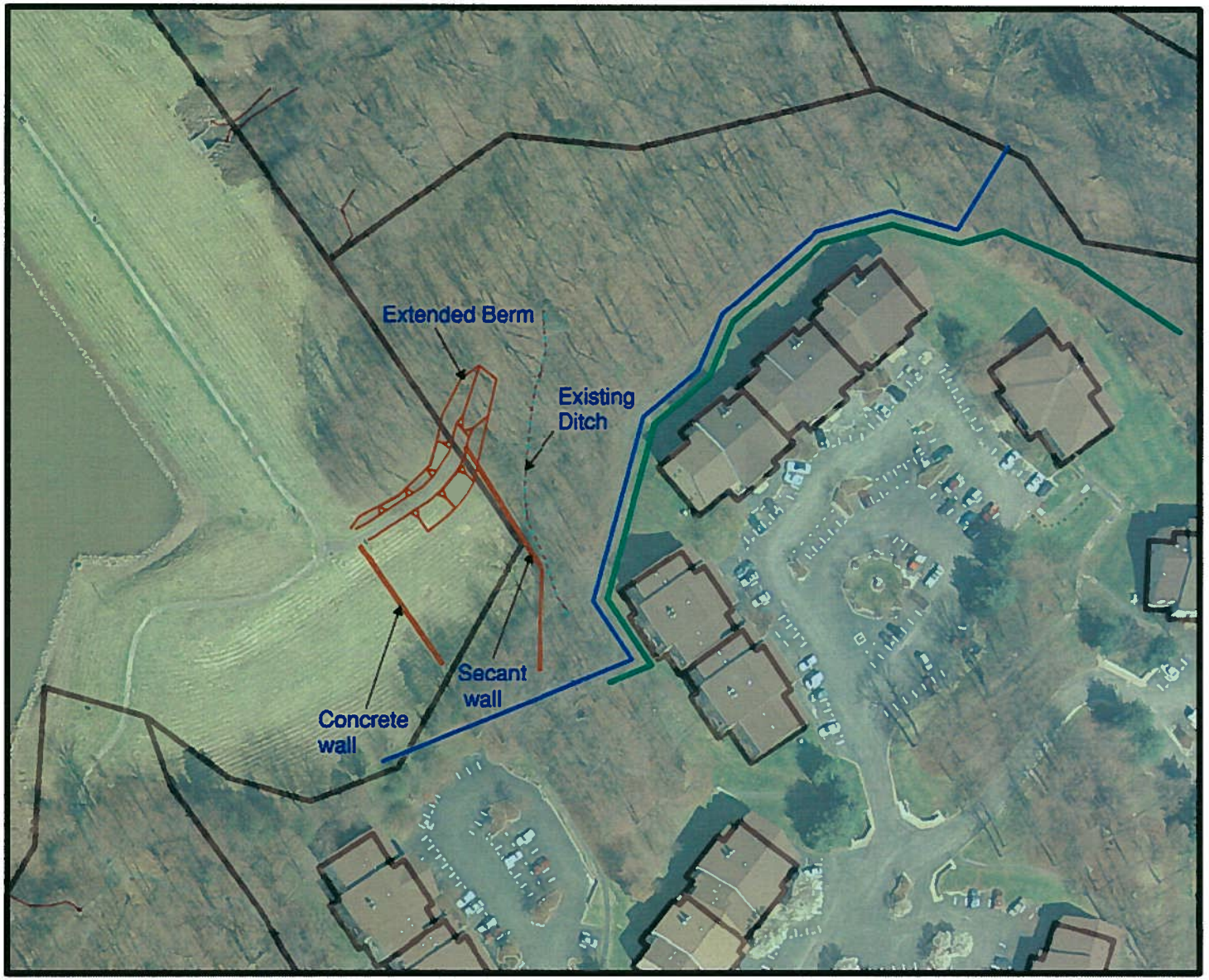
13. Page 37, Selected Rehabilitation Options: It is stated here that if dredging occurs *prior* to the spillway construction, it will not be necessary to raise the water level of the lake. At this point, our goal is to complete a dredging plan at the same time as the rehabilitation design. We will do our best to fund the dredging project and put it out to bid prior to the spillway rehabilitation project. To allow for unforeseen delays, we would appreciate your qualifying this statement to indicate that if Fairfax County has made substantial progress towards and has obligated funds for dredging prior to the spillway construction, it will not be necessary to raise the current normal pool and perform any associated modifications to the principal spillway riser opening.

14. We recommend replacing Figure D1 with the attached figure (Lake Barton Land Ownership) which more clearly shows land ownership by parcel and also conceptually shows the proposed construction access road alignment. We also suggest including the attached figure (Preferred Spillway Rehabilitation Option) as an additional Figure D8, that shows the preferred rehabilitation alternative in plan view over an aerial photo base for better visualization of this alternative.

Lake Barton Land Ownership



Preferred Spillway Rehabilitation Option



County of Fairfax, Virginia

MEMORANDUM

DATE: May 29, 2009

TO: Craig Carinci, Director
Stormwater Planning Division
Department of Public Works and Environmental Services

FROM: Pamela G. Nee, Chief
Environment and Development Review Branch
Department of Planning and Zoning

SUBJECT: DRAFT Supplemental Watershed Plan – Environmental Assessment for the Pohick Creek Watershed - A supplement to the original watershed plan for the rehabilitation of Pohick Creek Watershed Dam No. 2, Lake Barton

The Fairfax County Department of Planning and Zoning has reviewed the Environmental Assessment for the proposed rehabilitation of Pohick Creek Watershed Dam No. 2, Lake Barton. According to the Draft Environmental Assessment (EA) the primary issues which resulted in the proposed rehabilitation project are related to dam design and safety concerns. The proposed scope of work is identified as:

- Installation of a reinforced concrete wall at the end of the level section and a concrete secant wall at the end of the outlet section.
- The permanent pool elevation will be raised by 0.8 feet to achieve the required sediment storage capacity.
- The auxiliary spillway crest will be raised by 0.5 feet to maintain the design volume of floodwater storage and to meet National Resource Conservation Service (NRCS) criteria for a vegetated auxiliary spillway.
- There will be no change in the current levels of flood protection downstream as a result of project activity.

The EA also notes that a dam breach could impact Roberts Parkway, Guinea Road, Burke Lake Road, Premier Court, rail lines, 192 homes, 14 commercial buildings, 15 industrial sites, 9 office buildings and three public buildings, and the parking structure and up to 545 vehicles parked daily at the railroad parking lot which are all located within the identified breach inundation zone. While the EA notes Fairfax County's efforts with regard to the Chesapeake Bay Preservation Act (pages 7-8) and notes that there are two types of land features as defined by the Chesapeake Bay Preservation Ordinance (Fairfax County Code, Chapter 118) as Resource Management Areas (RMA's) and Resource Protection Areas (RPA's) the EA fails to note that Lake Barton is located entirely within the RPA for Pohick Creek. We feel that this oversight should be noted and that the RPA is the more restrictive designation in terms of land

use and water quality protection. The Comprehensive Plan contains a number of specific references to the Chesapeake Bay Preservation Ordinance. *The Policy Plan: The Countywide Policy Element of The Comprehensive Plan for Fairfax County, Virginia*, includes a chapter on the environment of Fairfax County which refers to the Chesapeake Bay Preservation Ordinance and the specific land features which comprise the RPA's in the County. The Comprehensive Plan also includes the *Chesapeake Bay Supplement to The Countywide Policy Element of The Comprehensive Plan for Fairfax County, Virginia.* While the Plan documents provide general guidance regarding development within the County and the implications of the Chesapeake Bay Preservation Ordinance, the overriding provisions applying to any new development or redevelopment are contained with the Chesapeake Preservation Ordinance within the County Code. As you are aware, the Department of Public Works and Environmental Services has the primary responsibility to administer this Ordinance. As such, it seems that the primary guidance on the proposed dam rehabilitation should come from staff within the Department of Public Works and Environmental Services.

However, I would offer the following comments on the information contained in the EA. While the project is described in fairly general terms, a more explicit description of the project area, proposed access to the project area and limits of clearing and grading would be helpful in determining the physical impacts to the land surrounding the spillway project area. While these comments are noted, and hopefully taken into consideration, we feel that the EA adequately demonstrates the need for the proposed work particularly given the potential threat to public and private property, transit, the environment and human life if the project failed to go forward.

If you have any questions about our comments, feel free to contact John Bell of my staff at 703-324-1380.

PGN:JRB

cc: Dipmani Kumar, Department of Public Works and Environmental Services
John R. Bell, Department of Planning and Zoning

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014

Telephone: 804-287-1691
Fax: 804-287-1737

July 6, 2009

Mr. Don Demetrius, Chief
Watershed Projects Evaluation Branch
Department of Public Works and Environmental Services
Stormwater Planning Division
12000 Government Center Parkway, Suite 449
Fairfax, VA 22035-0052

RE: Draft Supplemental Watershed Plan- Environmental Assessment (EA) for the Rehabilitation of Pohick Creek Watershed Dam No. 2 (Lake Barton), Fairfax County, Virginia

Dear Mr. Demetrius:

Thank you for your timely review of the referenced EA. We appreciate your support of this project. We will give careful consideration to the specific comments you raised as we develop the final plan for this project. Several of the comments will need to be addressed during the design and/or implementation phases of the project.

These issues include:

1. The camera survey was not completed due to the difficulties associated with negotiating the internal bends. The final design report will need to include an assessment of the adequacy of the existing internal drainage system, data utilized as supporting data for the assessment and any required remedial actions.
2. The final size of the orifice opening in the riser of the principal spillway will be determined in the design process.
3. The elevation of the crest of the auxiliary spillway will depend upon the final orifice size, the timeliness of the dredging process, and the NRCS preference to meet the criteria for a vegetated earth auxiliary spillway.

We appreciate the time and consideration given by Fairfax County staff and the members of the Lake Barton Task Force throughout the planning process. We especially appreciate the cooperation and participative spirit we have experienced from the public toward this worthwhile project.

As the project proceeds, we look forward to working with Fairfax County staff, the Fairfax County Board of Supervisors, and the Northern Virginia Soil and Water Conservation District in a joint effort to rehabilitate the Lake Barton Dam.

If questions or concerns arise as the project proceeds, please contact Wade Biddix, Assistant State Conservationist for Technology, at wade.biddix@va.usda.gov or by telephone at (804) 287-1675.

Sincerely,

W. Ray Dueth

Acting For JOHN A. BRICKER
State Conservationist

THE BURKE CENTRE CONSERVANCY
Nature and community in harmony

6060 Burke Centre Parkway
Burke, Virginia 22015-3702
(703) 978-2928 Fax: (703) 978-1073
www.burkecentre.org

June 25, 2009

Mr. John A. Bricker, State Conservationist
NRCS
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014

Re: Draft Supplemental Watershed Plan
Rehabilitation of Pohick Creek Site 2

Dear Mr. Bricker:

I have reviewed the above referenced plan and find it to be in keeping with what has been presented at the various public meetings concerning the issue.

The Burke Centre Conservancy is generally in favor of the plan, provided the various easement agreements between Fairfax County, the Conservancy and Burke Cove Condominium can be successfully negotiated and executed.

Also, it has been the Conservancy's position from the beginning that dredging the lake is the ultimate solution to meeting the fifty year sediment storage capacity required in the plan. The Conservancy views raising the pool elevation as a temporary solution, and fully expects Fairfax County to complete the necessary dredging activity to address the sediment issues of the lake. It is our desire that dredging plans be substituted prior to the commencement of work so that raising the pool elevation is not necessary for the successful completion of this important project.

Sincerely,

Patrick M. Gloyd, PCAM
Executive Director

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014

Telephone: 804-287-1691
Fax: 804-287-1737

July 6, 2009

Mr. Patrick M. Gloyd, PCAM
Executive Director
The Burke Centre Conservancy
6060 Burke Centre Parkway
Burke, Virginia 22015-3702

RE: Draft Supplemental Watershed Plan- Environmental Assessment (EA) for the Rehabilitation of Pohick Creek Watershed Dam No. 2 (Lake Barton), Fairfax County, Virginia

Dear Mr. Gloyd:

Thank you for your timely review of the referenced Draft EA submitted to your organization for review. We appreciate the time and consideration given by your organization to carefully examine our assessment and provide input.

We hereby acknowledge receipt of your letter indicating that your organization has no conflict with the rehabilitation proceeding as presented. The dredging issues you raised will hopefully be worked out during the design and implementation phases of the project.

If questions or concerns arise as the project proceeds, please contact Wade Biddix, Assistant State Conservationist for Technology, at wade.biddix@va.usda.gov or by telephone at (804) 287-1675.

Sincerely,

W. Ray Dewitt

Acting For JOHN A. BRICKER
State Conservationist

3060 Williams Drive, Suite 510
Fairfax, Virginia 22031
www.novaregion.org

Northern Virginia Regional Commission

Voice: 703-642-0700
Fax: 703-642-5077

Action: Elad
cc: Jack

June 25, 2009

John Bricker
USDA Natural Resources Conservation Service
Culpeper Building, Suite 209
1606 Santa Rosa Road
Richmond, VA 23229-5014

Re: Draft Supplemental Watershed Plan – Environmental Assessment for the Pohick Creek Watershed

Dear Mr. Bricker:

The Northern Virginia Regional Commission staff has reviewed the Environmental Assessment for the proposed project referenced above, and would like to offer the following additional comments:

Please be advised that Fairfax County has enacted a jurisdiction-wide Chesapeake Bay Resource Management Area (RMA) designation. This RMA designation requires that all development result in a no-net-increase standard for phosphorus loadings, based on the jurisdiction's average imperviousness. Please refer to the Northern Virginia BMP Handbook for calculation procedures. A copy of the Handbook is available on NVRC's website at http://www.novaregion.org/index.asp?NID=250.

Special attention should be given to post-construction stormwater quality management. The developing agency must adhere to *the post-development* water quality requirements set forth by the Virginia Stormwater Management Regulations (VR 215-02-00 Part IV and §2.3). State agencies are required to meet all local ordinances pursuant to the Virginia Chesapeake Bay Act.

Additionally, please be advised that this project falls under the jurisdiction of the Chesapeake Bay Preservation Act (CBPA), which was adopted into Fairfax County's local ordinance in 1990. The CBPA requires the maintenance of a 100 foot riparian buffer along all perennial streams and wetlands. Please refer to the CBPA for allowable uses within, or near, such Resource Protection and Maintenance Areas.

A copy of this letter should be included with your submission to indicate that preliminary review by this agency has been completed. Your cooperation with this intergovernmental review process is appreciated.

Sincerely,

Marshall Popkin
Environmental Planner

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014

Telephone: 804-287-1691
Fax: 804-287-1737

July 6, 2009

Mr. Marshall Popkin
Environmental Planner
Northern Virginia Regional Commission
3060 Williams Drive, Suite 510
Fairfax, Virginia 22031

RE: Draft Supplemental Watershed Plan- Environmental Assessment (EA) for the Rehabilitation of Pohick Creek Watershed Dam No. 2 (Lake Barton), Fairfax County, Virginia

Dear Mr. Popkin:

Thank you for your staff's timely review of the referenced Draft EA submitted to your office for review. We appreciate the time and consideration given by your office to carefully examine our assessment and provide input.

We hereby acknowledge receipt of your letter indicating that your office has no conflict with the rehabilitation proceeding as presented.

If questions or concerns arise as the project proceeds, please contact Wade Biddix, Assistant State Conservationist for Technology, at wade.biddix@va.usda.gov or by telephone at (804) 287-1675.

Sincerely,

W. Ray Smith

JOHN A. BRICKER
State Conservationist

Acting For

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
TDD (804) 698-4021
www.deq.virginia.gov

L. Preston Bryant, Jr.
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4020
1-800-592-5482

June 16, 2009

Mr. John A. Bricker
State Conservationist
Natural Resources Conservation Service
1606 Santa Rosa Road, Suite 209
Richmond, Virginia 23229

RE: Draft Supplemental Watershed Plan-Environmental Assessment for the Rehabilitation of Pohick Creek Watershed Dam No. 2, Lake Barton, Fairfax County, Virginia (DEQ 09-098F)

Dear Mr. Bricker:

The Commonwealth of Virginia has completed its review of the above-referenced Draft Environmental Assessment (EA). The Department of Environmental Quality (DEQ) is responsible for coordinating Virginia's review of federal environmental documents prepared pursuant to the National Environmental Policy Act and responding to appropriate federal officials on behalf of the Commonwealth. DEQ is also responsible for coordinating state reviews of federal consistency determinations or certifications submitted under the Coastal Zone Management Act. The following agencies and locality joined in this review:

Department of Environmental Quality
Department of Game and Inland Fisheries
Department of Conservation and Recreation
Marine Resources Commission
Department of Mines, Minerals and Energy
Department of Historic Resources
Department of Health

The Department of Forestry, the Northern Virginia Regional Commission and Fairfax County were also invited to comment. Fairfax County indicated that the County's comments would be sent directly to the Natural Resources Conservation Service (NRCS).

PROJECT DESCRIPTION

The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service, has submitted a Draft Supplemental Watershed Plan-Environmental Assessment for the Pohick Creek Watershed. Project sponsors are the Fairfax County Board of Supervisors and the Northern Virginia Soil and Water Conservation District. The recommended plan is to rehabilitate the Lake Barton dam to meet current federal and state design, safety and performance standards. The plan provides for building a reinforced concrete wall at the end of the level section and a concrete secant wall at the end of the outlet section. The permanent pool elevation would be raised 0.8 feet to achieve the required sediment storage capacity. The auxiliary spillway crest will be raised by 0.5 feet to maintain the design volume of floodwater storage and the meet NRCS criteria for vegetated auxiliary spillways. There will be no change in the current levels of flood protection downstream.

ENVIRONMENTAL IMPACTS AND MITIGATION

1. Dam Safety and Floodplain Management. According to the EA (page vi), the proposed project does not meet current dam design and safety criteria.

1(a) Agency Jurisdiction. The Department of Conservation and Recreation's (DCR) is the lead coordinating agency for the Commonwealth's floodplain management program and the National Flood Insurance Program (Executive Memorandum 2-97).

1(b) Findings. DCR's Division of Dam Safety and Floodplain Management states that the EA is acceptable with regards to the Virginia Dam Safety Regulations. DCR has been working with the dam owner regarding the proposed upgrade to the emergency spillway over the past 2 years and anticipates reviewing the Alteration Permit submittal soon.

1(c) Recommendations. Continue to work with DCR's Division of Dam Safety to secure approval of the Alteration Permit for the proposed project.

2. Subaqueous Lands Impacts. The EA (page 44) states that the proposed project will have no adverse effect on wetlands, streams and lakes.

2(a) Agency Jurisdiction. The Virginia Marine Resources Commission (VMRC) regulates encroachments in, on or over state-owned subaqueous beds as well as tidal wetlands pursuant to Virginia Code 28.2 Sections 1200 through 1400. Also, the VMRC serves as the clearinghouse for the Joint Permit Application (JPA) used by the:

- U.S. Army Corps of Engineers (Corps) for issuing permits pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act;
- DEQ for issuance of a Virginia Water Protection permit;
- VMRC for encroachments on or over state-owned subaqueous beds as well as tidal wetlands; and

- local wetlands board for impacts to wetlands.

The VMRC distributes completed JPAs to the appropriate agencies. Each agency conducts its review and responds.

2(b) Agency Comments. According to VMRC, if any portion of the proposed project involves encroachments channelward of ordinary high water along natural rivers and streams, a permit may be required from the VMRC prior to commencing land-disturbing activities.

2(c) Recommendations. For additional information on requirements pertaining to the submission of the JPA and potential impacts to subaqueous lands, contact the VMRC.

3. Erosion and Sediment Control and Stormwater Management. According to the EA (page 39), Lake Barton will provide sediment storage for 50 years after rehabilitation. The anticipated accumulated sediment volume of 34 acre-feet is material that would not be deposited in Pohick Creek, the Potomac River or Chesapeake Bay. The EA does not address erosion and sediment control or stormwater management during the construction phase of the proposed project. The footprint of the disturbed area is approximately 0.7 acres (EA, page 40).

3(a) Erosion and Sediment Control. The property owner is responsible for submitting a project specific erosion and sediment control (ESC) plan to Fairfax County for review and approval pursuant to the local ESC requirements, if the project involves a land-disturbing activity of greater than 2,500 square feet. Depending on local requirements the area of land-disturbance requiring an ESC plan may be less. The ESC plan must be approved by the locality prior to any land-disturbing activity at the project site. All regulated land-disturbing activities associated with the project, including on- and off-site access roads, staging areas, borrow areas, stockpiles, and soil intentionally transported from the project must be covered by the project specific ESC plan. Local ESC program requirements must be requested through Fairfax County.

3(b)Stormwater Management Plans. Dependent on local requirements, a Stormwater Management (SWM) plan may be required. Local SWM program requirements must be requested through Fairfax County.

3(c) VSMP General Permit for Construction Activities. DCR is responsible for the issuance, denial, revocation, termination and enforcement of the Virginia Stormwater Management Program (VSMP) General Permit for Stormwater Discharges from Construction Activities related to municipal separate storm sewer systems (MS4s) and construction activities for the control of stormwater discharges from MS4s and land-disturbing activities under the Virginia Stormwater Management Program. Therefore, for projects involving land-disturbing activities equal to or greater than 2,500 square feet, the land owner or its authorized agent is required to apply for registration coverage under the General Permit for Discharges of Stormwater from Construction Activities and develop a project-specific stormwater pollution prevention plan (SWPPP). The SWPPP must be prepared prior to submission of the registration statement for coverage under

the general permit, and it must address water quality and quantity in accordance with the VSMP Permit Regulations. General information and registration forms for the permit are available at http://www.dcr.virginia.gov/soil_and_water/index.shtml.

4. Air Pollution Control. The EA (page 38) states that construction activities will create dust. Air pollution abatement actions will minimize any potential impacts from dust problems during construction. Construction is not expected to violate any federal, state or local air quality standards.

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

4(b) Ozone Nonattainment Area. According to the DEQ Air Division, the project site is located in an ozone (O_3) nonattainment area and an emission control area for the volatile organic compounds (VOCs) and oxides of nitrogen (NO_x), which are contributors to ozone pollution. Therefore, the applicant should take all reasonable precautions to limit emissions of VOCs and NO_x principally by controlling or limiting the burning of fossil fuels.

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

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

4(d) Open Burning. If project activities include open burning of materials on- or off-site, this activity must meet the requirements under 9 VAC 5-130 *et seq.* of the *Regulations* for open burning and it may require a permit. The *Regulations* provide for,

but do not require, the local adoption of a model ordinance concerning open burning. The applicant should contact Fairfax County officials to determine what local requirements, if any, exist.

5. Solid and Hazardous Wastes and Hazardous Materials. The EA does not address solid or hazardous waste issues.

5(a) Agency Jurisdiction. Solid and hazardous wastes in Virginia are regulated by the Virginia Department of Environmental Quality, the Virginia Waste Management Board (VWMB) and the U.S. Environmental Protection Agency. They administer programs created by the federal Resource Conservation and Recovery Act, Comprehensive Environmental Response Compensation and Liability Act, commonly called Superfund, and the Virginia Waste Management Act. DEQ administers regulations established by the VWMB and reviews permit applications for completeness and conformance with facility standards and financial assurance requirements. All Virginia localities are required, under the Solid Waste Management Planning Regulations, to identify the strategies they will follow on the management of their solid wastes to include items such as facility siting, long-term (20-year) use, and alternative programs such as materials recycling and composting.

5(b) Comments. Neither solid nor hazardous waste issues were addressed in the report. The EA does not include a search of waste-related data bases. A Geographic Information System (GIS) database search did not reveal any waste sites within a half-mile radius that would impact or be impacted by the subject site.

5(c) Findings. Staff reviewed the Waste Division's data files and determined that a hazardous waste site (VA1210000906, US Army Engineer Proving Ground, TSDF) and a voluntary remediation program (VRP) site (VRP00246, Crest Dry Cleaners, Certificate Issued) are located in the same zip code as the proposed project, but their proximities to the subject site are unknown.

The following website may prove helpful in locating additional information for these identification numbers: http://www.deq.virginia.gov/waste/waste.html. Click on "Search EPA's CERCLIS database" for information regarding Superfund sites and "Hazardous Waste Facilities" for information on generators of hazardous waste.

5(d) Recommendations. DEQ encourages all construction projects to implement pollution prevention principles, including:

- the reduction, reuse, and recycling of all solid wastes generated; and
- the minimization and proper handling of generated hazardous wastes.

For further information, contact Paul Kohler, DEQ-Waste Division, at (804) 698-4208.

6. Coastal Lands Management and Chesapeake Bay Preservation Areas. According to the EA (page 38), Lake Barton is located in the Chesapeake Bay drainage (EA, page 39).

6(a) Agency Jurisdiction. DCR's Division of Chesapeake Bay Local Assistance (DCBLA) administers the coastal lands management enforceable policy of the Virginia Coastal Program which is governed by the Chesapeake Bay Preservation Act (Virginia Code §10.1-2100-10.1-2114) and Chesapeake Bay Preservation Area Designation and Management Regulations (9 VAC 10-20 *et seq.*).

6(b) Comments. Projects that include land disturbing activity must adhere to the general performance criteria in § 9 VAC 10-20-120 of the Regulations, especially with respect to minimizing land disturbance (including access and staging areas), retaining indigenous vegetation and minimizing impervious cover. For land disturbance over 2,500 square feet, the project must comply with the requirements of the *Virginia Erosion & Sediment Control Handbook*, Third Edition, 1992. Additionally, stormwater management criteria consistent with water quality protection provisions of the *Virginia Stormwater Management Regulations*, § 4 VAC 50-60-10, shall be satisfied.

6(c) Chesapeake Bay Agreement. The 1998 *Federal Agencies' Chesapeake Ecosystem Unified Plan* requires the signatories to fully cooperate with local and state governments in carrying out voluntary and mandatory actions to comply with the management of stormwater. The signatory agencies also committed to encouraging construction design that minimizes natural area loss on new and rehabilitated federal facilities, adopts low impact development and best management technologies for storm water, sediment and erosion control, and reduces impervious surfaces. In addition, the *Chesapeake 2000* agreement committed the government agencies to a number of sound land use and stormwater quality controls. The signatories additionally committed the agencies to lead by example with respect to controlling nutrient, sediment and chemical contaminant runoff from government properties. In December 2001, the Executive Council of the Chesapeake Bay Program issued *Directive No. 01-1: Managing Storm Water on State, Federal and District-owned Lands and Facilities*, which includes specific commitments for agencies to lead by example with respect to stormwater control.

6(d) Findings. The proposed project is within areas designated as Resource Protection Areas (RPA) and Resource Management Areas (RMA). The routine maintenance of dams is allowed in RPA areas; however, the project must adhere to the Performance Criteria found in Sections 118-3-2 and 118-3-3 of Fairfax County's Chesapeake Bay Preservation Ordinance.

6(e) Recommendations. To ensure that this project complies with the General Performance Criteria of the Bay Act Regulations, contact DCR-DCBLA (Joan Salvati, telephone (804) 225-3440) for additional guidance and coordination.

6(f) Conclusion. Provided that the project adheres to the above requirements, DCR-DCBLA concurs that the proposed activity would be consistent with the *Chesapeake Bay Preservation Act* and the Regulations.

7. Natural Heritage Resources. The EA does not address natural heritage resources.

7(a) Agency Jurisdiction. The mission of the Virginia Department of Conservation and Recreation is to conserve Virginia's natural and recreational resources. DCR supports a variety of environmental programs organized within seven divisions including the Division of Natural Heritage (DNH). The Natural Heritage Program's (DCR-DNH) mission is conserving Virginia's biodiversity through inventory, protection, and stewardship. The Virginia Natural Area Preserves Act, 10.1-209 through 217 of the Code of Virginia, was passed in 1989 and codified DCR's powers and duties related to statewide biological inventory: maintaining a statewide database for conservation planning and project review, land protection for the conservation of biodiversity, and the protection and ecological management of natural heritage resources.

7(b) Agency Comments. DCR-DNH has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

7(c) Findings. According to the information in DCR's files, natural heritage resources have not been documented in the project area. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

7(d) Threatened and Endangered Plant and Insect Species. The Endangered Plant and Insect Species Act of 1979, Chapter 39, §3.1-102- through 1030 of the Code of Virginia, as amended, authorizes the Virginia Department of Agriculture and Consumer Services (VDACS) to conserve, protect and manage endangered species of plants and insects. VDACS Virginia Endangered Plant and Insect Species Program personnel cooperates with the U.S. Fish and Wildlife Service (FWS), DCR-DNH and other agencies and organizations on the recovery, protection or conservation of listed threatened or endangered species and designated plant and insect species that are rare throughout their worldwide ranges. In those instances where recovery plans, developed by FWS, are available, adherence to the order and tasks outlines in the plans are followed to the extent possible.

VDACS has regulatory authority to conserve rare and endangered plant and insect species through the Virginia Endangered Plant and Insect Species Act. Under a Memorandum of Agreement established between the VDACS and DCR, DCR has the authority to report for VDACS on state-listed plant and insect species. DCR found that the current activity will not affect any documented state-listed plant and insect species.

7(e) Natural Area Preserves. DCR found that there are no State Natural Area Preserves under its jurisdiction in the project vicinity.

7(f) Recommendations. Contact DCR's Division of Natural Heritage at (804) 786-7951 if a significant amount of time passes before the project is implemented, since new and updated information is continually added to Biotics.

8. Wildlife and Fisheries Resources. According to the EA (page 40), the rehabilitation of the dam would not cause major changes in wildlife habitat around the lake. There are no federally-listed threatened or endangered species within the project area (EA, page 43); however, there are several state-listed threatened and endangered species within the project area. It is unlikely that the proposed project would affect any state-listed threatened or endangered species or their habitat.

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

8(b) Findings. DGIF states that there are no listed wildlife resources under its jurisdiction documented in the proposed project area. Therefore, DGIF does not anticipate impacts upon wildlife resources under its jurisdiction as a result of the proposed project.

8(c) Recommendations. DGIF recommends the following for in-stream work:

- conduct any in-stream activities during low or no-flow conditions;
- use nonerodible cofferdams to isolate the construction area;
- block no more than 50% of the streamflow at any given time;
- stockpile excavated material in a manner that prevents reentry into the stream;
- restore original streambed and streambank contours;
- revegetate barren areas with native vegetation; and
- implement strict erosion and sediment control measures.

For additional information wildlife resources and protected species, contact Amy Ewing, DGIF, at (804) 367-2211.

9. Forest Resources. The EA (pages 40 and 41) states that 0.2 acres of trees will be removed for construction activities. After construction, approximately 0.2 acres of trees will be planted offsite as mitigation for the impacts.

9(a) Agency Comments. The Department of Forestry did not respond to our request for comments.

9(b) Recommendations. To the extent practicable, the County should implement the following measures during construction to protect trees not slated for removal:

- mark and fence trees at least to the dripline or the end of the root system, whichever extends farther from the tree stem;
- mark trees with highly visible ribbon so that equipment operators can see the protected areas easily;
- do not park heavy equipment, move or stack construction materials near trees which can damage root systems by compacting the soil;
- use temporary crossing bridges or mats to minimize soil compaction and mechanical injury to plants; and
- stockpile soil away from trees to avoid killing the root systems.

Questions on tree protection may be directed to the Department of Forestry, Todd Groh, at (434) 220-9044.

10. Historic Structures and Archaeological Resources. According to the EA (page 41), a Phase I archaeological survey was completed in December 2007. The report states that the site should not be recommended as eligible for the National Register of Historic Places and that no further work should be required.

10(a) Agency Jurisdiction. The Department of Historic Resources (DHR) conducts reviews of projects to determine their effect on historic structures or cultural resources under its jurisdiction. DHR, as the designated State's Historic Preservation Office, ensures that federal actions comply with *Section 106 of the National Historic Preservation Act of 1966 (NHPA)*, as amended, and its implementing regulation at 36 CFR Part 800. The NHPA requires federal agencies to consider the effects of federal projects on properties that are listed or eligible for listing on the National Register of Historic Places. Section 106 also applies if there are any federal involvements, such as licenses, permits, approvals or funding. DHR also provides comments to DEQ through the state EIR review process.

10(b) Comments. The DHR states that the Lake Barton dam rehabilitation area was previously subjected to an archaeological survey by URS Corporation. The resulting report, entitled *Phase I Archaeological Evaluation of Dam Rehabilitation Sites at Lake Barton (Pohick 2), Woodglen Lake (Pohick 3), Lake Huntsman (Pohick 8), and Lake Laura (Stony Creek 9), Fairfax and Shenandoah Counties, Virginia* was accepted by DHR on April 15, 2008.

10(c) Findings. The survey identified one archaeological site (44FX3307), which was determined to be not eligible for listing in the National Register of Historic Places. No further archaeological study was recommended for the Lake Barton project area. DHR concurs with the finding of *no historic properties affected* and states that the EA accurately details the consultation to date.

10(d) Recommendation. Inclusion of DHR's determination and DHR's letter of concurrence in the Final EA will provide the interested public the opportunity to inspect

the documentation prior to approval of the undertaking in accordance with 36 CFR 800.4(d)(1) of the regulations implementing Section 106 of the National Historic Preservation Act of 1966 (as amended).

11. Geologic Resources. The EA does not address geologic resources.

11(a) Agency Jurisdiction. The Virginia Department of Mines, Minerals and Energy (DMME), through its six divisions, regulates the mineral industry, provides mineral research and offers advice on the wise use of resources. The Department's mission is to enhance the development and conservation of energy and mineral resources in a safe and environmentally sound manner in order to support a more productive economy in Virginia. The DMME Division of Geology and Mineral Resources (DGMR), serving as Virginia's geological survey, generates, collects, compiles and evaluates geologic data, creates and publishes geologic maps and reports, works cooperatively with other state and federal agencies, and is the primary source of information on geology, mineral and energy resources, and geologic hazards for both the mineral and energy industries and the general public. DMME DGMR also provides the necessary geologic support for those divisions of DMME that regulate the permitting of new mineral and fuel extraction sites, miner safety and land reclamation.

11(b) Agency Findings. DMME states that the proposed project will not impact mineral resources.

12. Waterworks Operation. The Pohick Creek Watershed is not considered a Public Drinking Water Source or Supply (EA, page 6).

12(a) Findings. The Virginia Department of Health (VDH), Office of Drinking Water (ODW) states that there are no records of public groundwater sources within a 1-mile radius and no surface water intakes located within 5 miles of the project location. Also, the project is not located within a surface water resource drainage basin. No impacts to water resources are anticipated.

13. Regional Planning Area. The Northern Virginia Regional Commission and Fairfax County were invited to comment.

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

13(b) Regional Agency Comments. The Northern Virginia Regional Commission did not respond to our request for comments.

13(c) Local Comments. Fairfax County states that it will send consolidated comments on the EA directly to the NRCS before the commenting deadline.

FEDERAL CONSISTENCY UNDER THE COASTAL ZONE MANAGEMENT ACT

According to the EA (page 54), prior to beginning any construction activities, the project sponsor, Fairfax County, must determine the extent of construction activities on coastal uses and resources and must submit a consistency certification to DEQ.

Pursuant to the Coastal Zone Management Act of 1972, as amended, prior to initiating activities, the project sponsors are required to determine the consistency of its activities affecting Virginia's coastal resources or coastal uses with the Virginia Coastal Resources Management Program (see section 307(c)(3)(A) of the Act and 15 CFR Part 930, sub-part F, section 930.90). This involves an analysis of the activities in light of the Enforceable Policies of the VCP (see attached), and submission of a consistency certification reflecting that analysis and committing the project sponsors actions to be consistent with the Enforceable Policies. We encourage the project sponsors to consider the Advisory Policies of the VCP as well (Attachment 2).

The Draft EA does not contain a consistency certification for the project. This certification may be provided as part of the final EA concluding the NEPA process, or independently, depending on your agency's preference. A consistency certification must be submitted to DEQ for coordinated review prior to construction. Section 930.58 gives content requirements for the consistency certification, or you may visit the DEQ Website at, http://www.deq.virginia.gov/eir/federal.html.

REGULATORY AND COORDINATION NEEDS

1. Dam Safety and Floodplain Management. Continue to work with DCR to receive approval of the Alteration Permit for the proposed project. For additional information, contact Robert VanLier of DCR's Division of Dam Safety and Floodplain Management at (540) 351-1587.

2. Subaqueous Lands Impacts. Pursuant to Section 28.2-1204 of the Code of Virginia the VMRC has jurisdiction over encroachments in, on, or over any State-owned rivers, streams, or creeks in the Commonwealth. Accordingly, if any portion of the subject project involves any encroachments channelward of ordinary high water along natural rivers and stream, a permit may be required. For additional information, contact Elizabeth Murphy, VMRC, at (757) 247-8027.

3. *Erosion & Sediment Control and Stormwater Management.* This construction project must comply with Virginia's Erosion and Sediment Control Law (Virginia Code 10.1-567) and regulations (4 VAC 50-30-30 *et seq.*) and Stormwater Management Law (Virginia Code 10.1-603.5) and regulations (4 VAC 50-60 *et seq.*) as locally

administered. Local erosion and sediment control, and stormwater management requirements should be coordinated with Fairfax County.

3(a) VSMP General Permit. For projects involving land-disturbing activities greater than 2,500 square feet in Chesapeake Bay Preservation Areas, the property owner is required to apply for registration coverage under the Virginia Stormwater Management Program General Permit for Discharges of Stormwater from Construction Activities. Specific questions regarding the Stormwater Management Program requirements should be directed to Holly Sepety, DCR, at (804) 225-2613.

4. Air Quality Regulations. Guidance on minimizing the emission of volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) during construction may be obtained from the DEQ-Northern Regional Office staff. Furthermore, activities associated with this project may be subject to air regulations administered by DEQ. The state air pollution regulations that may apply to the construction phase of the project are:

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

For information regarding air permits that may be required, contact Terry Darton, Air Permits Manager, DEQ-Northern Regional Office (telephone, (703) 583-3845).

5. Solid and Hazardous Wastes. Fairfax County should contact DEQ's Northern Regional Office (telephone, (703) 583-3800) concerning the location and availability of suitable waste management facilities in the project area or if free product, discolored soils, or other evidence of contaminated soils are encountered.

All solid waste, hazardous waste, and hazardous materials must be managed in accordance with all applicable federal, state, and local environmental regulations.

Some of the applicable state laws and regulations are:

- Virginia Waste Management Act (Code of Virginia Section 10.1-1400 *et seq.*);
- Virginia Hazardous Waste Management Regulations (VHWMR) (9VAC 20-60);
- Virginia Solid Waste Management Regulations (VSWMR) (9VAC 20-80); and
- Virginia Regulations for the Transportation of Hazardous Materials (9VAC 20-110).

Some of the applicable Federal laws and regulations are:

- Resource Conservation and Recovery Act (RCRA) (42 U.S.C. Section 6901 *et seq.*);
- Title 40 of the Code of Federal Regulations; and
- U.S. Department of Transportation Rules for Transportation of Hazardous materials (49 CFR Part 107).

6. Coastal Lands Management and Chesapeake Bay Preservation Areas. For additional guidance regarding compliance with the General Performance Criteria of the

Chesapeake Bay Preservation Act and *Regulations,* contact DCR-DCBLA (Joan Salvati, telephone (804) 225-3440).

7. Coastal Zone Management Act. Fairfax County is required to determine the consistency of its activities affecting Virginia's coastal resources or coastal uses with the Virginia Coastal Resources Management Program (see section 307(c)(3)(A) of the Act and 15 CFR Part 930, sub-part F, section 930.90). Therefore, please submit 6 hard copies and 12 CDs of the federal consistency certification for review to DEQ's Office of Environmental Impact Review. If you have additional question, contact Anne Pinion at (804) 698-4488.

Thank you for the opportunity to review the Draft Supplemental Environmental Assessment for this undertaking. Detailed comments of reviewing agencies are attached for your review. Please contact me at (804) 698-4325 or Anne Pinion at (804) 698-4488 for clarification of these comments.

Sincerely,

Ellie L. Irons, Manager
Office of Environmental Impact Review

Enclosures

cc: Paul Kohler, DEQ-ORP
David Hartshorn, DEQ-NRO
Elizabeth Murphy, VMRC
Amy Ewing, DGIF
Joan Salvati, DCR-DCBLA
Roger Kirchen, DHR
Matt Heller, DMME
Barry Matthews, VDH
Todd Groh, DOF
G. Mark Gibb, Northern Virginia RC
Anthony Griffin, Fairfax County

COMMONWEALTH of VIRGINIA

L. Preston Bryant. Jr.
Secretary of Natural Resources

DEPARTMENT OF ENVIRONMENTAL QUALITY
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Mailing address: P. O. Box 10009, Richmond, Virginia 23240
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David K. Paylor
Director

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

Attachment 1

Enforceable Regulatory Programs comprising Virginia's Coastal Resources Management Program (VCP)

a. Fisheries Management - The program stresses the conservation and enhancement of finfish and shellfish resources and the promotion of commercial and recreational fisheries to maximize food production and recreational opportunities. This program is administered by the Marine Resources Commission (VMRC); Virginia Code 28.2-200 to 28.2-713 and the Department of Game and Inland Fisheries (DGIF); Virginia Code 29.1-100 to 29.1-570.

The State Tributyltin (TBT) Regulatory Program has been added to the Fisheries Management program. The General Assembly amended the Virginia Pesticide Use and Application Act as it related to the possession, sale, or use of marine antifoulant paints containing TBT. The use of TBT in boat paint constitutes a serious threat to important marine animal species. The TBT program monitors boating activities and boat painting activities to ensure compliance with TBT regulations promulgated pursuant to the amendment. The VMRC, DGIF, and Virginia Department of Agriculture Consumer Services (VDACS) share enforcement responsibilities; Virginia Code 3.1-249.59 to 3.1-249.62.

b. Subaqueous Lands Management - The management program for subaqueous lands establishes conditions for granting or denying permits to use state-owned bottomlands based on considerations of potential effects on marine and fisheries resources, tidal wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the Department of Environmental Quality (DEQ). The program is administered by the Marine Resources Commission; Virginia Code 28.2-1200 to 28.2-1213.

c. Wetlands Management - The purpose of the wetlands management program is to preserve wetlands, prevent their despoliation, and accommodate economic development in a manner consistent with wetlands preservation.

(1) The tidal wetlands program is administered by the Marine Resources Commission; Virginia Code 28.2-1301 through 28.2-1320.

(2) The Virginia Water Protection Permit program administered by DEQ includes protection of wetlands --both tidal and non-tidal; Virginia Code §62.1-44.15:5 and Water Quality Certification pursuant to Section 401 of the Clean Water Act.

d. Dunes Management - Dune protection is carried out pursuant to The Coastal Primary Sand Dune Protection Act and is intended to prevent destruction or alteration of primary dunes. This program is administered by the Marine Resources Commission; Virginia Code 28.2-1400 through 28.2-1420.

e. Non-point Source Pollution Control – (1) Virginia's Erosion and Sediment Control Law requires soil-disturbing projects to be designed to reduce soil erosion and to decrease inputs of chemical nutrients and sediments to the Chesapeake Bay, its tributaries, and other rivers and waters of the Commonwealth. This program is administered by the Department of Conservation and Recreation; Virginia Code 10.1-560 et.seq.).

(2) Coastal Lands Management is a state-local cooperative program administered by the DCR's Division of Chesapeake Bay Local Assistance and 84 localities in Tidewater (see i) Virginia; Virginia Code §10.1-2100 –10.1-2114 and 9 VAC10-20 et seq.

f. Point Source Pollution Control - The point source program is administered by the State Water Control Board (DEQ) pursuant to Virginia Code 62.1-44.15. Point source pollution control is accomplished through the implementation of:

(1) the National Pollutant Discharge Elimination System (NPDES) permit program established pursuant to Section 402 of the federal Clean Water Act and administered in Virginia as the Virginia Pollutant Discharge Elimination System (VPDES) permit program.

(2) The Virginia Water Protection Permit (VWPP) program administered by DEQ; Virginia Code §62.1-44.15:5 and Water Quality Certification pursuant to Section 401 of the Clean Water Act.

g. Shoreline Sanitation - The purpose of this program is to regulate the installation of septic tanks, set standards concerning soil types suitable for septic tanks, and specify minimum distances that tanks must be placed away from streams, rivers, and other waters of the Commonwealth. This program is administered by the Department of Health (Virginia Code 32.1-164 through 32.1-165).

h. Air Pollution Control - The program implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards. This program is administered by the State Air Pollution Control Board (Virginia Code 10-1.1300 through §10.1-1320).

(i) Coastal Lands Management is a state-local cooperative program administered by the DCR's Division of Chesapeake Bay Local Assistance and 84 localities in Tidewater, Virginia established pursuant to the Chesapeake Bay Preservation Act; Virginia Code §10.1-2100 –10.1-2114 and Chesapeake Bay Preservation Area Designation and Management Regulations; Virginia Administrative Code 9 VAC10-20 et seq.

Attachment 2

Advisory Policies for Geographic Areas of Particular Concern

a. Coastal Natural Resource Areas - These areas are vital to estuarine and marine ecosystems and/or are of great importance to areas immediately inland of the shoreline. Such areas receive special attention from the Commonwealth because of their conservation, recreational, ecological, and aesthetic values. These areas are worthy of special consideration in any planning or resources management process and include the following resources:

a) Wetlands
b) Aquatic Spawning, Nursery, and Feeding Grounds
c) Coastal Primary Sand Dunes
d) Barrier Islands
e) Significant Wildlife Habitat Areas
f) Public Recreation Areas
g) Sand and Gravel Resources
h) Underwater Historic Sites.

b. Coastal Natural Hazard Areas - This policy covers areas vulnerable to continuing and severe erosion and areas susceptible to potential damage from wind, tidal, and storm related events including flooding. New buildings and other structures should be designed and sited to minimize the potential for property damage due to storms or shoreline erosion. The areas of concern are as follows:

i) Highly Erodible Areas
ii) Coastal High Hazard Areas. including flood plains.

c. Waterfront Development Areas - These areas are vital to the Commonwealth because of the limited number of areas suitable for waterfront activities. The areas of concern are as follows:

i) Commercial Ports
ii) Commercial Fishing Piers
iii) Community Waterfronts

Although the management of such areas is the responsibility of local government and some regional authorities, designation of these areas as Waterfront Development Areas of Particular Concern (APC) under the VCRMP is encouraged. Designation will allow the use of federal CZMA funds to be used to assist planning for such areas and the implementation of such plans. The VCRMP recognizes two broad classes of priority uses for waterfront development APC:

i) water access dependent activities:
ii) activities significantly enhanced by the waterfront location and complementary to other existing and or planned activities in a given waterfront area.

Advisory Policies for Shorefront Access Planning and Protection

a. Virginia Public Beaches - Approximately 25 miles of public beaches are located in the cities, counties, and towns of Virginia exclusive of public beaches on state and federal land. These public shoreline areas will be maintained to allow public access to recreational resources.

b. Virginia Outdoors Plan - Planning for coastal access is provided by the Department of Conservation and Recreation in cooperation with other state and local government agencies. The Virginia Outdoors Plan (VOP), which is published by the Department, identifies recreational facilities in the Commonwealth that provide recreational access. The VOP also serves to identify future needs of the Commonwealth in relation to the provision of recreational opportunities and shoreline access. Prior to initiating any project, consideration should be given to the proximity of the project site to recreational resources identified in the VOP.

c. Parks, Natural Areas, and Wildlife Management Areas - Parks, Wildlife Management Areas, and Natural Areas are provided for the recreational pleasure of the citizens of the Commonwealth and the nation by local, state, and federal agencies. The recreational values of these areas should be protected and maintained.

d. Waterfront Recreational Land Acquisition - It is the policy of the Commonwealth to protect areas, properties, lands, or any estate or interest therein, of scenic beauty, recreational utility, historical interest, or unusual features which may be acquired, preserved, and maintained for the citizens of the Commonwealth.

e. Waterfront Recreational Facilities - This policy applies to the provision of boat ramps, public landings, and bridges which provide water access to the citizens of the Commonwealth. These facilities shall be designed, constructed, and maintained to provide points of water access when and where practicable.

f. Waterfront Historic Properties - The Commonwealth has a long history of settlement and development, and much of that history has involved both shorelines and near-shore areas. The protection and preservation of historic shorefront properties is primarily the responsibility of the Department of Historic Resources. Buildings, structures, and sites of historical, architectural, and/or archaeological interest are significant resources for the citizens of the Commonwealth. It is the policy of the Commonwealth and the VCRMP to enhance the protection of buildings, structures, and sites of historical, architectural, and archaeological significance from damage or destruction when practicable.

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014

Telephone: 804-287-1691
Fax: 804-287-1737

July 6, 2009

Ms. Ellie Irons, Manager
Office of Environmental Impact Review
Commonwealth of Virginia
Department of Environmental Quality
P.O. Box 1105
Richmond, Virginia 23218

RE: Draft Supplemental Watershed Plan- Environmental Assessment (EA) for the Rehabilitation of Pohick Creek Watershed Dam No. 2 (Lake Barton), Fairfax County, Virginia

Dear Ms. Irons:

Thank you for the Commonwealth's consolidated comments of the referenced Draft EA. We also received individual comments from Fairfax County and the Northern Virginia Regional Commission. We appreciate your support of this project.

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

If questions or concerns arise as the project proceeds, please contact Wade Biddix, Assistant State Conservationist for Technology, at wade.biddix@va.usda.gov or by telephone at (804) 287-1675.

Sincerely,

W. Ray Dubs

Acting For JOHN A. BRICKER
State Conservationist

COMMONWEALTH of VIRGINIA

L. Preston Bryant, Jr.
Secretary of Natural Resources

Department of Historic Resources
2801 Kensington Avenue, Richmond, Virginia 23221

Kathleen S. Kilpatrick
Director

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www.dhr.virginia.gov

June 12, 2009

Mr. John A. Bricker, State Conservationist
USDA – NRCS
1606 Santa Rosa Rd., Suite 209
Richmond, Virginia 23229-5014

Re: Draft Supplemental Watershed Plan – Environmental Assessment for the Pohick Creek Watershed, Pohick Creek Dam #2, Lake Barton, Fairfax County
DHR File No. 2005-1529; DEQ #09-098F

Dear Mr. Bricker:

We have received the above-referenced document for review. The Lake Barton dam rehabilitation area was previously subjected to an archaeological survey by URS Corporation. The resulting report, entitled *Phase I Archaeological Evaluation of Dam Rehabilitation Sites at Lake Barton (Pohick 2), Woodglen Lake (Pohick 3), Lake Huntsman (Pohick 8), and Lake Laura (Stony Creek 9), Fairfax and Shenandoah Counties, Virginia* was accepted by our office on April 15, 2008. Survey of the Lake Barton project area identified one archaeological site – 44FX3307 – which was determined to be not eligible for listing in the National Register of Historic Places. No further archaeological study was recommended for the Lake Barton project area.

We find that the draft Environmental Assessment accurately details the consultation to date. We concur with your finding of *no historic properties affected.* Inclusion of this determination in the final EA, along with our letter of concurrence, will provide the interested public the opportunity to inspect the documentation prior to approval of the undertaking in accordance with 36 CFR 800.4(d)(1) of the regulations implementing Section 106 of the National Historic Preservation Act of 1966 (as amended).

If you have any questions concerning these comments, please do not hesitate to contact me at roger.kirchen@dhr.virginia.gov.

Sincerely,

Roger W. Kirchen, Archaeologist
Office of Review and Compliance

Cc: Ms. Anne N. Pinion, DEQ – OEIR

Administrative Services
10 Courthouse Ave.
Petersburg, VA 23803
Tel: (804) 862-6416
Fax: (804) 862-6196

Capital Region Office
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Roanoke Region Office
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Northern Region
Preservation Office
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United States Department of Agriculture

NRCS

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July 6, 2009

Mr. Roger W. Kirchen, Archaeologist
Office of Review and Compliance
Commonwealth of Virginia
Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221

RE: Draft Supplemental Watershed Plan- Environmental Assessment (EA) for the Rehabilitation of Pohick Creek Watershed Dam No. 2 (Lake Barton), Fairfax County, Virginia

Dear Mr. Kirchen:

Thank you for your timely review of the referenced Draft EA submitted to your office for review. We appreciate the time and consideration given by your agency to carefully examine our assessment and provide input.

As per your suggestion, we will note your department's concurrence with the finding of *no historic properties affected* in the Draft EA.

If questions or concerns arise as the project proceeds, please contact Wade Biddix, Assistant State Conservationist for Technology, at wade.biddix@va.usda.gov or by telephone at (804) 287-1675.

Sincerely,

W. Ray Dartt

JOHN A. BRICKER
Acting For State Conservationist

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND 23219-2000

DAVID S. EKERN, P.E.
COMMISSIONER

June 3, 2009

John A. Bricker
Natural Resource Conservation Service
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014

Re: EA for rehabilitation of Pohick Creek Site 2 (Lake Barton) in Fairfax County

Mr. Bricker,

The Virginia Department of Transportation (Northern Virginia District Planning) has reviewed the information provided for the referenced project. These comments may be found in the enclosed letter. Please notify if there is anything additional this office may provide to assist you in review of this project.

Sincerely,

Melanie L. Allen
VDOT Environmental Program Planner
Office: 804-786-0868

COMMONWEALTH of VIRGINIA

DAVID S. EKERN, P.E.
COMMISSIONER

DEPARTMENT OF TRANSPORTATION
14685 Avion Parkway
Chantilly, VA 20151
(703) 383-VDOT (8368)

June 2, 2009

MEMORANDUM

To: Melanie Allen, Environmental Division

From: Bob McDonald, NoVA Planning Section

Subj: Draft Supplemental Watershed Plan for Pohick Creek Dam #2 (Lake Barton) (Fairfax County)

I have reviewed the Draft Supplemental Watershed Plan Environmental Assessment (EA) prepared by the U.S. Department of Agriculture's Natural Resources Conservation Service for the subject project. The project proposes to rehabilitate the existing earthen dam in order to bring it to present standards and minimize the chances for failure and subsequent downstream flooding. As the EA points out, flooding would impact traffic on nearby Roberts Parkway, on Guinea Road, on Burke Lake Road, and disrupt trains on the nearby Norfolk Southern Railway tracks (used by AMTRAK / Virginia Railway Express for passenger / commuter traffic in addition to freight trains). From a transportation improvement standpoint, the proposed project should not have any significant impact on current highway usage or planned improvements. There are no planned improvements for the cited roads in the vicinity of the dam, and the planned widening of Guinea Road from its present two lanes to four lanes is not proposed until the 2015 timeframe, per the regional Comprehensive Long Range Plan (CLRP). Additionally, the planned widening will be north of the railway tracks.

Thank you for alerting us to this project.

cc: Bud Siegel

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014

Telephone: 804-287-1691
Fax: 804-287-1737

July 6, 2009

Ms. Melanie L. Allen
VDOT Environmental Program Planner
Commonwealth of Virginia
Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219-2000

RE: Draft Supplemental Watershed Plan- Environmental Assessment (EA) for the Rehabilitation of Pohick Creek Watershed Dam No. 2 (Lake Barton), Fairfax County, Virginia

Dear Ms. Allen:

Thank you for your timely review of the referenced Draft EA submitted to your office for review. We appreciate the time and consideration given by your agency to carefully examine our assessment and provide input.

We hereby acknowledge receipt of your letter indicating that your department has no conflict with the rehabilitation proceeding as presented.

If questions or concerns arise as the project proceeds, please contact Wade Biddix, Assistant State Conservationist for Technology, at wade.biddix@va.usda.gov or by telephone at (804) 287-1675.

Sincerely,

W. Ray Dunn

JOHN A. BRICKER
Acting For State Conservationist

L. Preston Bryant, Jr.
Secretary of Natural Resources

Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951 FAX (804) 371-2674

June 2, 2009

John Bricker
Natural Resources Conservation Service
1616 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014

Re: Pohick Creek Watershed Plan

Dear Mr. Bricker:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, natural heritage resources have not been documented in the project area. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

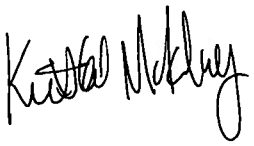
In addition, our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Shirl Dressler at (804) 367-6913.

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,



Kristal McKelvey
Coastal Zone Locality Liaison

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014

Telephone: 804-287-1691
Fax: 804-287-1737

July 6, 2009

Ms. Kristal McKelvey
Coastal Zone Locality Liason
Commonwealth of Virginia
Department of Conservation and Recreation
217 Governor Street
Richmond, Virginia 23219-2010

RE: Draft Supplemental Watershed Plan- Environmental Assessment (EA) for the Rehabilitation of Pohick Creek Watershed Dam No. 2 (Lake Barton), Fairfax County, Virginia

Dear Ms. McKelvey:

Thank you for your timely review of the referenced Draft EA submitted to your office for review. We appreciate the time and consideration given by your agency to carefully examine our assessment and provide input.

We hereby acknowledge receipt of your letter indicating that your department has no conflict with the rehabilitation proceeding as presented.

If questions or concerns arise as the project proceeds, please contact Wade Biddix, Assistant State Conservationist for Technology, at wade.biddix@va.usda.gov or by telephone at (804) 287-1675.

Sincerely,

W. Ray Dusett

JOHN A. BRICKER
Acting For State Conservationist

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

June 15, 2009

John A. Bricker
State Conservationist
Natural Resources Conservation Service
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014

RE: Draft Supplemental Watershed Plan-Environmental Assessment for the Pohick Creek Watershed Supplement No. 5 to the original watershed plan for the rehabilitation of Pohick Creek Dam No. 2 (Lake Barton) Fairfax County, VA May 2009

Dear Mr. Bricker:

In accordance with the National Environmental Policy Act (NEPA) of 1969 and Section 309 of the Clean Air Act, the U.S. Environmental Protection Agency (EPA) has reviewed the above referenced Environmental Assessment (EA) for the Pohick Creek Dam No. 2. We offer the following comments for your use.

Page 4 states that since the U. S. Fish and Wildlife Service did not provide comments during the scoping process and that the state databases did not include federally listed species the project will have "no effect" on any federally listed species or habitat. NRCS should still contact the USFWS and document the coordination in the final NEPA document.

Page 6 states that the Lake Barton shoreline, inlet, and outlet were visually surveyed in November 2006, February 2007, and December 2007 for jurisdictional wetlands and that no jurisdictional or non-jurisdictional wetlands are associated with this site. Further documentation should be provided regarding the method used to make this determination and the findings.

We suggest the following methods for reducing construction emissions be considered:

- Utilize appropriate dust suppression methods during on-site construction activities. Available methods include application of water, soil stabilizers, or vegetation; use of enclosures, covers, silt fences, or wheel washers; and suspension of earth-movement activities during high wind conditions;
- Maintain a speed of less than 15 mph with construction equipment on unpaved surfaces as well as utilize fuel with lower sulfur content;

- Employ a construction management plan in order to minimize interference with regular motor vehicle traffic;
- Use electricity from power poles instead of generators whenever possible;
- Repair and service construction equipment according to the regular maintenance schedule recommended for each individual equipment type;
- Incorporate energy-efficient supplies whenever feasible;
- Minimize idling of vehicles to help save fuel and reduce air pollution.

This project should be consistent with Executive Order 13112 for invasive species.

Thank you for the opportunity to offer these comments. If you have any questions, please feel free to contact me at (215) 814-3330.

Sincerely,

Barbara Okorn
Office of Environmental Programs

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014

Telephone: 804-287-1691
Fax: 804-287-1737

July 6, 2009

Ms. Barbara Okorn
Office of Environmental Programs
United States Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

RE: Draft Supplemental Watershed Plan- Environmental Assessment (EA) for the Rehabilitation of Pohick Creek Watershed Dam No. 2 (Lake Barton), Fairfax County, Virginia

Dear Ms. Okorn:

Thank you for your timely review of the referenced Draft EA submitted to your office for review. We appreciate the time and consideration given by your agency to carefully examine our assessment and provide input. We will give careful consideration to the specific comments you raised as we develop the final plan for this project. Some of the comments will need to be addressed during the design/construction phase.

We hereby acknowledge receipt of your letter indicating that your department has no conflict with the rehabilitation proceeding as presented.

If questions or concerns arise as the project proceeds, please contact Wade Biddix, Assistant State Conservationist for Technology, at wade.biddix@va.usda.gov or by telephone at (804) 287-1675.

Sincerely,

W. Ray Dutt

Acting For JOHN A. BRICKER
State Conservationist

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6669 Short Lane
Gloucester, VA 23061

JUL 10 2009

Mr. E.J. Fanning
Natural Resources Conservation Service
1606 Santa Rosa Rd., Suite 209
Richmond, Virginia 23229-5014

Re: Supplemental Watershed Plan – Pohick Creek Watershed (Lake Barton), Fairfax County, Virginia

Dear Mr. Fanning:

We have reviewed your request for information on Federally listed endangered and threatened species and designated critical habitat for the referenced project. The following comments are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended.

Based on the project description and location, it appears that no impacts to Federally listed species or designated critical habitat will occur. Should project plans change or if additional information on the distribution of listed species or critical habitat becomes available, this determination may be reconsidered.

You can find species information and other pertinent information on project reviews within Virginia at our website http://www.fws.gov/northeast/virginiafield/Project_Reviews.html. If you have any questions, please contact Tylan Dean of this office at (804) 693-6694, extension 104.

Sincerely,

Acting Supervisor

Cindy Schulz
Supervisor
Virginia Field Office

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014

Telephone: 804-287-1691
Fax: 804-287-1737

July 16, 2009

Ms. Cindy Schulz
Supervisor, Virginia Field Office
U. S. Fish and Wildlife Service
Ecological Services
6669 Short Lane
Gloucester, VA 23061

RE: Draft Supplemental Watershed Plan- Environmental Assessment (EA) for the Rehabilitation of Pohick Creek Watershed Dam No. 2 (Lake Barton), Fairfax County, Virginia

Dear Ms. Schulz:

Thank you for the review that Mr. Tylan Dean provided of the referenced Draft EA. We hereby acknowledge receipt of your letter indicating that the USFWS has provided concurrence to our determination of "No Effect" regarding Federally listed endangered and threatened species and their designated critical habitat for the referenced project.

If questions or concerns arise as the project proceeds, please contact Wade Biddix, Assistant State Conservationist for Technology, at wade.biddix@va.usda.gov or by telephone at (804) 287-1675.

Sincerely,

Kenneth Clarke, Acting for

JOHN A. BRICKER
State Conservationist

APPENDIX B

RECORD OF INVESTIGATION AND ANALYSIS

Appendix B. Investigation and Analysis Used in the Planning for the Rehabilitation of Pohick Creek Dam Site No. 2.

Threatened and Endangered Species: Identification of Federal and State listed threatened and endangered plant and animal species within a two mile radius of the project area was determined using the Virginia Fish & Wildlife Information Service computer program, a publication of the Virginia Department of Game and Inland Fisheries. USFWS was consulted and concurred with the NRCS determination of "No Effect."

Cultural Resources, Natural and Scenic Areas, and Visual Resources: A pedestrian survey of the dam area downstream for 200 meters was conducted on Feb. 13, 2007. The channel area was also surveyed for quartz and other tool-making materials, but failed to reveal any of this type of material. No indications of archaeological or historical sites were uncovered during this survey. A Phase I survey was completed on December 6, 2007. Twenty-four shovel test pits (STPs) were dug, and 26 artifacts were uncovered from 11 STPs. The site was determined ineligible for the NRHP, and no further work was recommended.

The absence of Natural Heritage Resources, including Scenic Areas and Visual Resources, was determined by review of the Virginia Department of Conservation & Recreation Natural Heritage Resource Map for Fairfax County.

Water Quality: Impaired stream and lake listings and supporting information was taken from the Virginia DEQ 2006 305(b)/303(d) Integrated Water Quality Assessment and Impaired Waters Report.

Wetlands: Absence of jurisdictional wetlands was determined by a site visit; the finding of a lack of jurisdictional wetlands was concurred with by the Northern Virginia Regulatory Section of the Army Corps of Engineers.

Forest and Wildlife Resources: Information on the potential natural vegetation of northern Virginia and associated wildlife resources was obtained from The Natural Communities of Virginia Classification of Ecological Community Groups, VADCR, Natural Heritage Division, and the Virginia Comprehensive Wildlife Conservation Strategy, VDGIF, 2005.

Chesapeake Bay and /or Coastal Zone Management Areas: Information on the Chesapeake Bay Act and Coastal Zone Management Areas was taken from DEQ program literature.

Geology: Reference for this plan: The Geologic Map of Virginia, 1993, compiled by the Commonwealth of Virginia Department of Mines, Minerals, and Energy.

Sediment: For this project, Fairfax County had a sediment survey completed in late February and early March 2007. That survey showed that the as-built sediment pool was only 46.2 acre-feet instead of the 64 acre-feet called for in the design. It is speculated that the amount of borrow taken from the pool area was less than originally planned. The survey and dredging showed that 43% of the sediment originally predicted to flow into Lake Barton had done so in the period from dam construction in 1978 to 2007 (29 years). The sedimentation rate for this time period

was 0.96 acre-feet/year. Per Kerry Robinson, NRCS Hydraulic Engineer, the projected rate of sedimentation for future years is estimated to be 0.68 acre-feet/year (1,100 CY).

HYDRAULICS AND HYDROLOGY

Background: A May 2001 report on the integrity of the Pohick 2 auxiliary spillway, prepared by Gannett Fleming, Inc. for Fairfax County, showed the stability and integrity of the soils were not sufficient to pass the PMP event without a breach of the dam. In 2006, Fairfax County commissioned the engineering firm of A. Morton Thomas & Associates, Inc. (AMT), to conduct an analysis of the existing auxiliary spillway, evaluate rehabilitation alternatives, and quantify the effects of a breach on the downstream watershed. Hydrologic and hydraulic investigations consisted of an analysis of rainfall runoff relationships of the watershed. The models were calibrated by comparing the output files to previous modeling.

Precipitation Data and Hydrologic Data: The precipitation data has changed since the original design was completed in 1976. The table below compares the design precipitation values to the NOAA-14 data from 2004. AMT used the 2004 NOAA-14 precipitation data in the evaluation.

Year	100-year, 6-hour event, inches	100-year, 24-hour event, inches	100-year, 10-day event, inches	6-hour PMP, inches	24-hour PMP, inches
1976	5.4	8	14	27.3	36
2004	5.31	8.27	12.14	28.0	36

The Hydrologic procedures in TR-55 were used to compute the runoff parameters. WinTR20 was used to route the 50, 100, 200 and 500-year, Type II, 24-hour storm discharges through the existing structures and the intervening subwatersheds' downstream floodplain. Land cover was determined from digital land use maps provided by Fairfax County and developed in conjunction with NRCS. A digital soil data set for the watershed was generated by NRCS using the Fairfax County detailed soil survey.

SITES Analysis: The SITES model was used to evaluate the capacity, stability and integrity of the existing structure and the auxiliary spillway alternatives. Geotechnical information was taken from the Pohick Creek Dam Site No. 2 Emergency Spillway Investigation study by Gannett Fleming, Inc., dated May 2001, and from the original SCS drill hole data as shown on the as-built drawings. The NRCS Standard rainfall distribution was used for the 6-hour PMP and the 24-hour PMP events. This is the dimensionless storm distribution from TR-60, Figure 2-4. The 5-point distribution was also used for evaluation of the 24-hour PMP event.

The existing vegetated auxiliary spillway meets NRCS stability criteria. Using a pair of cutoff walls will provide the necessary integrity to meet NRCS and State dam safety criteria. The SITES program is intended for use on vegetated earth spillways. By giving artificially high numbers for the erodibility and hardness of the auxiliary spillway soil and rock materials, SITES can be used to estimate the effects of the cutoff walls. During the design process, other techniques may be used.

The SITES analysis also showed that the orifice in the riser was too small to allow complete release of the floodwater volume within 10 days, as required in TR-60. The required drawdown rate can be achieved by increasing the height of the orifice by 0.5 feet.

Per the SITES analysis, the auxiliary spillway crest will be raised by 0.5 feet to meet the 1-day, 10-day storage requirement for a vegetated spillway. The frequency of operation of the auxiliary spillway is once in 100 years.

Water Surface Elevation Modeling: The HEC-RAS model was used to identify the water surface elevations within the downstream floodplain. The stream cross sections were developed using HEC-GeoRAS and supplemented with field survey data. The final "n" values for the channel and overbank flow were 0.033 and 0.08, respectively.

Breach Modeling: In accordance with the National Engineering Manual and instructions from the State Conservation Engineer, the breach zone is determined by a breach that could occur if both the principal and auxiliary spillways were blocked, the reservoir was full, and the dam failed under "sunny day" conditions. The criteria defined in TR-60, Earth Dams and Reservoirs, was used to determine the peak discharge of 60,052 cfs for the breach hydrograph.

A comparison between the As-Built drawings dated December 1981 and field surveyed data obtained for Lake Barton was used to determine the maximum height used in the breach discharge. The field survey and As-Built data were used for determining the depth of water (H) of 40.1 feet at failure.

An analysis using HEC-RAS was used to determine the inundation zone due to the breach of the dam. The stream cross sections were developed using HEC-GeoRAS and supplemented with field survey data. Manning's roughness coefficient "n" values ranging from 0.16 in the overbank to 0.08 in the channel were used. These values were selected to account for mud/trees/brush that would be disturbed and washed downstream due to a breach of the dam. Contraction and expansion values of 0.1 and 0.3 respectively were used in the modeling. The extent of model limits were taken to a point where the depth of the inundation area was within 1 foot of the 100-year FEMA floodplain as determined from delineated Fairfax County DFIRM GIS data.

SOCIAL AND ECONOMIC CONDITIONS

Sources for the data included in the social and economic conditions section of this supplement include the U.S. Census Bureau, Department of Commerce, 2000 Census, and interviews conducted with local contacts who are knowledgeable about recreational activities on and around Lake Barton.

Economic Analysis: The NRCS National Watershed Manual was used as a reference for the economic analysis along with two economic analysis guidance documents: "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies" (P&G), U.S. Water Resources Council, March, 1983, and the "Economics Handbook, Part II for Water Resources", USDA/Natural Resources Conservation Service, July, 1998. These

guidance documents were used to evaluate potential flood damages, and estimate recreational use, project benefits and associated costs. P&G was developed to define a consistent set of project formulation and evaluation instructions for all federal agencies that carry out water and related land resource implementation studies. The basic objective of P&G is to determine whether or not benefits from project actions exceed project costs. P&G also requires that the "National Economic Development" or NED alternative, which maximizes monetary net benefits, be selected for implementation unless there is an overriding reason for selecting another alternative based on federal, state, local or international concerns related to the social and environmental accounts. The allowance for exceptions to the NED plan recognizes the fact that not all project considerations or benefits can be quantified and monetized when it comes to some ecological system and social effects.

Basic data were obtained from field surveys, interviews with residents, businesses and local government officials within the watershed. Detailed data on the homes and other structures within the floodplain, breach inundation zone, and breach flood pool of the Lake Barton watershed were obtained either from field surveys or from the Fairfax County Department of Public Works and Environmental Services, Stormwater Planning Division, Watershed Project Evaluation and Implementation Branch.

Flood damages were based on the results of the hydrology and hydraulics (H&H) simulation modeling carried out by the AMT, Inc. The H&H data routed water for the storm events modeled establishing the extent of the floodplain as well as flood depths. This data was then used with water depth to damage functions developed by the Federal Emergency Management Agency (FEMA) to estimate damages by storm event for both the future without federal project (FWOFP) and future with federal project (FWFP) candidate plans.

These estimated damages formed the basis needed to construct damage frequency curves relating percent chance of storm occurrence with specific event damage estimates. The resulting functional relationships permit the prediction of damages for lesser and greater events than the storms of record and the simulated storm events. Annualized estimates of storm damages from all storm events for the FWOFP and FWFP scenarios is the end result of this analysis. Loss of recreation and property values, if applicable are added to the predicted annual damages to establish total average annual damages for both the FWOFP and FWFP alternatives.

All costs of installation, operation and maintenance were based on 2008 prices. The costs of all structural measures were assumed to be implemented over a two-year installation period and to have a 50-year useful life. Thus, a 52 year period of analysis was used along with the mandated 4.625% discount rate for all federal water resource projects for FY08 to discount and amortize the anticipated streams of costs and benefits.

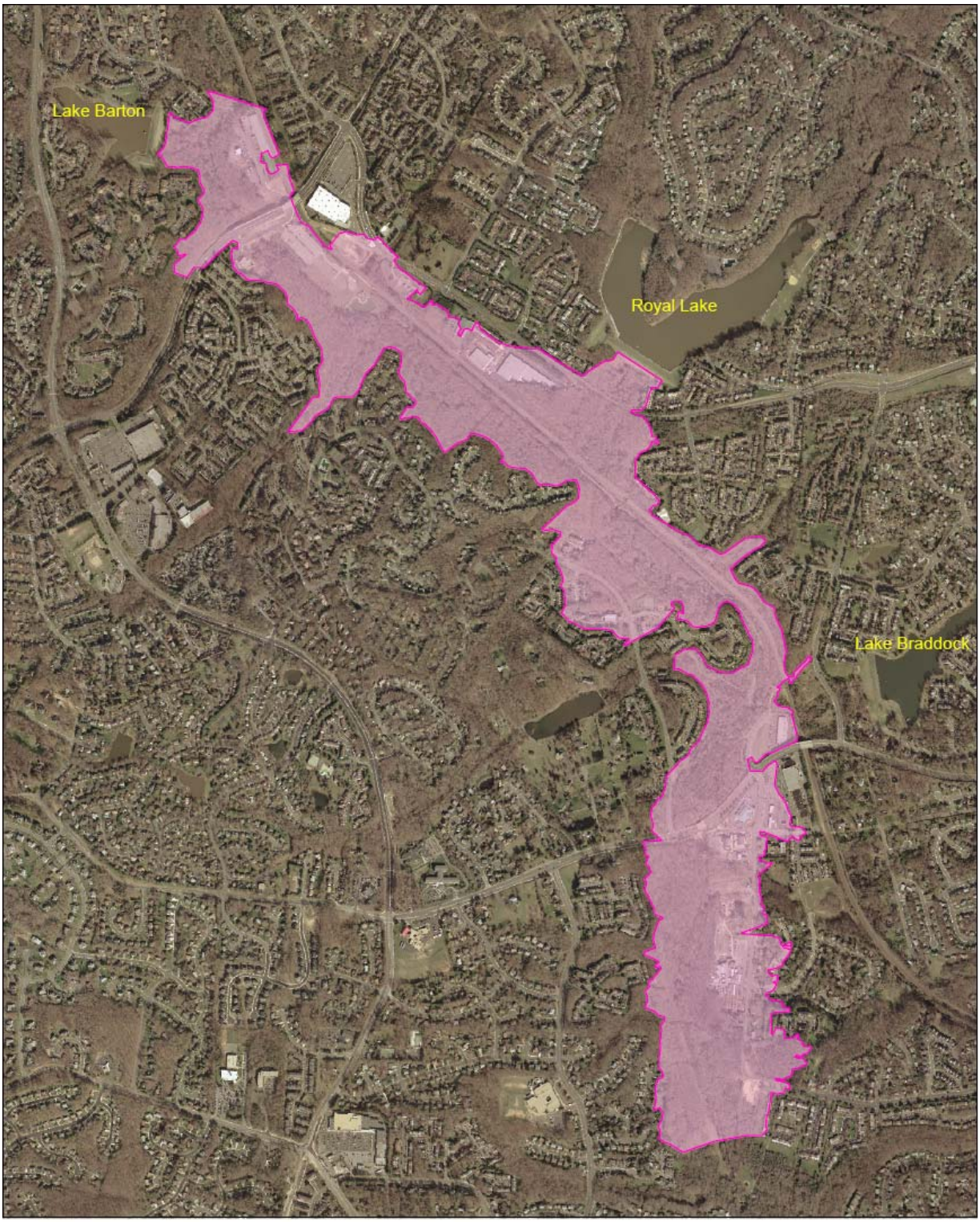
There has been no computation of damage reduction, nor recreation benefits associated with the two alternative because these two alternatives are the same. Therefore, there are no net benefits. The basis for the assumptions concerning FWOFP and FWFP conditions are covered in the plan under "Effects of Alternative Plans" and "Comparison of Candidate Plans."

APPENDIX C

BREACH INUNDATION ZONE MAP

AND

WATER SURFACE ELEVATION DATA



LAKE BARTON - POHICK CREEK 2 BREACH INUNDATION ZONE FROM AMT - ENGINEERING ANALYSIS

0 700 1,400 2,800 Feet

NRCS

Table C1 - Depth of Water Flow over Bridges during Flooding Events (feet)

Stream Crossing	100-year	200-year	500-year	Sunny Day Breach
Roberts Parkway	-	-	1.1	11.4
*VRE Railroad	-	-	-	-
Premier Court	-	-	7.1	17.4
Burke Lake Road	-	-	-	-

*Beneath Roberts Parkway

Table C2 - Results of a Dam Breach Routing for Lake Barton

River Station (#)	**Maximum Water Surface Elevation (feet)**	**Maximum Flow (cfs)**	**Location**
Barton Dam			
27023.83	328.9	60052	Just Below Dam
25570	323.4	54787	Upstream of Roberts Parkway
25363	Multiple Opening		Roberts Parkway
25156	312.0	53984	Downstream of Roberts Parkway
20953	288.3	45405	At Royal Lake
13405	262.3	26269	Upstream of Burke Lake Road
13331	Bridge		Burke Lake Rd
13257	256.7	25953	Downstream of Burke Lake Road
9263	239.4	21855	End of Breach Zone

APPENDIX D

ALTERNATIVES

Figure D1. Lake Barton land ownership and proposed access road.

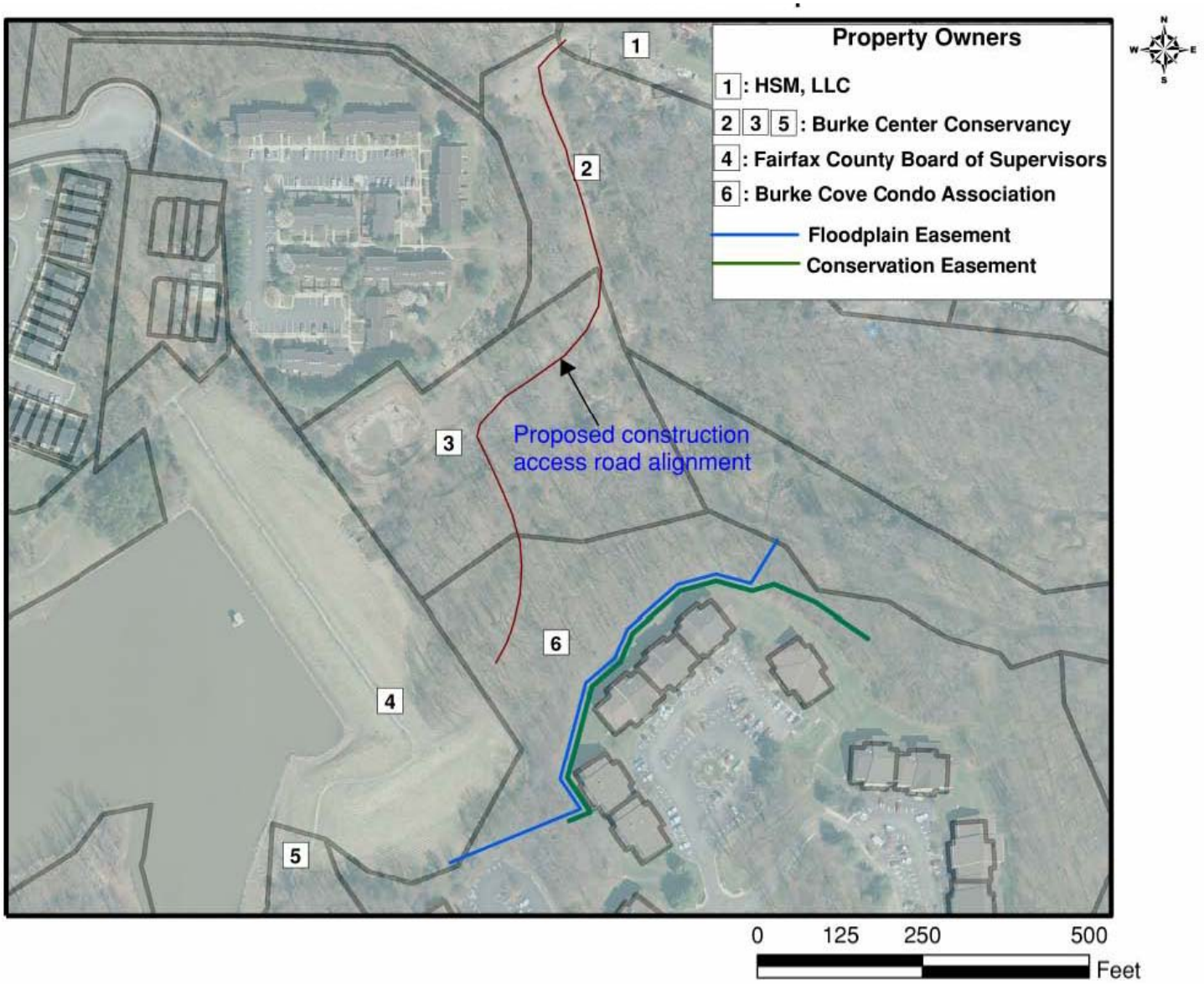


Figure D2. Option 1 Plan View - Armor with ACBs.

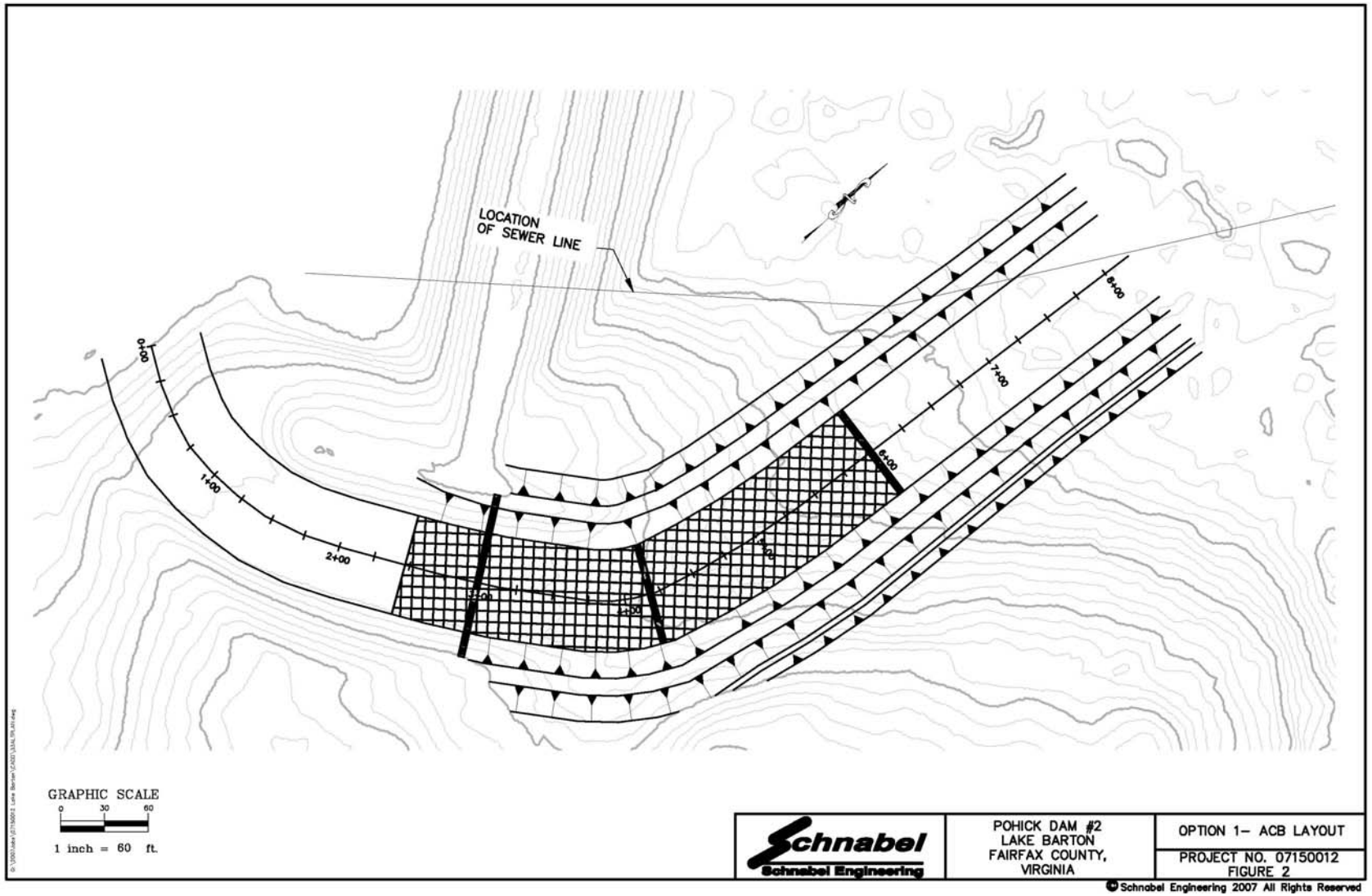


Figure D3. Option 2 Plan View - Two Cutoff Walls.

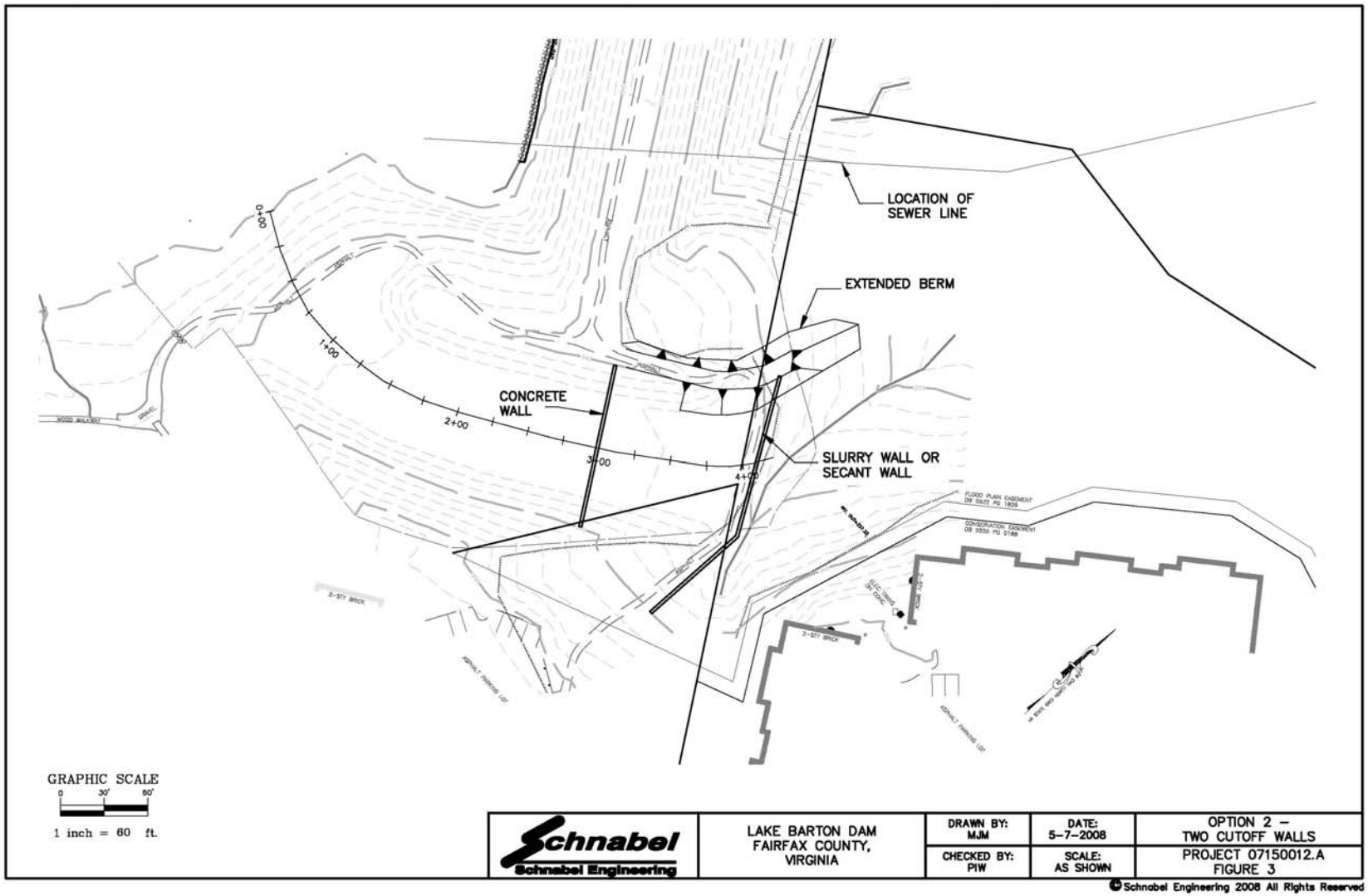


Figure D4. Option 3 Plan View - One Cutoff Wall with ACB Armor

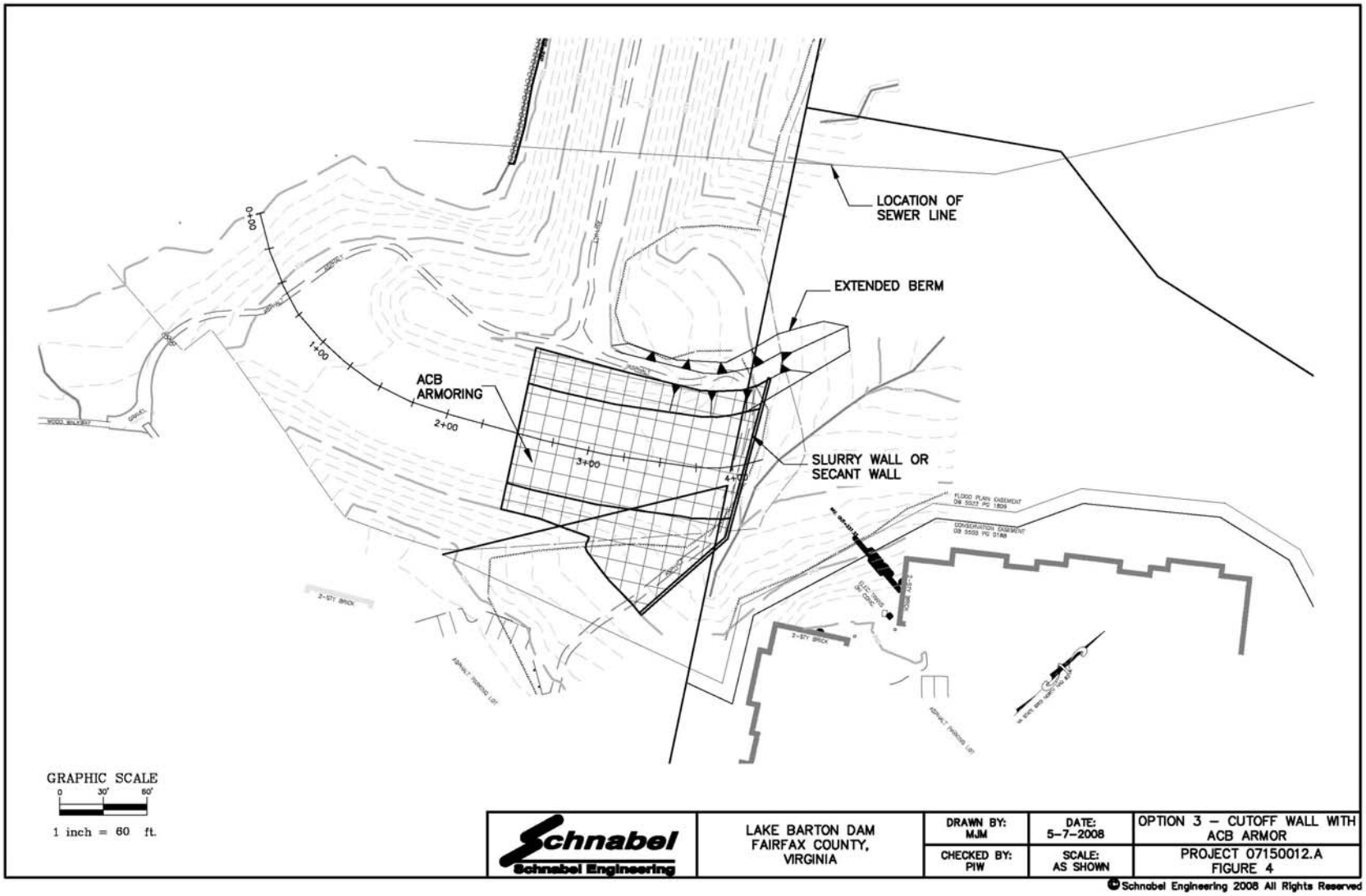


Figure D5. Option 2 and 3 Profiles

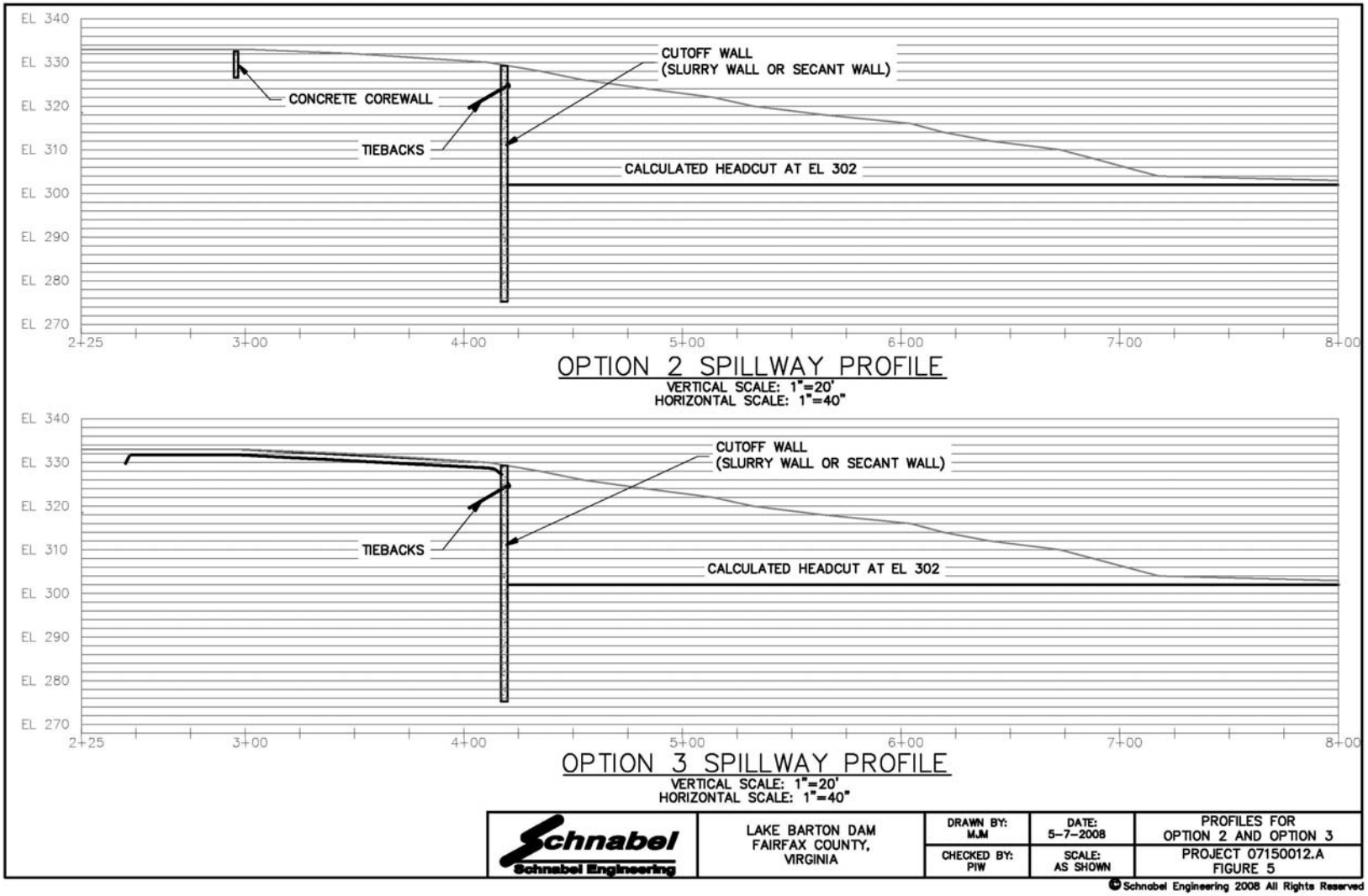


Figure D6. Option 4 Plan View - Realigned ACB Spillway

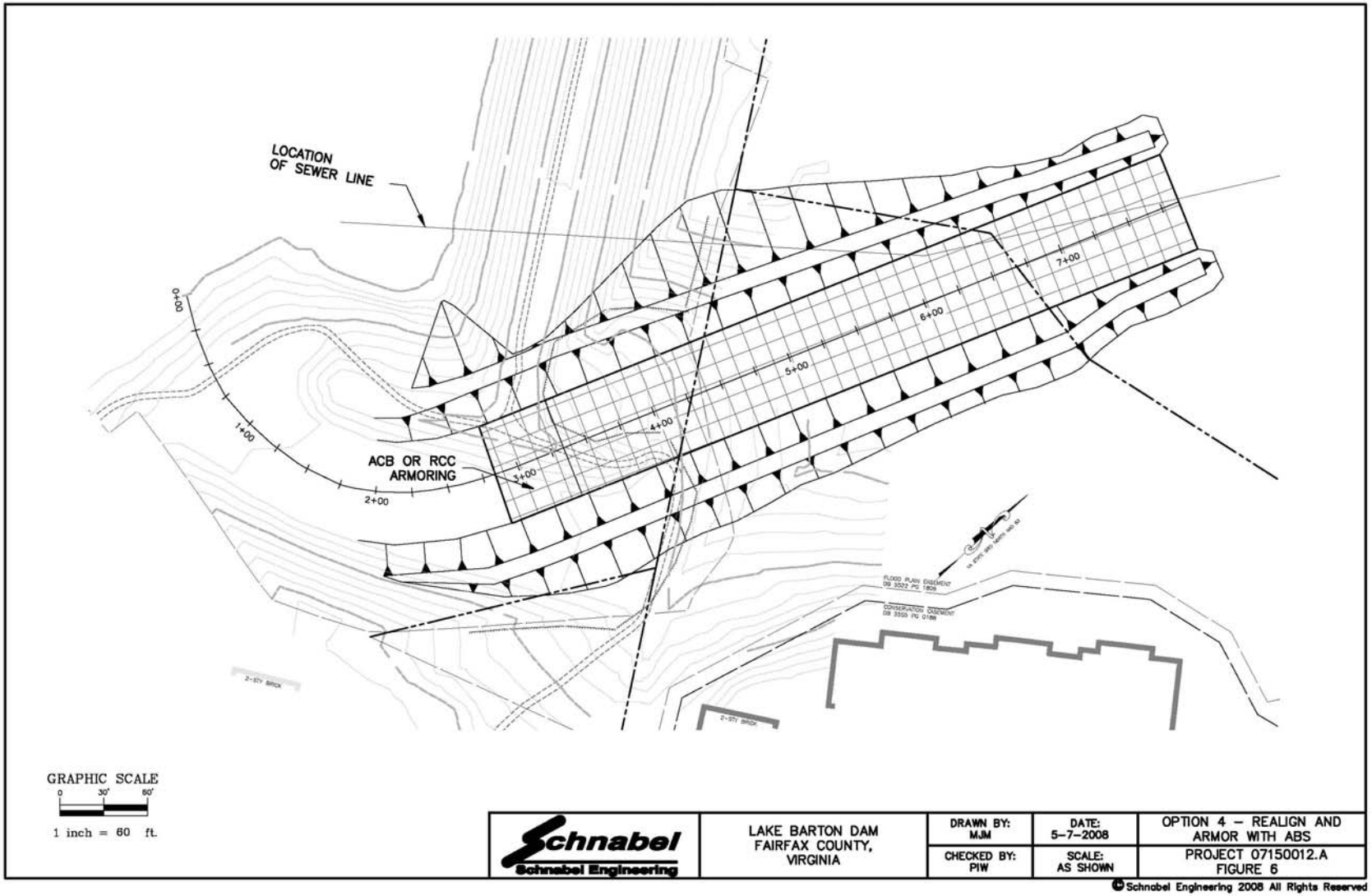


Figure D7. Option 4 Profile

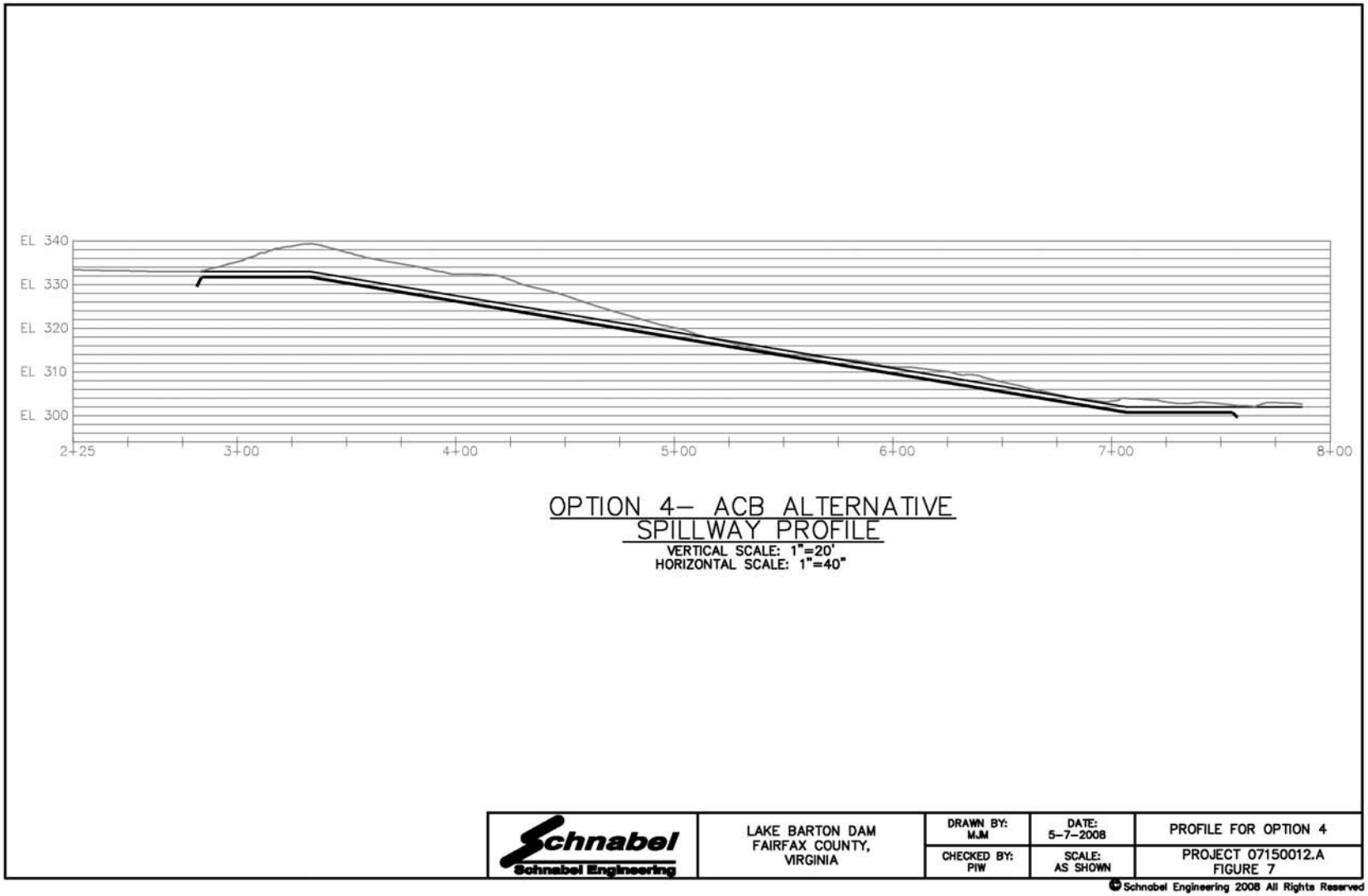
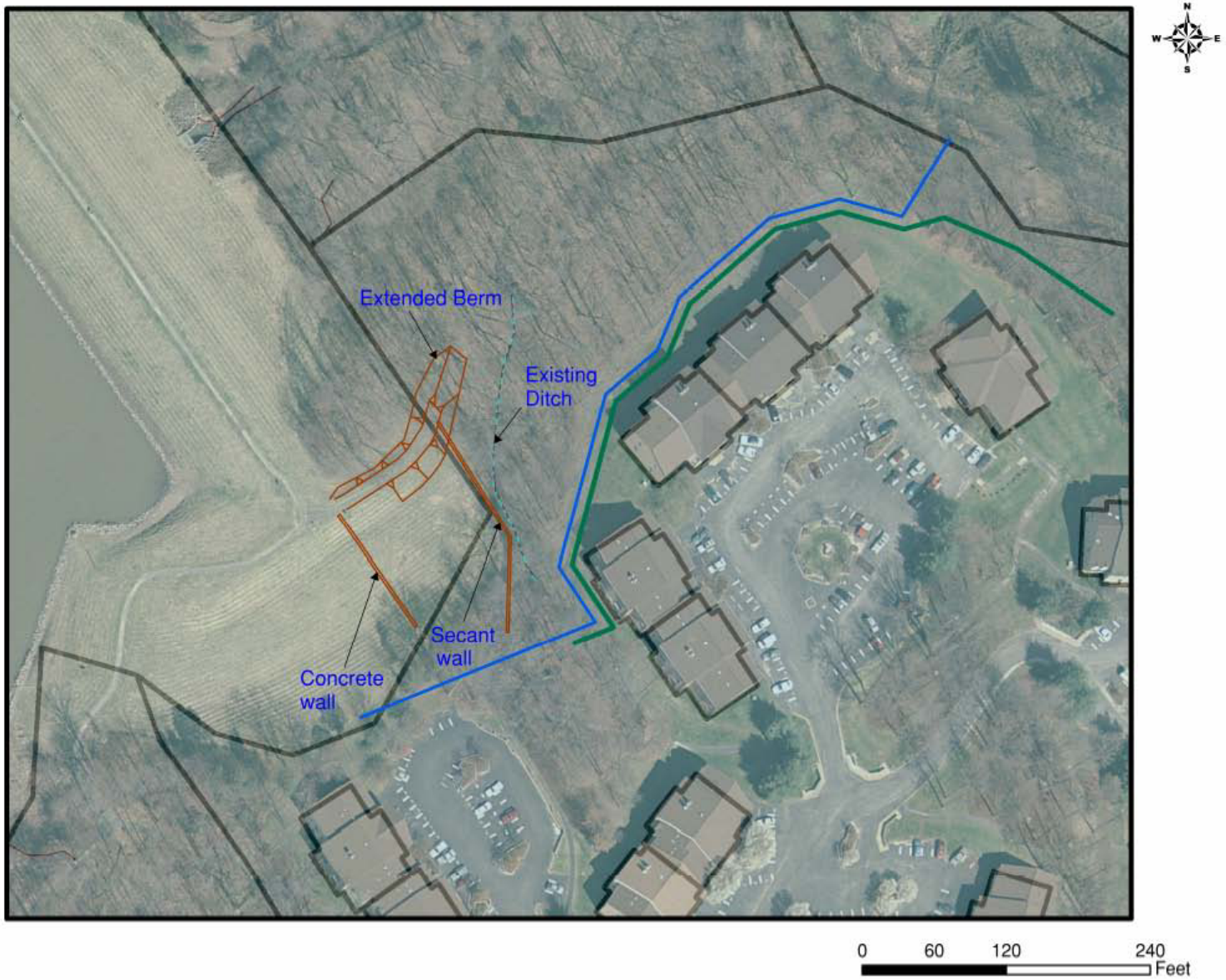
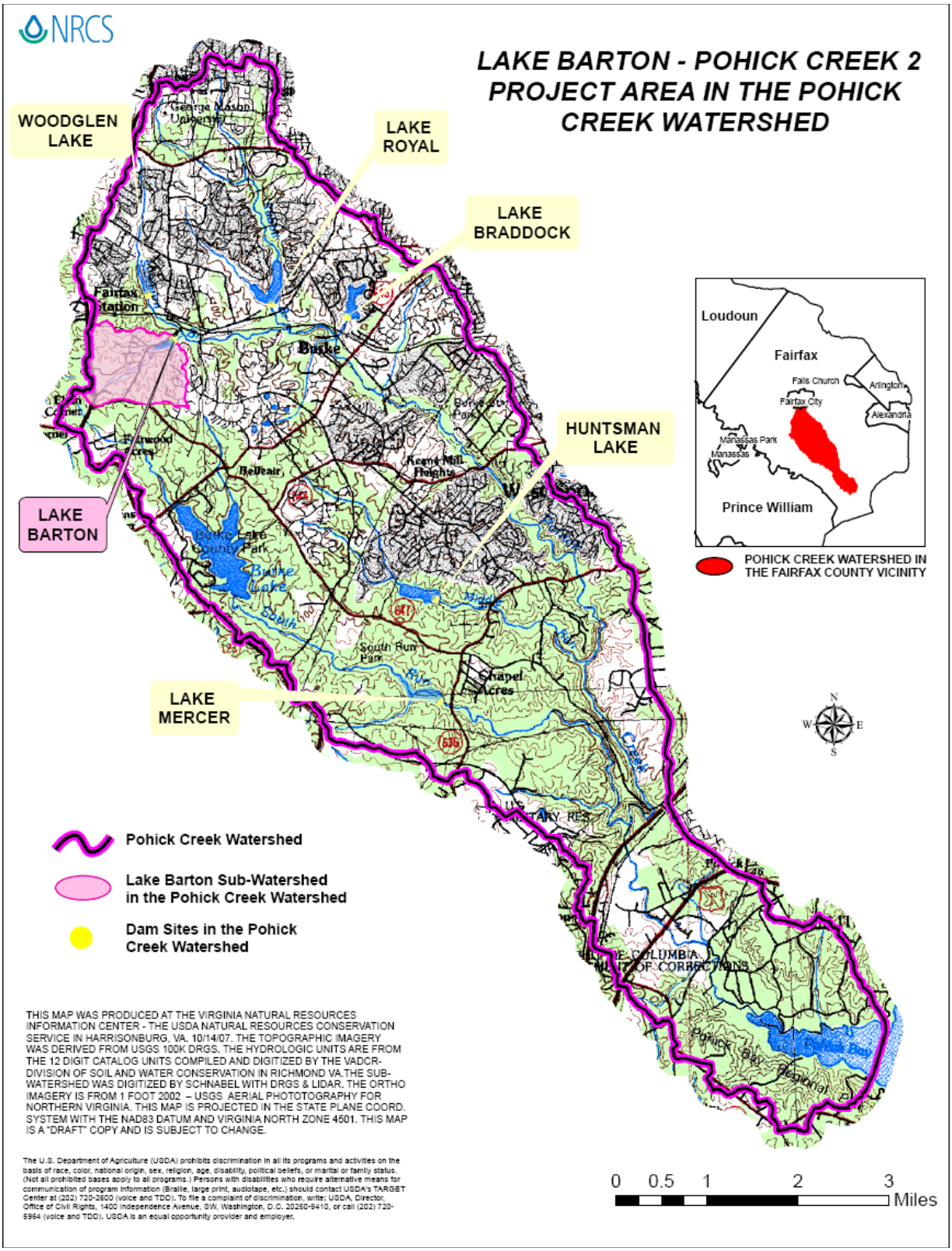


Figure D-8. Recommended Alternative.



APPENDIX E

WATERSHED PROJECT MAPS


NRCS
LAKE BARTON - POHICK CREEK 2 PROJECT AREA IN THE POHICK CREEK WATERSHED
WOODGLEN LAKE
LAKE ROYAL
LAKE BRADDOCK
HUNTSMAN LAKE
LAKE BARTON
LAKE MERCER
Loudoun
Fairfax
Falls Church
Fairfax City
Arlington
Alexandria
Manassas Park
Manassas
Prince William
POHICK CREEK WATERSHED IN THE FAIRFAX COUNTY VICINITY
Pohick Creek Watershed
Lake Barton Sub-Watershed in the Pohick Creek Watershed
Dam Sites in the Pohick Creek Watershed
THIS MAP WAS PRODUCED AT THE VIRGINIA NATURAL RESOURCES INFORMATION CENTER - THE USDA NATURAL RESOURCES CONSERVATION SERVICE IN HARRISONBURG, VA. 10/14/07. THE TOPOGRAPHIC IMAGERY WAS DERIVED FROM USGS 100K DRGS. THE HYDROLOGIC UNITS ARE FROM THE 12 DIGIT CATALOG UNITS COMPILED AND DIGITIZED BY THE VADCR-DIVISION OF SOIL AND WATER CONSERVATION IN RICHMOND VA.THE SUB-WATERSHED WAS DIGITIZED BY SCHNABEL WITH DRGS & LIDAR. THE ORTHO IMAGERY IS FROM 1 FOOT 2002 – USGS AERIAL PHOTOTOGRAPHY FOR NORTHERN VIRGINIA. THIS MAP IS PROJECTED IN THE STATE PLANE COORD. SYSTEM WITH THE NAD83 DATUM AND VIRGINIA NORTH ZONE 4501. THIS MAP IS A "DRAFT" COPY AND IS SUBJECT TO CHANGE.
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0 0.5 1 2 3
Miles

LAKE BARTON - POHICK CREEK 2
SUB-WATERSHED USGS 2002 AIR PHOTO

0 450 900 1,800 Feet

NRCS